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HOFFMANN Machine Company, Inc.

Operating and Maintenance Manual
MS35-SF Double Miter Saw with Dovetail Routing Stations

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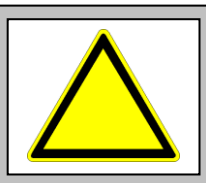
1 Table of contents

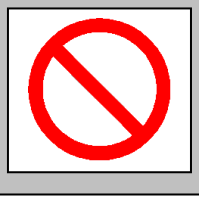
2 Warning and Safety Symbols used in this manual

Operator must read, understand and follow all safety rules, symbols and operating instructions at all times.

The following symbols are used in this operating manual:



Danger Symbol
This symbol warns of a serious danger.
Ignoring the safety instructions will lead to serious bodily harm and/or death!



Warning Symbol
This symbol warns of a possible danger.
Ignoring the safety instructions can lead to serious bodily harm and/or death!

Important Instructions
Instructions listed with this symbol must be strictly adhered to.

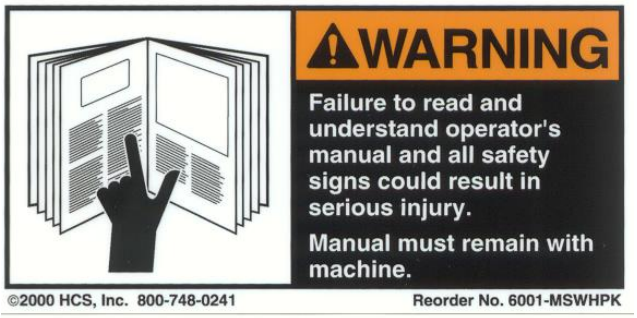
Safety Warning Symbol
This symbol warns of a possible danger.
Ignoring the safety instructions can lead to serious bodily harm and/or damage to the equipment and/or material being processed.

This symbol does not include a warning.
It is used to denote helpful hints and tips to improve the operation and performance of the equipment.

2.1 Warning and Safety Labels attached to machine

A number of important warning labels have been attached to this MS35SF Double Miter Saw for your information and protection.
For your own safety, please take a moment to locate and read all warning labels before operating this machine.
If a label has been removed, defaced or is illegible, please contact Hoffmann Machine Company, Inc. to request a free replacement.

NEVER REMOVE ANY SAFETY OR WARNING LABEL!




⚠WARNING
Do NOT operate this machine.
A safety guard has been removed. Replace guard before operating.
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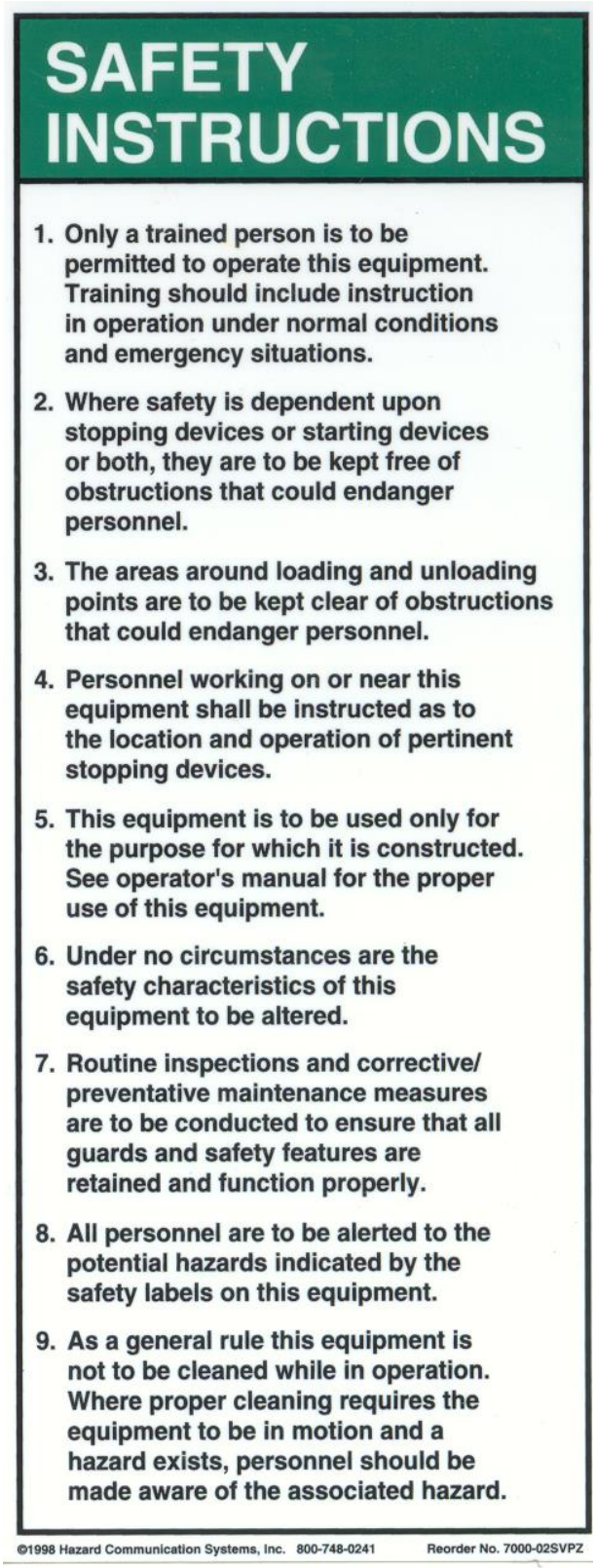
Reorder No. 8000-72WHPU


SAFETY INSTRUCTIONS
1. Only a trained person is to be permitted to operate this equipment. Training should include instruction in operation under normal conditions and emergency situations.
2. Where safety is dependent upon stopping devices or starting devices or both, they are to be kept free of obstructions that could endanger personnel.
3. The areas around loading and unloading points are to be kept clear of obstructions that could endanger personnel.
4. Personnel working on or near this equipment shall be instructed as to the location and operation of pertinent stopping devices.
5. This equipment is to be used only for the purpose for which it is constructed. See operator's manual for the proper use of this equipment.
6. Under no circumstances are the safety characteristics of this equipment to be altered.
7. Routine inspections and corrective/ preventative maintenance measures are to be conducted to ensure that all guards and safety features are retained and function properly.
8. All personnel are to be alerted to the potential hazards indicated by the safety labels on this equipment.
9. As a general rule this equipment is not to be cleaned while in operation. Where proper cleaning requires the equipment to be in motion and a hazard exists, personnel should be made aware of the associated hazard.
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Reorder No. 7000-02SVPZ

3 Intended Use and Operation

The HOFFMANN MS35SF Double Miter Saw is designed solely for length cutting and dovetail keyway routing of solid wood and wood-related materials.

The machine may not be used for any other processes or materials.

All work pieces must fall within the following dimensional parameters:

Dimension	MIN (mm)	MAX (mm)
Width	**10**	**92**
Thickness	**10**	**100**
Length	**100**	**unlimited**

Using the HOFFMANN MS35SF Double Miter Saw for any other operation or material can result in unforeseen dangers and is hereby forbidden!

The manufacturer is not liable for any damages resulting from unapproved use or operation of the equipment.
The operator is solely responsible for any such risks and dangers.

The equipment may not be copied or dismantled for the purpose of duplication of all or part of the design or operation.

Technical changes to this equipment require the prior written consent of the manufacturer.
Any changes, additions, removal of components, etc. not expressly permitted in writing by the manufacturer will immediately void the warranty. Any risks, dangers or damages resulting from unauthorized modifications are solely the responsibility of the user/operator.

Adjustments on moveable components of the HOFFMANN MS35SF Double Miter Saw during the operating process are only permitted if such adjustments are required for the proper operation of the equipment and if such adjustment procedures are outlined in this manual. All pertinent safety rules and regulations are to be strictly adhered to.

3.1 Transportation and Installation

Only trained and qualified personnel may transport, set-up and install this equipment and any auxiliary components.

You are required to assure a safe, clean and suitable environment for this equipment and its operation.

3.2 Technical Changes and Maintenance

Technical changes or alterations of any kind are only permitted if the prior written authorization from Hoffmann Machine Company, Inc. has been secured.

Never remove safety guards and shields, remove or by-pass safety devices, switches, sensors, use or install tooling other than originally supplied.

The manufacturer is not liable for any injuries or damages caused by unauthorized changes, removal or add-ons to this equipment.
Only trained, qualified personnel may perform installation, set-up and maintenance procedures as well as replacement of parts or components of any kind.

3.3 Operator and Maintenance Personnel

Machine operator and maintenance personnel may only perform activities described in this manual.
Persons working on or with this machine must be at least 18 years old, they must be thoroughly familiar with this operating manual and they must adhere to all local safety rules and regulations. All OSHA specified rules must be followed if applicable.

Persons working on or with this machine must wear suitable clothing designed to avoid entrapment in rotating machine components.
No loose fitting clothes e.g. ties or shawls, or bracelets, wristwatches, necklaces, etc. may be worn when operating this machine.
Persons with long hair must tie their hair securely and wear an appropriate hair covering to avoid entanglement.

3.4 Equipment Owner's Responsibilities

The owner of the equipment must make this operator manual available to all machine operators and maintenance personnel.
The equipment owner must assure that all operators and maintenance personnel are qualified to work on this equipment and that they have read and fully understand this operator manual, especially all sections pertaining to possible dangers and safety rules.

The owner must assure that all areas of responsibility, including set-up, operation, maintenance, etc. – are clearly defined and explained.
All responsibilities must be assigned to and understood by all involved persons to avoid the risk of injury and /or damage to material.

The owner is responsible for the adherence to all applicable safety rules and regulations.
The owner is responsible for the proper and safe condition of the machine; he is further responsible for the proper installation and set-up and he must provide a safe and secure work environment.
The owner must be familiar with and is responsible for the adherence to any and all local and national safety rules and regulations pertaining to this equipment.
The manufacturer is not liable for any injuries or damages as a result of non-compliance with, or adherence to, applicable safety rules and regulations.

If the operator and/or maintenance personnel do not understand English, the owner must provide a properly translated operator manual to assure the safety of all personnel.

3.5 Change of Ownership

In case of sale of this equipment all components, tools, manuals, safety instructions, accessories as well as any electronic or software updates you have originally received with the machine must be included.
This includes any and all operator manuals, maintenance instructions, equipment or components replacement parts, etc.

4 Machine Description

4.1 Terminology used in this manual

- MS 35-SF / 7.148 = **HOFFMANN Double Miter Saw model MS 35-SF**
- Bit = Hoffmann dovetail router bits in sizes W-1 / W-2 / W3
- Workpiece = User supplied moulding profiles made of wood or wood related materials
- Dovetail Key = HOFFMANN Dovetail Keys

4.2 Machine Description

HOFFMANN Double Miter Saw MS 35-SF consists of:

- HOFFMANN Double Miter Saw model MS 35-SF
- Adjustable table supports (2)
- Infeed and outfeed table extensions
- Adjustment gauge for router bits
- Length stop 45° with locking lever
- Length stop system DMS 10
- Toolkit
- Operating manual

The HOFFMANN MS35SF Double Miter Saw is designed to miter-cut to length moulding profiles made of wood or wood related materials and to rout dovetail keyways into the mitered ends.

Adjustments for material length and length and position of routing strokes allow the operator to process different moulding styles.

Machine performance:

- Up to 100 cycle per hour (depending on operator performance, material condition, work flow, etc.)

Work stations

- 2x saw motor, 3 phase @ 1,8 kW
- 2x router motor, single phase @ 500W

Accessories and Options:

- Flip Stops
- Horizontal workpiece clamps, pneumatic
- Fence extensions (for tall material)

5 Technical Data and Specifications

Electrical Power Supply	
Supply voltage	230 V / 3 phase / ground supply wires: 3x 4mm²
Frequency	60 Hz
Input Amperage	14 A
Total power requirement	6 kVA
Safety Code	IP 54
Supply line breaker	16 A slow acting
Saw motors	2x three-phase motor (1,8 kW) 2800 rpm with electronic brake BR VB230-25L
Router motors	2x router motor Type UWC-24-R (500 Watt) 24000 rpm
Saw blades	Saw blades, diameter 350mm x 3,4 / arbor size 30mm 84 teeth, carbide tipped, HOFFMANN brand
Router bits	2x Hoffmann Dovetail Router Bits, size W1 / W2 / W3
Pneumatics	
Compressed air supply	6 bar – 90 psi (max. 8 bar)
Volume requirement	Up to 1.5 cubic feet per cycle
Air	lubricated
Filter mesh size	5µ
Other Specifications	
Work piece material	Wood and wood related materials
Machine performance	Up to 100 cycles/hour (depending on operator, material flow, material quality, etc.)
Weight	approx. 1430 lbs.
Dim. Length x depth x height	approx. 57” x 67” x 38”
Noise emissions:	
Sound Pressure Level (SPL):	84,1 dB
Sound Pressure Level at the Source:	102,1 dB
Machine Environment	
Temperature range for operation	59.... + 104 F
Temperature for storage / transport	32.... + 140 F
Temperature change during operation	max. 20 F
Temperature change during storage / transport	max. 40 F
Relative humidity according to DIN 40040	15... 80 % without condensation at 95 F
Air pressure during operation	860-1060 hPA (bar)
Air pressure during storage / transport	860-1060 hPA (bar)

6 Operator Environment

The work areas for the operator have been designed with ergonomic principles in mind.

The machine owner is responsible for ease of access, adequate lighting, fresh air supply, etc.

Specific work areas for this machine are:

⇒ In front of the machine to load and unload work pieces and to adjust settings.

⇒ In front of the operator panel to start the machine and to initiate the machining cycle.

⇒ At the back of the machine for maintenance procedures only.

Rules for safe work areas:

⇒ The work area must be free from clutter and must be kept neat and unobstructed. Local and national safety rules, including but not limited to all applicable OSHA Rules must be adhered to.

⇒ Access space of no less than 24” shall be available on all sides of the machine for set-up and maintenance procedures.

⇒ All electrical and compressed air supply lines must be securely fastened in accordance with all local and national safety codes. Secure all wires, hoses and lines and do not allow lines to lie on the floor as they may present a trip hazard to the operator. Supply lines, wires and hoses must be inspected periodically and replaced if any damage is observed.

⇒ The environmental conditions must meet the guide lines given under section 5 “Technical Date and Specifications”.

7 Potentially Dangerous Areas

Especially dangerous areas of the machine are:

- Areas around the miter cutting operations
- Areas around the dovetail routing operations

During set-up and maintenance procedures, the following dangers exist in the above areas:

Danger of entanglement and pinching!

During set-up and maintenance work, especially when access doors must be opened, additional dangers of entanglement or pinching on belts, sprockets, saw station, router station, drilling station, etc. are present. Do not wear loose fitting clothing. Long hair must be covered with a hair net.

Danger of cutting of hands and fingers!

All sawing, routing and drilling areas present dangers of cutting of hands and fingers.

Danger of amputation!

All sawing areas present the danger of severe cutting or amputation of fingers.

8 Potential Sources of Danger

8.1 Unapproved Use

Unapproved procedures are:

- Processing work pieces made of material other than solid wood or wood related material such as MDF, particle board, plywood, etc.
- Operating of the machine by more than one operator at the same time.

Unapproved use and/or misuse of the machine can result in the following:

⇒ Minor to severe injuries to the machine operator and/or bystanders.

⇒ Damage to the machine and/or work pieces.

8.2 Mechanical Dangers

⇒ During operation of this machine, saw blades, router bits and drive belts rotate and sections or components of the machine are being moved and adjusted pneumatically, mechanically and/or electronically.
These components can cause severe injury or death if hair, clothing or extremities become entangled.
Never reach into the machine during operation!!

⇒ Only make adjustments during operation if these adjustments are absolutely necessary and if the procedure is fully outlined and approved in this operator manual.

8.3 Defective equipment

If the machine does not function properly and if the fault cannot be rectified immediately, the equipment must be shut down by the person responsible for the operation.

Signs of defective are:

- ⇒ The machine shows signs of mechanical damage.
- ⇒ Electrical wires or cables are damaged.
- ⇒ Pneumatic air lines are damaged.
- ⇒ The machine was stored or has not been in use for an extended period of time in an unsuitable environment, for example in high relative humidity or too high or too low temperature.

8.4 Electrical Dangers

- ⇒ Dangerous electrical current is present in many different locations inside of the machine when the main power is switched on. Do not remove any covers or components unless the written guidelines instruct you to do so and you can do so without the use of a key or a tool. Warning symbols show areas and terminals where electrical currents may be present.
- ⇒ Be aware that if an uninterruptable power supply (UPS) is installed, some areas inside the machine may have electrical current present even if the main power is switched off.
- ⇒ Never use damaged or worn cables, wires, supply lines or electrical components or parts on this machine.
- ⇒ Only trained and authorized Service Technicians shall be allowed to replace parts on this machine.
- ⇒ Switch off and lock the main power supply before starting any maintenance procedures. Always follow proper Lock-Out / Tag-Out Protocol and all applicable OSHA Rules and Regulations.

8.5 Cleaning agents and chemicals

- ⇒ Review and observe all safety rules provided by the chemicals manufacturer while working with cleaning agents and other chemicals. Read and understand the Material Safety Data Sheets (MSDS) provided by the manufacturer and follow all safety precautions described therein.
- ⇒ Always wear proper protective gear, including safety glasses and gloves, when using cleaning agents, degreaser, etc.
- ⇒ Do not eat, drink or smoke when using chemicals.
- ⇒ Dispose of used cleaning agents and other chemicals in accordance with all State and local laws.

8.6 Remaining Risks

If the operator does not pay attention, it is possible to squeeze ones' fingers when loading and pre-clamping a work piece. The maximum air pressure is limited to 2 bar and the maximum clamping force is limited to 60N.

9 Noise Emissions

The machine generates a work place Sound Pressure Level (SPL) of 84.1 dB(A) when processing a work piece.

The Sound Pressure Level at the Source (Lw) is 102.1 dB(A) when processing a work piece.

Local conditions could increase the SPL, which could cause hearing damage or loss.

The machine owner must provide suitable protective gear to protect employees from hearing damage, as required by local and state laws and OSHA regulations.

Measurement margin of error = 4dB

Noise emission was measured according to EN3746

Notes:

All listed values are measured noise emission levels – they are not necessarily safe working environment levels.

Local conditions, the proximity of walls and ceilings, the type of wall, ceiling and floor material as well other equipment in close proximity could affect the total noise emissions at the work place.

The SPL values are provided as information only and it is recommended that the machine owner measure the actual local noise levels after installation.

Machine is owner is responsible for providing suitable protective gear depending on total noise emissions and local and state laws and regulations.

All OSHA regulations pertaining to noise protection are to be adhered to.

10 General Safety Rules in accordance with DIN 1870-9

DANGER: The following safety rules must be followed at all times!

Read and understand this operator manual thoroughly and store it in a safe place for future reference.

Heed all safety warnings and all applicable rules and regulations, including but not limited to all applicable OSHA rules, when operating or performing maintenance or set-up procedures on this equipment.

1. HOFFMANN Service Technicians will instruct machine operators in the proper use of this equipment upon installation and set-up.
2. The HOFFMANN MS35SF double miter saw may only be operated by trained personnel who have read and understood the operator manual. The manual shall be kept in a safe location, easily accessible for future reference.
3. Only trained and authorized persons may be allowed to operate the HOFFMANN MS35SF double miter saw. Untrained or unauthorized persons are to be kept away from the machine area. The operator(s) must disconnect the electrical and pneumatic power supplies when the machine is not under their control.
4. All applicable Safety Rules, including all applicable OSHA rules, are to be adhered to.
5. Only trained and qualified persons may perform work on the electrical components of the machine.
6. Before connecting the HOFFMANN MS35SF double miter saw to the electrical power supply, all electrical specifications must be confirmed with the machine's data sheet.
7. Never disable, remove or bypass any safety features, guards or devices!
8. HOFFMANN MS35SF double miter saw may only be energized if no danger for persons or materials is present.
9. All safety features, guards and safety devices must be checked for proper function at least every three months (always follow recommended maintenance schedule).
10. Upon discovery of any damage to any part or component of HOFFMANN MS35SF double miter saw, the machine must be shut off and locked to prevent further operation until all damager and/or faults are repaired.
11. The operator must inform his or her supervisor immediately upon notice of any damage or fault on the machine.

12. If the HOFFMANN MS35SF double miter saw has been moved, or has been out of service for an extended period of time, all safety features, guards and safety devices must be checked and repaired or replaced if necessary before the machine is put back into operation.
13. Operator must always wear tight fitting clothes without loose straps, ties, etc. to avoid the danger of entanglement. Long hair must be tied together and covered with a hair net.
14. Always wear eye and ear protection when operating this equipment! Do not wear gloves when operating this equipment – danger of entanglement!
15. Ensure adequate light conditions on and around the machine, with an ambient temperature of around 70 degrees Fahrenheit.
16. Keep the floor around the machine free from debris, saw dust or wood chips, etc. Larger cut-offs and waste material may not be left in the machine and must be removed manually in compliance with all applicable safety rules!
17. Tooling Change:

    Danger – cutting tools can injure and cut! Safety gloves are recommended when handling saw blades and router bits.

    Saw blades shall be compliant with prEN 847-1:2011.

    Do not change motor speeds or tooling speeds on saw, router or drill heads.

    All tooling (saw blades, router bits) is to be inspected daily for sharpness and breakage – dull and/or defective tooling is to be replaced before operating the machine.
18. Do not expose this machine to moisture or water and do not expose this machine to flammable liquids or gases.
19. Route and place all electrical and pneumatic supply lines to avoid the possibility of creating a trip hazard. All supply lines shall be adequately protected from accidental mechanical damage.
20. Disconnect the machine from all electrical and pneumatic power sources when performing any maintenance, repair or set-up procedures. Follow all applicable OSHA Lock-Out – Tag-Out Procedures.

Guidelines for safe work practices in accordance with DIN1870-9:2000 sub-section B:

It is important for all machine operators to be:

a) Adequately trained in all set-up and operational procedures of the machine

b) Informed about factors which influence the noise emission of equipment, e.g.
i) Saw blades
ii) Optimum saw blade speed (rpm)
iii) Maintenance of saw blades and machine

c) Informed about factors which could contribute to a dust explosion, e.g.

i) Type of material being processed

ii) Importance of the individual dust collection ports

iii) Proper adjustment of dust collection guide panels

IV) Activation of the central dust collection system before starting the machine

d) Informed about the condition of the environment around the machine, e.g.

i) Floor shall be level, clean and free from debris, cut-off and other trash.

ii) There shall be adequate common as well as task lighting in place.

iii) The raw material and the finished material shall be placed close to the machine in a position to allow for proper work flow.

The operator shall always wear suitable personal protective gear, e.g.

- Hearing protection
- Breathing protection to avid breathing of wood dust
- Gloves should be worn whenever tooling is handled or changed.
- Saw blades should be transported in a saw blade carrier.

iv) The machine should be switched-off when not in use.

v) Any faults, error messages or damage to the machine must be reported to a supervisor immediately.

vi) The operator shall be trained in the proper procedures to remove cut-off, waste, dust and debris from the machine to reduce the risk of fire.

vii) The operator shall follow all rules and guidelines in regards to tooling maintenance, sharpening and installation.

viii) The operator shall not exceed the maximum speed engraved on the saw blades.

ix) The operator shall only use correctly sized and properly sharpened saw blades.

x) The operator shall assure that all saw spindle discs and nuts are of adequate size and condition.

xi) The operator shall not remove cut-offs or debris while the machine is in operation.

xii) The operator shall assure that all safety features, guards and safety devices are checked and repaired or replaced if necessary before the machine is put into operation.

11 Safety Devices

A number of safety devices have been designed and installed on the HOFFMANN MS35SF double miter saw to provide the best possible protection for the operator.

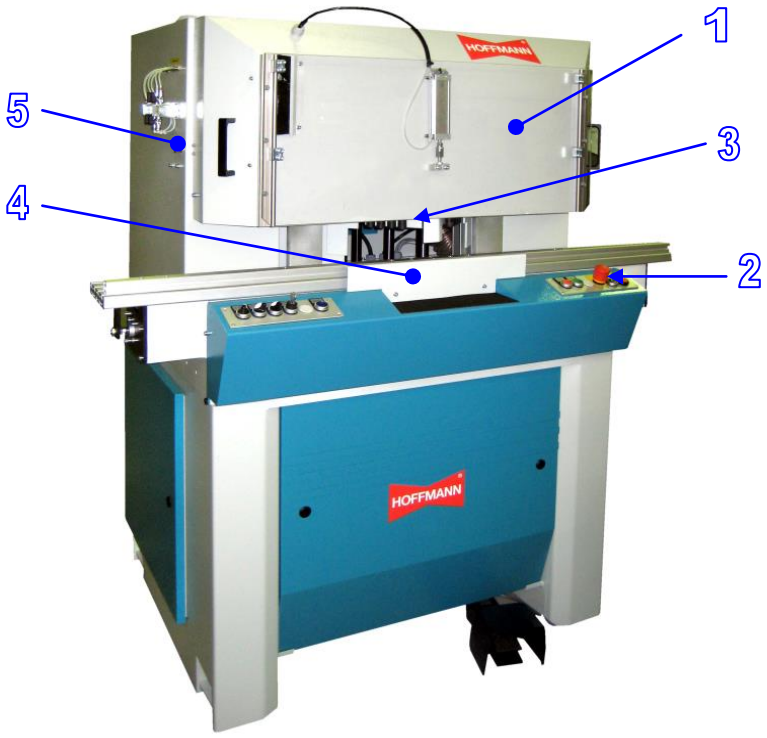
Warning: Strictly follow all safety rules!

1. The machine features safety shields, doors and guards which must be in place and locked when operating the equipment.
2. Danger of personal injury and/or death exists if the safety shields, doors and guards are not place during operation.
3. Safety devices shall not be removed, damaged or by-passed.
4. Any unauthorized modifications, including but limited to by-passing of safety switches or sensor, immediately void the warranty on the equipment.
5. All safety features, guards and safety devices must be checked every time for proper operation before the machine is started and operated.
6. If any damage or malfunction on any safety feature, guard and safety device is found, it must be repaired or replaced before the HOFFMANN MS35SF double miter saw is put into operation

11.1 Safety Devices

The machine is equipped with a variety of safety guards, shields, switches and sensors. These devices are for the protection of the operator and other persons near the machine.
NEVER REMOVE OR DISABLE ANY SAFETY DEVICES!!

Safety devices may only be temporarily removed if necessary for approved maintenance or set-up procedures.
If safety devices have been removed or deactivated, they must immediately be re-installed and re-activated. Before the machine is put back into operation, all safety devices must be thoroughly checked for proper operation.



Pos.	Description
1	Pneumatic front cover – closed during machining cycle
2	Emergency-Stop button on front console. Pushing the E-Stop immediately stops the machine. The material clamps stay in place. The E-Stop button remains in a locked position until unlocked by operator. To unlock, turn and pull-out knob
3	Material clamps with low-pressure pre-clamp circuit
4	Metal shields covering machining area.
5	Front cover with time delayed release bolt

In an emergency, one can also use the power switch (on right side electrical cabinet) to stop the machine!

11.2 What to do in an Emergency?

In an emergency situation, push the E-Stop button (see red arrow) of the Hoffmann MS35SF double miter saw!

The fault or danger must be rectified or removed after emergency-stop activation and before the machine is put back into operation.

Use the E-Stop button ONLY in an emergency!
Do not use the E-Stop button for regular or controlled shut-down as this may cause operational faults in the control system.

11.3 Safety device check list

All safety devices must be checked for proper function.
upon installation and sign-off and according to the maintenance schedule in this operator manual.

All safety switches, interlocks, sensors and emergency-stop buttons must be checked and tested daily.

Never damage, remove or by-pass any safety device, interlock switch, sensor or guard.

⇒ The machine is equipped with a red E-Stop button on the control panel.
⇒ Pushing the button in will active the emergency stop sequence.
⇒ Use the E-Stop button only in an actual emergency and to test the function of the button.
⇒ Do not use the E-Stop button for a regular and controlled shut-down of the machine.
⇒ The machine is equipped with safety switches, interlock and sensors which will interrupt the machine operation if triggered.

Testing the Emergency-Stop Button:

⇒ Start the machine and press the red E-Stop button. All functions of the machines must cease immediately and the saw blades must return to their home position. The material clamps must remain in the extended (clamped) position.

⇒ Release the E-Stop button before restarting the machine.

12 Warranty and Liability

The „Hoffmann Machine Company, Inc. Terms and Conditions of Sale “are the basis for all dealings between the manufacturer and the customer. These Terms have been made available to the customer during the proposal and order processing stage.

In addition to the complete Terms and Conditions of Sale, any of the following conditions immediately voids the warranty and releases the manufacturer from any and all liability.

- ⇒ Unapproved use of the machine.
- ⇒ Improper installation, start-up, maintenance or operation of the machine.
- ⇒ Operation of machine with defective, missing or by-passed safety devices of any kind.
- ⇒ Non adherence to any rule or regulation in this operator manual.
- ⇒ Unauthorized changes to the machine or any of its components as well as unauthorized changes to control parameter (changes to PLC program, etc.)
- ⇒ Insufficient supervision and maintenance of parts subject to normal wear and tear.
- ⇒ Damage due to unforeseen circumstances, acts of God, etc.
- ⇒ Improper or unauthorized repairs.

13 Transportation and Installation

This machine may only be transported, set-up and installed by qualified service technicians having received written authorization from Hoffmann Machine Company, Inc. to perform such work.

Danger of Injury!
HOFFMANN MS35SF can tilt or fall over during transportation!

Only use properly equipped and sufficiently sized equipment to lift and transport the MS35SF. Refer to the machine weight under section „Technical Data“

When transporting the MS35SF

- **Wear approved safety shoes with steel toes!**
- **Wear safety gloves!**
- **Consider the weight of the machine and use appropriate equipment!**
- **Lift MS35SF only as high as necessary!**
- **Lift MS35SF only on lift points marked on drawing below!**

13.1 Transportation

The MS35SF may be lifted and moved with a pallet jack or fork lift having a lifting capacity of at least 2,000 lbs.

Only lift the machine at the marked lift points and secure it against tipping or tilting during transport if necessary.

Electrical wires and compressed air supply lines as well as mechanical components on the underside of the machine shall not be damaged during lifting or transportation!!

Removal of shipping bracing

The machine is shipped secured to shipping timbers and covered with shrink-wrap. All manuals, toolkits and machine components are included.

The machine may be secured to a shipping pallet with angle brackets and bolts.

Remove machine covers on both sides and remove all angle brackets and bolts securing the machine base to the shipping timbers and/or pallets.

Remove shipping straps and brackets securing the electrical enclosure.

Check immediately upon receipt:

⇒ Does the shipment correspond to the packing list?

⇒ Does the shipment correspond to the purchase order and order confirmation?

⇒ Is the shipment complete and without any damage?

Immediately report any shipping damage in writing to the carrier and to the manufacturer.

13.2 Installation and Set-Up

HOFFMANN MS35SF must be installed plumb and level in all directions.

The load capacity of the floor must be at least 2 t/m². All machine legs have leveling bolts and must be adjusted to have full contact with the floor.

Check all floor levelers and adjust if necessary. All levelers must have contact with the floor.

Using a machinist's level, the machine must set plumb and level in all directions.

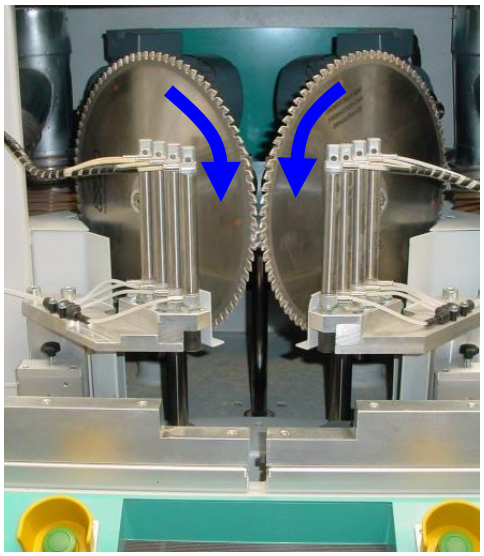
Make all electrical and pneumatic connections per the enclosed circuit diagrams and according to all local and state laws.

See section „Electrical and compressed air connections"

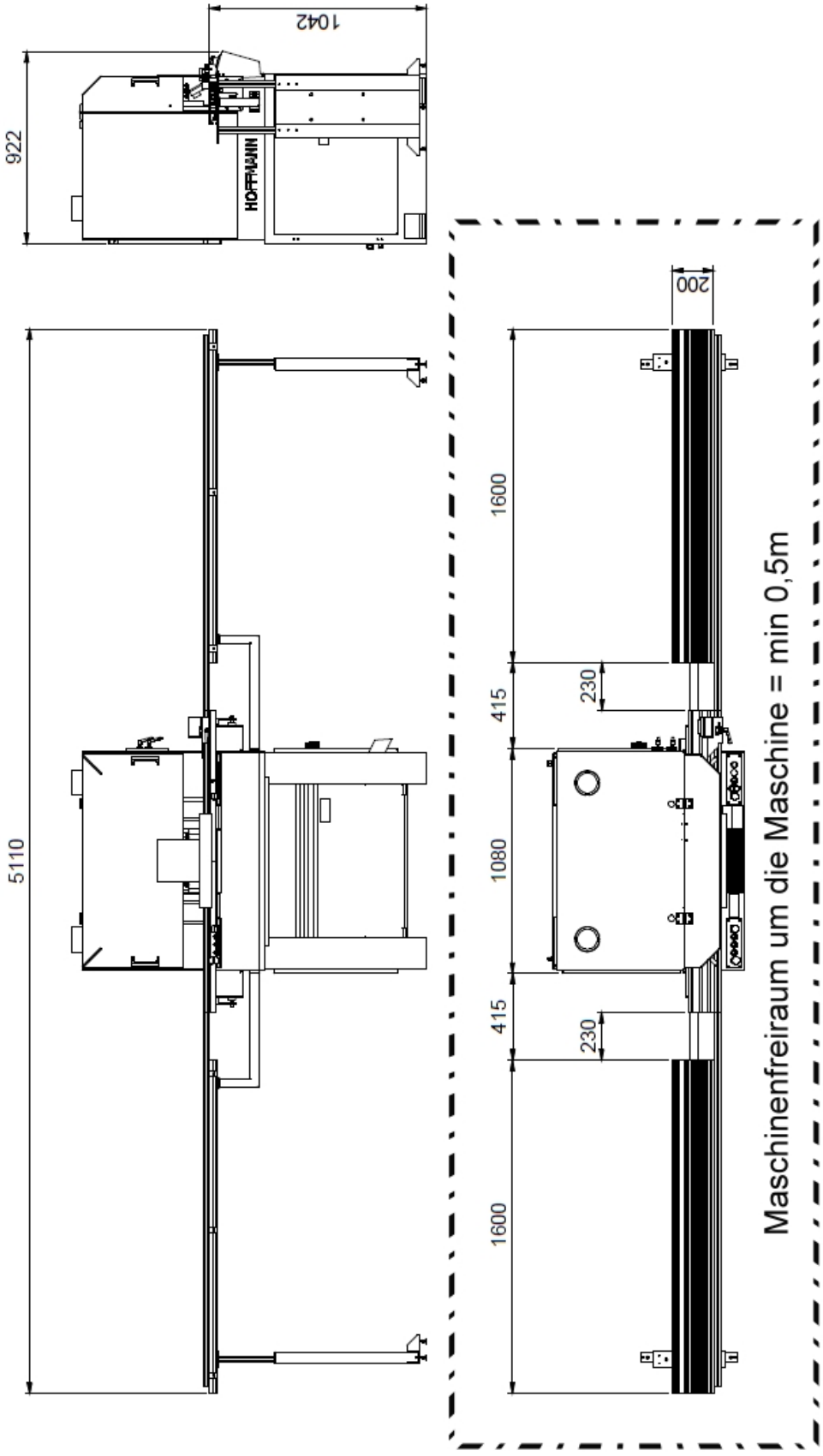
When first connected to electrical power source, the proper rotation of the saw blades must be verified.

Turn on control panel by pushing green button (1).

Momentarily push the Motor Start (3) and Stop (4) buttons on the control panel to check if the blades turn in the correct direction (see arrow)
Turn off panel with red button (2)



13.3 Machine installation diagram



13.4 Electrical and compressed air connections

HOFFMANN MS35SF double miter saw is delivered pre-wired and ready for on-site connections

Danger:
Follow these safety instructions!

Trip Hazard!
Lose wires and cables must be secured and covered with an appropriate cable cover to reduce the risk of tripping and falling.

The machine is equipped with separate electrical and pneumatic circuits, which must be connected and disconnected separately.

The proper resistance of the safety loop and the correct sizing of the supply breakers/fuses must be checked and verified on site.

1. Verify proper supply voltage and wire gauges before connecting MS35SF to electrical supply lines.
2. Only trained technicians are authorized to perform work on this equipment.
3. Main power may not be connected until all electrical assemblies have been installed and tested.
4. Always disconnect and lock main power supply prior to working on any electrical circuit. Use proper „Lock-Out / Tag-Out “procedures.
5. Separate circuit sections if possible and bleed off any residual compressed air before working on pneumatic circuits.

13.4.1 Connecting electrical enclosure to power supply

Electrocution danger!
Only trained technicians shall work on electrical circuits!

Verify proper supply voltage – see circuit diagrams and electrical enclosure labels.

Main switch must be OFF when connecting power supply lines!

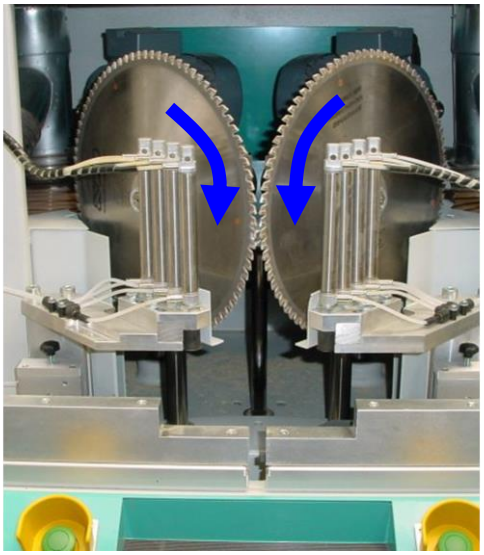
⇒ Install an approved and properly sized locking connector to main power cord (1).

⇒ If hardwired connection is required, such connection must be made by qualified and properly licensed electrician in accordance with all State and Local Laws.

⇒ Verify rotating magnetic field with suitable tester on main power switch inside of electrical enclosure.

⇒ **Continue with installation only after properly rotating magnetic field has been verified.**

⇒ **Incorrect connection can cause damage to the system!**



Confirm proper rotation of saw blades!

Caution – sharp tooling! Wear gloves to protect hands and fingers!

13.4.2 Compressed air connections

Compressed air in proper Quality and Quantity is to be supplied by plant owner – see technical data section.

The air regulator-filter-lubricator assembly is installed inside the left cabinet in the machine base frame.

Hoffmann MS35SF requires approx. 1.5 cubic feet per cycle.

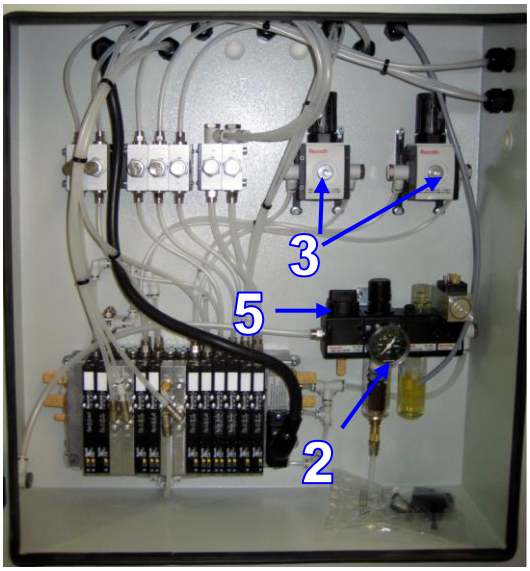
Supply pressure must be <u>90 psi +/- 7 psi</u>

Maximum supply pressure 115 psi.

<u>Note:</u>
The air pressure for the initial material clamping sequence is set to: 1.2 bar = 17.5 psi max.

The pressure is factory-set for operator safety (higher pressures increase risk of pinching) and is locked and sealed at the factory. Seals (3) may not be removed or broken!

The main shut-off cock (5) of the air regulator-filter-lubricator assembly (open for machine operation, closed for maintenance and repair work) must be secured with a padlock.



⇒ Connect compressed air supply line with a quick-connect fitting to hose fitting (1)

⇒ Verify air pressure is set to 90 psi – 6 bar (check gauge 2)

⇒ The pressure is factory-set for operator safety and **is** locked and sealed at the factory. Seals **(3)** may not be removed or broken!

⇒ For service and maintenance work, always lock shut-off cock with padlock (4)

⇒ Close access door for pneumatic cabinet (4)

13.4.3 Check Connections

Check all electrical and pneumatic connections again prior to initial startup.

Verify that all wires are connected to the correct electrical terminals and that no stray wire strands are present.

Check all air pressure lines and hoses for tightness and leak-proof fittings.

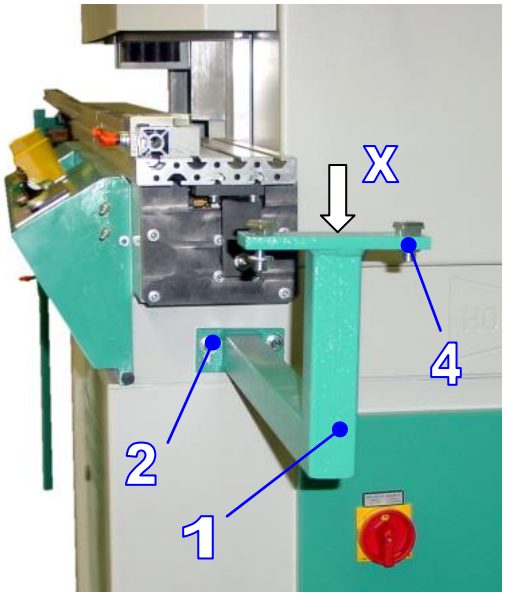
Correct any problems prior to initial start-up!

WARNING!

Shutting off machine or disconnecting electrical power supply will not disconnect compressed air supply.
Pneumatic circuit remains under pressure even when main power switch is switched-off and locked!

13.4.4 Installation of infeed and outfeed tables and fence rails

Install mounting arms (1) with two Allen head bolts (2) on left and right side of MS35SF machine base frame.



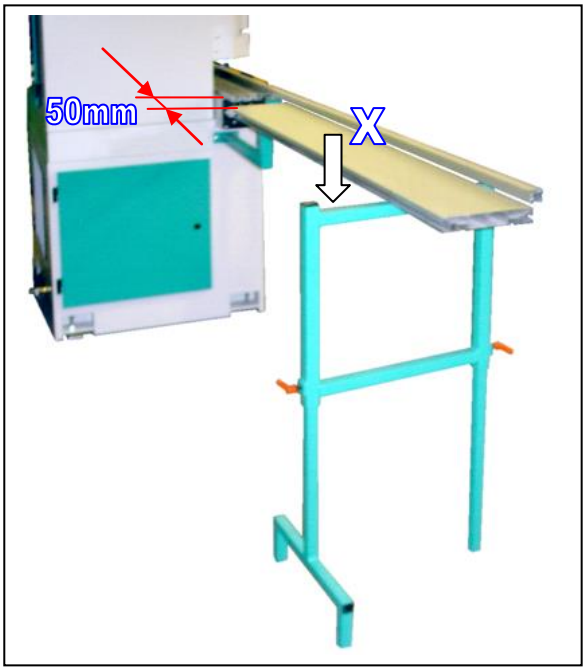
Adjust height of support leg assemblies to same level as height on mounting arms (x).
Slide infeed and outfeed material support tables (anodized aluminum profiles) onto square nuts and bolts (4) on mounting arms and support legs.

Disconnect machine from compressed air supply.
Slide open machine center tables to their maximum left and right hand positions.

Adjust infeed and outfeed support tables for a minimum gap of 2” = 50mm between machine table and outfeed tables. **A distance less than 2” creates a pinching hazard for the operator!**

Once proper minimum spacing is set, tighten bolts (4) on mounting arms and support legs to secure infeed and outfeed tables.

Lastly, set fence rail (30mmx30mm aluminum rail) on support blocks and connect it to the fixed fence rail on machine table.
Access set-screws from beneath table.



Align infeed and outfeed tables either by sight, with string or long straight edge.

13.4.5 Dust collection connections

The Hoffmann MS35SF must be connected to a suitable central dust collection system prior to use.

Two dust collection ports (120mm = 4.75” diameter) are located on top of the machine.

Internal dust collection hoses are routed directly to both saw stations and both routing stations.

Dust collections System requirements

- Min. collection volume = 450 cft/min = 750m³/h
- Pressure = 4.25 inches water column = 1050 Pa at 20ms-1
- Minimum velocity at dust collection port:

  Dry wood chips: 65 ft/s = 20ms-1

  Wet wood chips: 90 ft/s = 28ms-1

  Wet chips are chips with moisture content greater than 18%.

14 Operation – Warnings and Safety Rules

Additional hazards exist during set-up and maintenance work, including:

Cutting and Amputation Hazard!

Router bits are sharp and can cut fingers easily.
Saw blades are sharp and can cut and amputate fingers easily.
Never reach into cutting areas during operation!

Entanglement and Pinching Hazard!

When safety covers, shields, guards or access panels are open during set-up and maintenance additional dangers of entanglement and/or pinching hazards on rotating components (belts, sprockets, etc.) may be present.

Do not wear loose fitting clothing – always cover long hair with a hair net.

- **Follow all safety rules during set-up and maintenance work.**
- **Only trained and authorized personal may perform set-up and maintenance work.**
- **Control parameters are adjusted at the factory for optimal performance and may not be changed or tampered with.**

14.1 Initial start-up

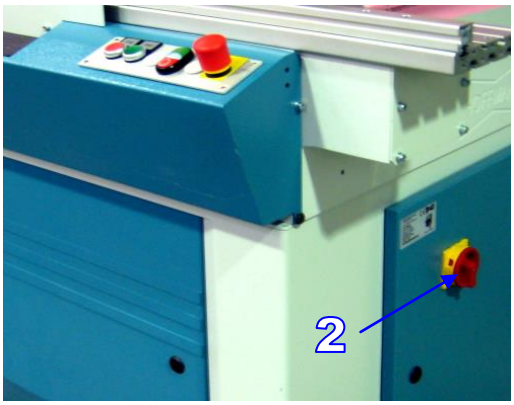
⇒ Once all connections have been made, all covers, shields and access panels must be reinstalled.

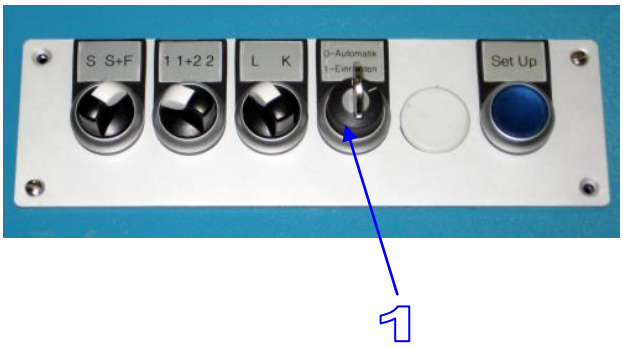
⇒ Set keyed switch (1) to “automatik”

⇒ Switch-on the main power switch (2)

⇒ Switch-on operator console with green button (3).

⇒ Signal lamp (4) will indicate machine ready for operation.





14.2 Tooling change

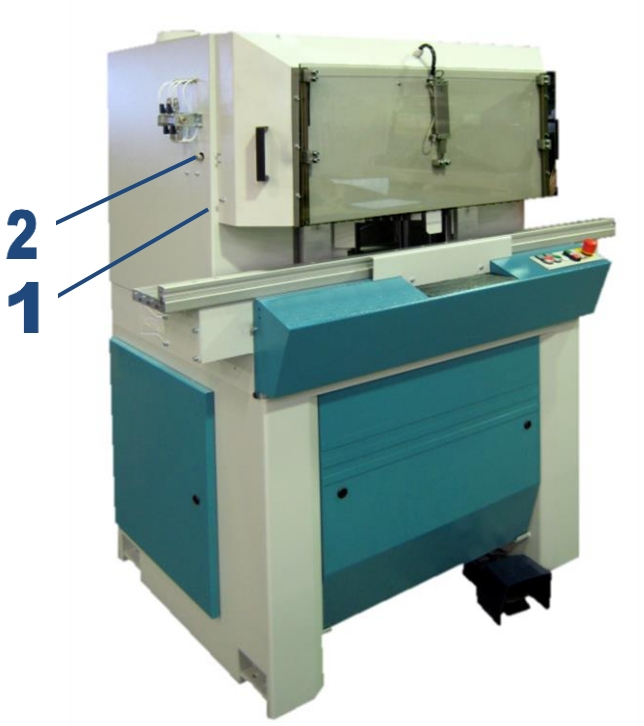
14.2.1 Opening machine front cover

The metal front cover may be opened to change saw blades and for maintenance and repair procedures.

A mechanically operated time-delay safety switch is used to assure both saw blades are at a complete standstill before the cover can be lifted up.

Steps to open front cover:

- Remove lock bolts (1) on left and right hand side of cover.
- Turn time-delay switch clockwise until interlock is released – this should take 15-20 seconds.
- Open front cover by swinging it all the way up. Cover will rest on rubber bumpers when open.



Important:
Open and close the knurled knob on the safety switch carefully. Over tightening the screw can damage the switch.

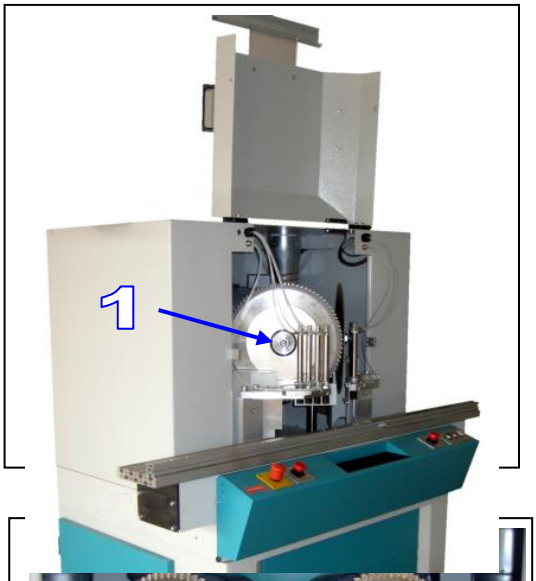
14.2.2 Saw blade change

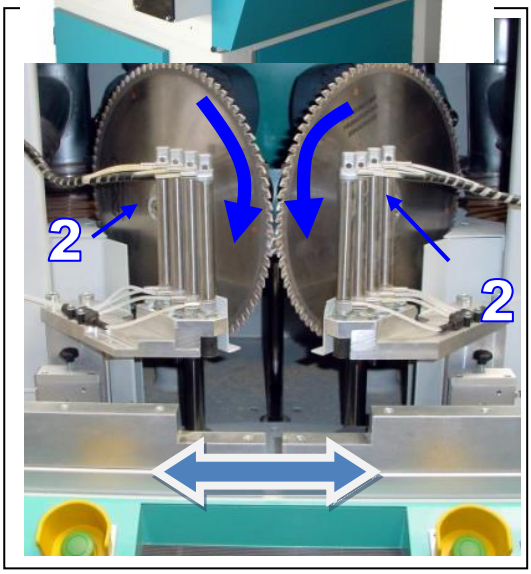
Verify main power is off and proper Lock-Out/Tag-Out procedures have been followed.

Saw blades are sharp and can cut – wear safety gloves when handling saw blades.

The saw blade is mounted on the saw arbor and held in place with a steel flange (1) and arbor nut. The blade is covered by a metal front cover, which must be opened to change blades.

Follow instruction on previous page to open cover.





⇒ Select “Set-Up” mode on front console and raise saw blades up above machine table.

⇒ Secure the arbor with an allen-key and loosen the arbor nut.

Saw arbors have different threads (LH and RH).

Note: The arbor nut is always loosened in the direction of the saw blade rotation (see arrows)

⇒ Remove arbor nut and flange.

⇒ Replace saw blades.
Pay close attention to proper installation and tooth configuration of the new blades.
Clean saw blade surface and flange before installation to remove dirt and dust.

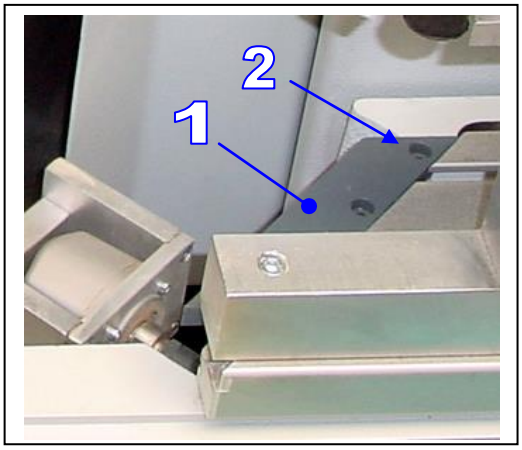
⇒ Tighten the arbor nut securely by hand and remove Allen key and wrench.

⇒ Close front cover, tighten safety switch and re-install lock bolts on both sides.

14.2.3 Chip breaker (table insert) change

Router bits are sharp and can cut – wear safety gloves when handling router bits.

Note: New chip breakers should be installed every time router bits are changed or replaced.



Caution:

When changing router bits, chip breakers must be removed to allow router carriage to travel unimpeded to bottom home position.

Note: Always place a piece of scrap material on machine table for initial cut through new chip breaker. The scrap acts as a backer and reduces the chance for splitting or tear-outs of the chip breaker.

⇒ With the router carriages underneath the machine table (in home position), open the front cover and remove the old chip breaker (1) by removing the mounting bolts (2).

⇒ Install a new chip breaker and tighten all mounting bolts.

Note: New chip breakers are generally oversized (wider than final size).

If, during installation, the tips of the new and uncut chip breakers touch, the machine tables will not close completely and the machine will not cycle.

It is then necessary to install one chip breaker and cut it to size first, then install the second chip breaker.

⇒ After installation of new chip breaker(s), lower front cover and secure with bolts.

⇒ Select “sawing only” with the selector switch and cut the chip breaker(s) to final width.

⇒ Select “set-up’ and rout initial keyways through new chip breakers – follow steps outlined under “router bit installation and adjustments”!

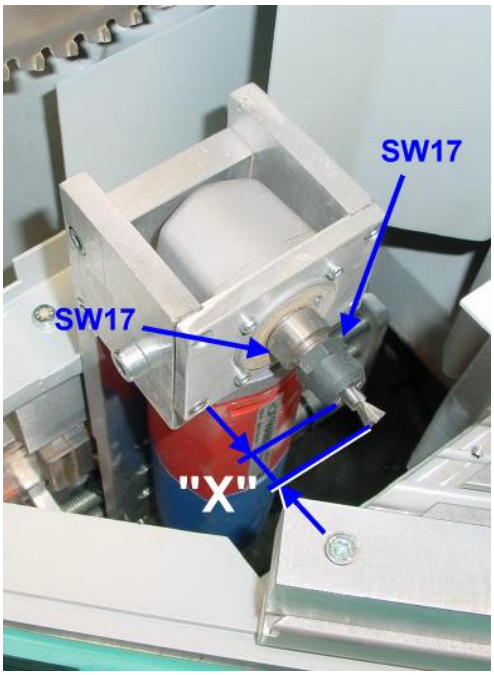
14.2.4 Router bit installation and adjustments (with set-up jig)

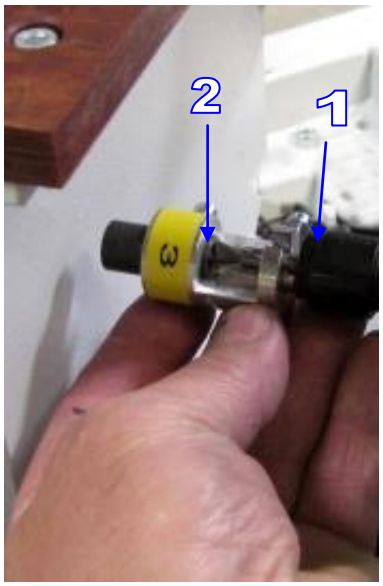
Router bits are sharp and can cut – wear safety gloves when handling router bits.

Collet must always sit flush in collet nut.

Use sharp router bits only – dull bits result in unsatisfactory results and increase strain on router motors.

Note: New chip breakers should be installed every time router bits are changed or replaced.





⇒ Select “set-up” and raise router carriage above machine table.

⇒ Open the front cover and remove the old chip breaker by removing the mounting bolt.

⇒ Open the motor collet with supplied open-end wrenches
⇒ (2 x 17mm).

⇒ Remove old and install new router bit.

⇒ If necessary, clean the collet and verify that collet is securely fastened in collet nut.

⇒ Place the corresponding set-up jig (1) onto the collet

⇒ Adjust the router bit until the tip of the bit touches the reference bolt in the set-up jig (2).

⇒ Secure the router bit with the set-screw in the jig, then tighten the motor collet with two 17mm wrenches.

⇒ Select “automatik” with keyed selector switch, lower front cover and secure cover with bolts and by turning time-delay safety switch.

⇒ To test the new setting, cut two test pieces and insert an appropriate HOFFMANN Dovetail Key. If the resulting joint is tight and meets specifications no further adjustments are needed.

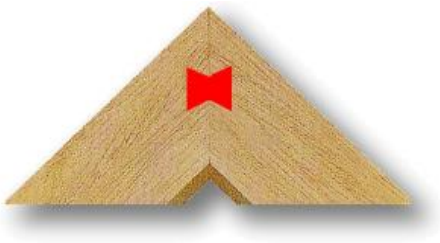
⇒ If the joint does not meet specifications, re-adjust the router bits until the proper setting is achieved.

⇒ Install new chip breakers as described in previous paragraph.

14.3 Router bit adjustments

Hoffmann Dovetail Keys are designed to create permanent and reliable joints in a wide range of wood products.

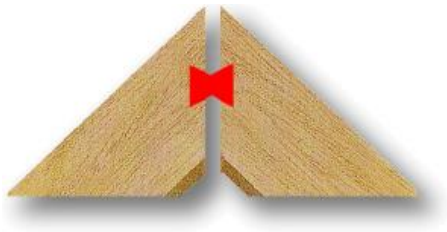
For optimum strength and reliability, it is important to adjust the router bits properly.



The minimum cutting depth into the miter face is

Size W1	3.5 mm
Size W2	5.1 mm
Size W3	6.9 mm

This is the minimum setting at which the Keys will still create a tight joint. If the material allows, a deeper setting will increase the “draw” or “pull” of the Key.



Incorrect:

If the router bit projection is set too shallow, the Key is not able to pull the miter faces together. An open joint is the result.

Incorrect:

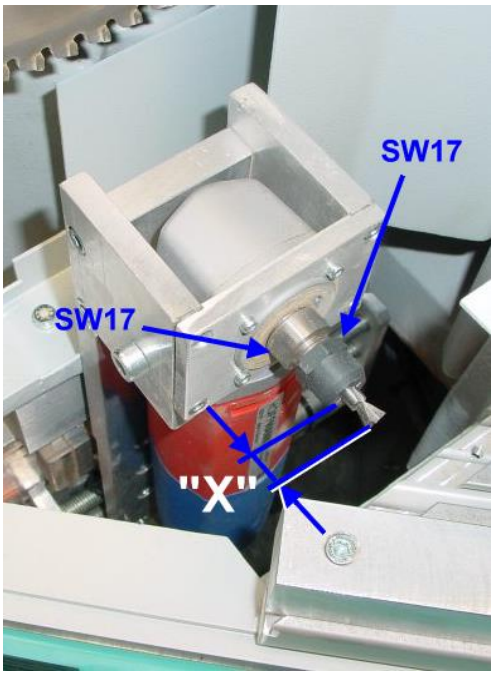
If the router bit projection is set too far, the Key and/or the material can split resulting in damage to the material.

14.3.1 Router bit adjustments (with caliper)

Router bits are sharp and can cut – wear safety gloves when handling router bits.

Collet must always sit flush in collet nut.

Use sharp router bits only – dull bits result in unsatisfactory results and increase strain on router motors.



Router bits are set and adjusted in relation to the saw cut. A change of saw blades will likely require minor adjustments of the router bits as well.

⇒ Cut and rout a test piece on each side of the machine and measure the keyway depth.

⇒ Calculate the difference between the measured distance and the desired setting, e.g. for W-2 if the test piece dimension is 5.28mm and the desired setting is 5.1mm, the difference is 0.18mm.

⇒ Measure distance “X” from tip of router bit to tip of collet with digital calipers and make note of said measurement.

⇒ Add or deduct the difference from the current router bit dimension “X”.

⇒ Open the motor collet with supplied open-end wrenches.

⇒ Adjust router bit to the adjusted measurement with aid of calipers.

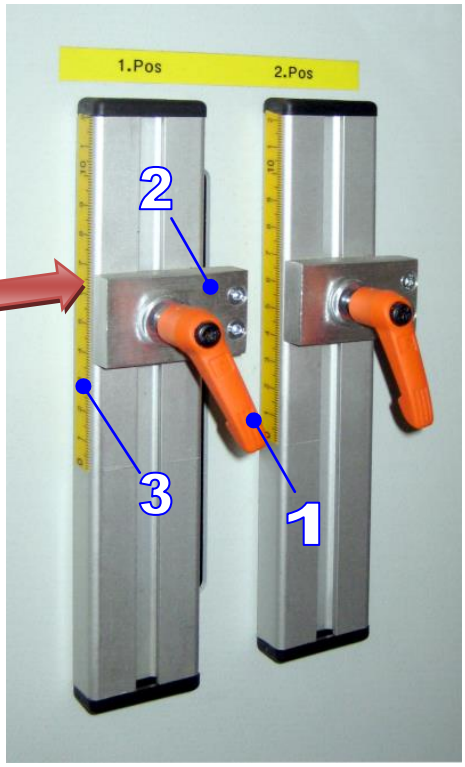
⇒ Tighten collet nut securely.

⇒ *To test the new setting, cut two test pieces and insert an appropriate HOFFMANN Dovetail Key.*

If the resulting joint is tight and meets specifications no further adjustments are needed.
If the joint does not meet specifications, re-adjust the router bits until the proper setting is achieved.

14.3.1.1 Adjustment of routing stroke (vertical travel)

The proper routing height (or keyway length) is determined by the thickness of the material being processed.
To assure a tight joint, the routing height should be adjusted so that the longest possible Hoffmann Key can be used. For example, 3/4” thick stock is generally joined with 5/8” long Keys.



The MS35SF features separate routing height adjustments for the two key locations.

The desired height is adjusted by moving the corresponding height adjustment bar (2), located on the right side of the machine.

The bar is locked in place with the locking lever (1); the routing height can be read directly on the attached scale (3).

The top edge of the height adjustment bar (red arrow) is used to read the routing height off the scale.

The first routing position (1. Pos) is the keyway closest to the outside tip of the miter.

The second routing position (2. Pos) is the keyway closest to the inside corner of the miter.

14.3.1.2 Adjustment of keyway positions

Router bits are sharp and can cut – wear safety gloves when handling router bits.

Collet must always sit flush in collet nut.

Use sharp router bits only – dull bits result in unsatisfactory results and increase strain on router motors.

Machine with front cover removed

Follow these steps to adjust the keyway locations:

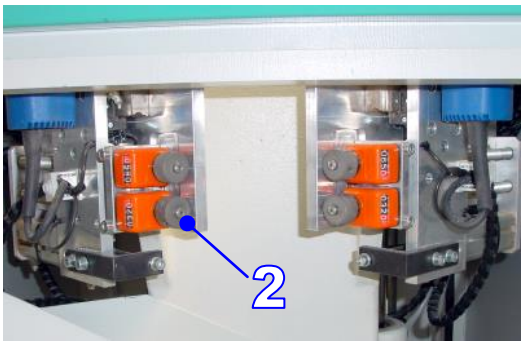
⇒ Remove front cover with included square key (1)

⟹ Adjust the setting for each location by turning the corresponding knob (2).

The settings for the left and right router motor must be identical for the kewyays to lign up.

The distance from the tip of the miter to the center of the keyway is displayed in millimeters on the installed mechanical counters (2).

Display accuracy is 1/10mm

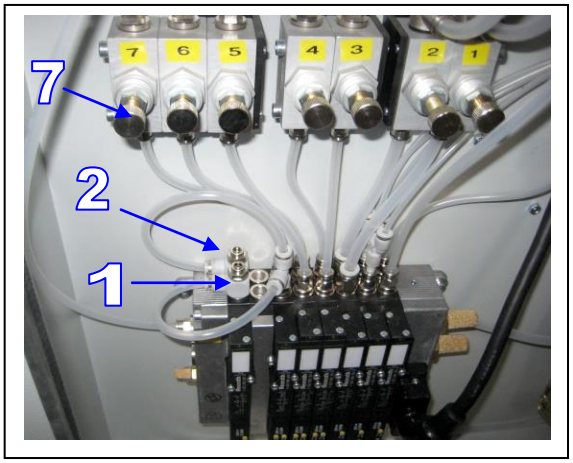


14.3.2 Adjustment of router feed rate

Proper feed rate is depended upon the material being processed and the material thickness.

Router bits can break if feed rate is set too. Serious injury due to flying router bit fragments can occur!

Router feed rate has been adjusted at the factory and may only be changed by trained personnel.



The upward and return movement of the router carriage (the router feed rate) can be adjusted depending on the material being processed.

The machine is equipped with a special two-stage control circuit to increase cycle times.

Flow Control Valve 1

The first stage moves the routers from their home position up until the router bits are just below the chip breakers (table inserts).

Flow Control Valve 2

The second stage controls the actual routing process through the chip breakers into the material until the pre-set height is reached.

Flow Control Valve 7

The return travel speed of the router carriage is adjusted with this flow control valve.

Closing the valves by turning the set-screws clockwise will slow down the feed rates, opening the valves will increase the feed rates. Even small adjustments of 1/8 – 1/4 turn will make a noticeable difference.

Make adjustments slowly and never increase the feed rate to a point where the routers slow down or noise emission increases upon entering the work piece.

Decreased router bit life, torn material and damage to router motor may occur if feed rate is set too fast.

14.4 Adjustment of sawing stations

14.4.1 Adjustment of saw feed rate

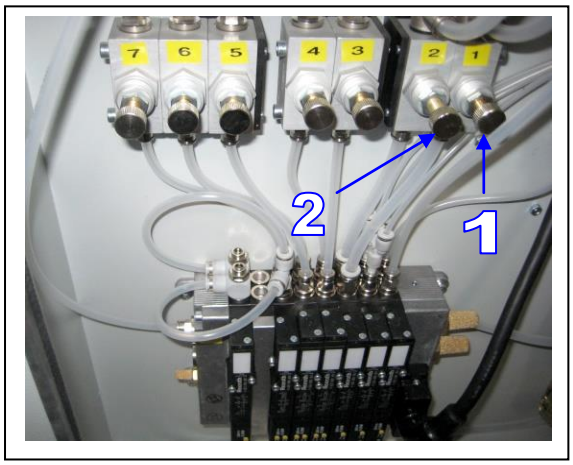
Proper feed rate is depended upon the material being processed and the material thickness!

Router bits can break if feed rate is set too. Serious injury due to flying router bit fragments can occur!

Router feed rate has been adjusted at the factory and may only be changed by trained personnel.

The feed rate of the saw carriage is adjusted with two pneumatic flow control valves (Pos. 1 + 2).

These valves are located in the pneumatics control cabinet.



The downward stroke speed and the return stroke speed can be separately adjusted to suit different materials and workpiece dimensions.

Closing the valves by turning the thumb-screws clockwise will slow down the feed rates, opening the valves will increase the feed rates.
Even small adjustments of 1/8 – 1/4 turn will make a noticeable difference.

Make adjustments slowly and never increase the feed rate to a point where the saws slow down or noise emission increases upon entering the work piece.

Decreased saw blade life, torn material and damage to saw motors may occur if feed rate is set too fast.

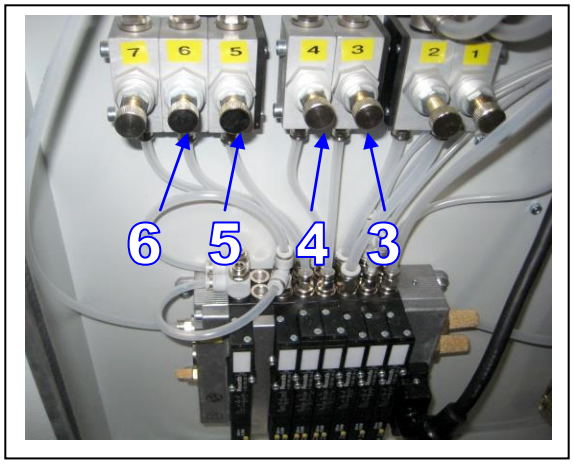
14.4.2. Adjustment of table movement

The table movement speed can be adjusted with flow control valves (3+4 and 5+6)

Flow control valves for table movements:

Valve 3: right table closing speed
Valve 4: right table opening speed
Valve 5: left table closing speed
Valve 6: left table opening speed

Closing the valves by turning the thumb-screws clockwise will slow down the feed rates, opening the valves will increase the feed rates.
Even small adjustments of 1/8 – 1/4 turn will make a noticeable difference.



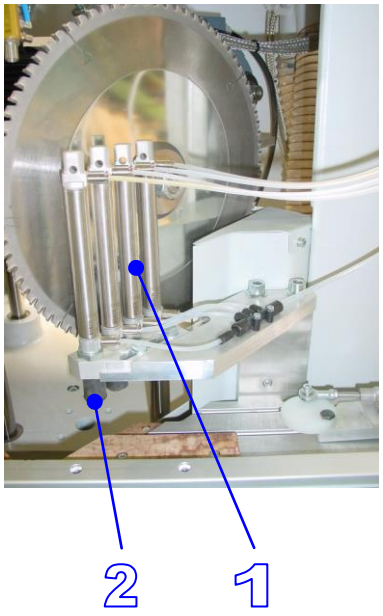
14.5 Material clamping cylinders

WARNING!
Clamping cylinders can pinch and injury fingers!

The machine is equipped with four pneumatic hold-down cylinders (1) on each side. The cylinders conform automatically to various moulding profiles.
Should one cylinder clamp down directly on the work piece edge, it can be switched off in the pneumatic cabinet on the left side of the machine.

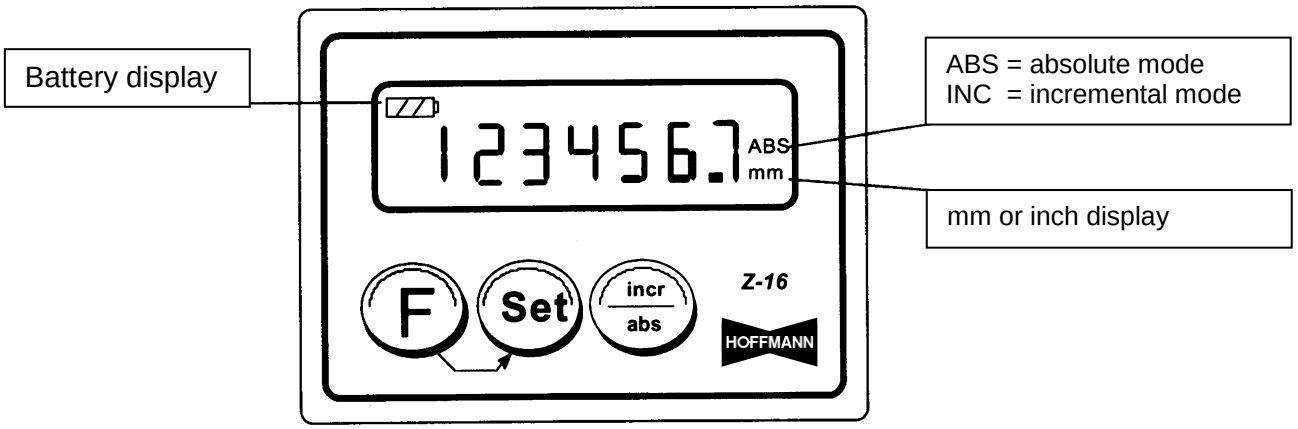
Warning: Never operate the machine with fewer than three operational clamping cylinders on each side! Serious injury could result if the work piece is not securely clamped during the cutting and routing operation.

Always use pneumatic hold-down clamps!



Replace the rubber bumpers (2) as needed – replacement parts are available from Hoffmann, Inc.

15 Calibration of digital length stop display model Z-16

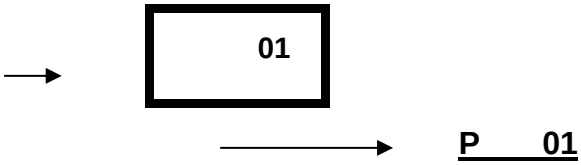


15.1. Installation of support tables, fence rails and magnetic tape

1. Install the infeed and outfeed tables and support legs on both sides of the machine, making sure the tables are at the correct height and in-line with the machine tables. Check the infeed and outfeed tables for level in both directions, front-to-back and left-to-right and adjust if necessary.
2. Place the fence extension rails on the nylon rollers. The extension rails are connected to the rails mounted on the machine tables with the enclosed bolt and connector plate. Slide the extension rail all the way into the table rail and lock the connection with the set screws in the connector plates. These plates must be mounted in the underside of the rails to avoid interference with the miter stop.
3. Check for free travel of the miter stop assembly from the phenolic table insert to the end of the right outfeed table.
4. Remove the miter stop and clean the aluminum fence rail with a clean rag and alcohol to remove grease and dirt. Use caution and read warning labels on solvent canister!
5. Remove backing to expose self-adhesive strip and carefully place magnetic tape on fence rail, aligned with the edge closest to the front of the machine. (Check miter stop – small black sensor must be able to read magnetic tape directly underneath!)
6. Press tape down firmly. Do not kink or splice magnetic tape – readout error will occur!
7. Clean magnetic tape with alcohol and install enclosed steel cover tape (self-adhesive) on top of magnetic tape.
8. Check proper position of tape by installing miter stop and check for free travel throughout measuring range. Distance between sensor and magnetic must not be more than 1mm to assure accurate readings.

15.2. Push button operation

F	press initially for 3 sec. to select parameter mode press to select parameter (P03, P05,etc.) and parameter digit, then press again to confirm the entered data
Set	press to switch between parameter digits
incr / abs	During normal display operation: press to switch between absolute or actual length of material to incremental mode. During parameter mode: press to increase displayed numbers
F + Set	press both buttons to reset display to reference dimension



15.3. Entering or changing parameters

1. Press “F” for approx. 3 seconds - display will change to
2. Press “F” again – the corresponding values will be displayed, for example
3. Press “Set” to switch between the two digits, press “incr/abs” to change the selected digit.
4. Press “F” to confirm the data entry. Display automatically advances to next parameter (P 05).
5. Repeat steps 2. – 4. to change next parameter.
6. Press “F” for approx. 3 seconds to confirm changes and to exit parameter mode.

15.4. Parameter Listing

				factory setting
P 01	display settings	first digit	0 = display in mm	
			1 = display in inches	
		second digit	0 = display increases is moved to the left	
			1 = display increases if moved to the right	01
P 03	decimal point		only active in mm mode (0,1,2,3)	1
P 05	push buttons	first digit	0 = incremental push button active	
			1 = incremental push button inactive	0
		second digit	0 = Set button active	
			1 = Set button inactive	0
P 08	multiplication factor		0.0001 – 9.9999	1.0000
P 09	reference dimension		- 999999.9 – 999999.9	0.0
P 99	software version		current software version is displayed	

15.5. Initial calibration

1. Move miter stop towards center of machine until set-screw in fence rail stops further movement. Screw is factory installed and should be adjusted only if necessary!

   CAUTION: SCREW MUST BE SET TO KEEP MITER STOP CLEAR OF PNEUMATIC HOLD-DOWN CLAMPS AS WELL AS THE PATH OF MOVING ROUTER BITS AND SAWBLADES!

2. Lock miter stop in place and cut a test piece to length.
3. Measure the exact length of the test piece, ideally with digital calipers.
4. Press “F” approx. 3 sec. to change display to Parameter Mode.
5. Press “F” repeatedly until P 09 (reference dimension) is reached.
6. Press “Set” until desired digit blinks, then press “incr/abs” to change dimension according to test piece.

   If test piece length is longer than the length shown on display, decrease reference number by the difference. If it is shorter, increase by the difference.

   Example: Length shown on display: 350.0mm, test piece length: 312.4mm = difference 37.6mm
   Decrease reference dimension by 37.6mm

7. Press “F” for 3 sec. to return to Display Mode.
8. Move miter stop away from saw blades and check if displayed measurement increases in value.

   If measurement does *increase*, lock miter stop and cut another test piece. Measure exact length and compare to displayed dimension. Repeat above steps if necessary.

   If measurement does *decrease*, follow instructions under “7. Changing counting direction”.

15.6. Changing display from millimeters to inches

1. Press “F” approx. 3 sec. to change display to Parameter Mode -- P 01 is now displayed.
2. Press “F” again – parameter values for P 01 are now displayed, for example “01”
3. Press ”incr/abs” to change first digit to “1”. (0=mm, 1=inches)
4. Press “F” approx. 3 sec. to return to display mode.

15.7. Changing display from decimal inches to fractional inches

Set display to “decimal inch” mode (see 5. Changing display from millimeters to inches)

1. Press “Set” once to switch from decimal inch to fractional inch display in 1/16” increments.
2. Press “Set” again to switch from 1/16” increments to 1/32” increments.
3. Press “Set” again to switch from 1/32” increments to 1/64” increments.
4. Press “Set” again to return to decimal inch mode.

15.8. Changing counting direction

If displayed measurement decreases when miter stop is moved to the right, make the following adjustment:

1. Press “F” approx. 3 sec. to change display to Parameter Mode.
2. Press “F” again – parameter values for P 01 are now displayed, for example “01”
3. Press “Set” to switch to second digit.
4. Press “incr/abs” to change second digit.
5. Press “F” approx. 3 sec. to return to Display Mode.

15.9. Changing the battery

It is advisable to change battery when only one bar on the battery indicator is displayed. To prevent damage to unit, use only a good quality, brand-name battery for replacement.

1. Move miter stop against set-screw and lock in place. (see 4. Initial Calibration)
2. Note displayed dimension.
3. Remove old battery and install new one, close battery cover.
4. Press “F” approx. 3 sec. to change display to Parameter Mode.
5. Press “F” repeatedly until P 09 (reference dimension) is reached.
6. Press “Set” until desired digit blinks, then press “incr/abs” to enter noted dimension.
7. Continue until exact dimension is displayed.
8. Press “F” for 3 sec. to return to Display Mode.
9. Move miter stop away from saw blades, lock stop and cut a test piece. Measure exact length and compare to displayed dimension. Repeat above steps if necessary.

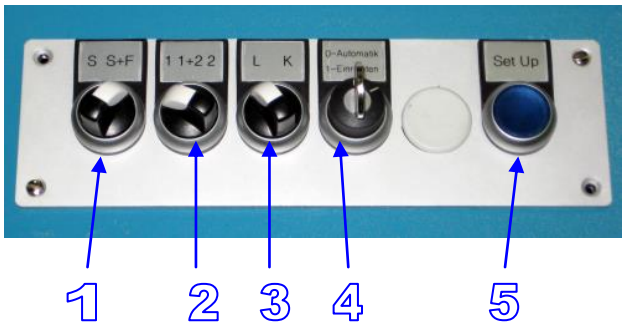
15.10. Technical Data

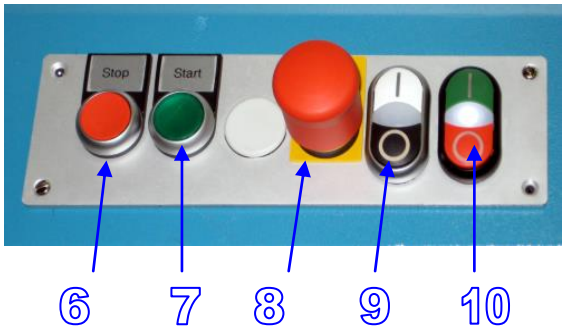
Liquid Crystal Display	Seven digits displayed, height 11mm
Battery	Alkaline type, 1.5 Volts, 8Ah
Power consumption	approx. 1mA / 1.5V
Battery life	approx. 12 months
Operating temperature	+ 5°C / + 50°C
Sensor speed	max. 2.5m/sec.
Accuracy	0.1mm – 0.004”
Sensor-Tape distance	max. 1.0mm
Tape type	Elgo MB 20.25

16 Operation

16.1 Controls

16.1.1 Operator Console





Pos.	Description	Function
1	**2-way selector switch**	To select “sawing only” or “sawing and routing” **WARNING – Sawing and Routing Operation** After completion of saw cut, both table sides will move sideways.
2	**3-way selector switch**	To select routing locations: 1= routing only positon 1 - front 1+2= routing position1 and position 2 – front and back 2= routing only position 2 - back
3	**OPTION**	Optional switch – not installed on standard machine version
4	**2-way keyed switch**	To select between „Automatik“ (normal operation) and „Set-Up“ operation.
5	**Push button with signal lamp**	Push to confirm in set-up mode.
6	**STOP push button**	Push to stop current operation
7	**START push button**	Push to start machining sequence. Note: The START button must be pushed until the front cover is fully closed.
8	**Emergency-Stop**	Emergency Stop Button
9	**ON-OFF switch**	To switch saw motors on and off.
10	**ON-OFF switch**	To switch machine control panel on and off.

16.2 Operation

A test run is recommended to make sure all setting are correct and to avoid production of unusable parts.

All settings and adjustments must be checked and confirmed prior to starting the machine. All covers and safety shields must be in place prior to starting the machine.

All appropriate personal protective devices must be worn prior to starting the machine.

⇒ **Before starting the machine, be sure to check:**

- Is compressed air line connected and is pressure at least 90 psi?
- Is electrical supply connected and is the direction of the saw blade rotation correct?
- Are the router settings (keyway location and routing height) set correctly?
- Has proper tooling (saw blades and router bits) been installed?
- Have the proper switch settings on the operator console been selected?

16.2.1 Machining Sequence

SAWING operation

- Operator places material into machine.
- Activating foot switch secures material with low-pressure clamps.
- Pressing START button initiates machining cycle - clamp pressure is increased to maximum and front safety shield is lowered.
- Saw blades move downward through material and return to upper home position.

SAWING and ROUTING operation

- While saw blades move to upper home position, both tables slide open.
- Either one or two dovetail keyways are routed into each mitered material end.
- Tables slid back together, front safety shield moves back up and clamps release material.
- Operator removes material from machine.

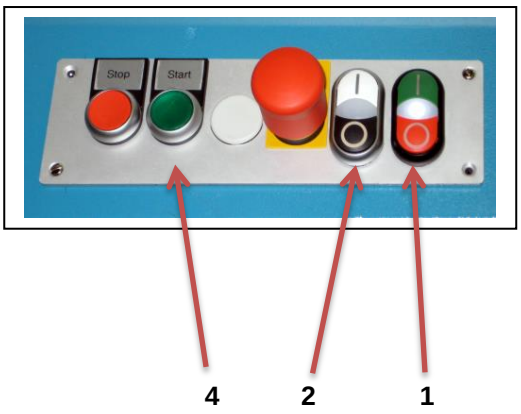
16.3 Machine Operation

⇒ Turn on the electrical power supply with the main power switch located in the electrical control cabinet.

⇒ Press green ON button (1) to switch on machine control panel.

⇒ Adjust routing locations and routing strokes.

⇒ Press the motor start button (2) on the operator panel.



Both saw motors start, the router motors are automatically started just prior to the routing sequence.

⇒ Select operating mode (S=sawing or S+F = sawing and routing) with selector switch (3)

⇒ Place material in machine and activate clamps by stepping on foot switch.

⇒ Press START button (4) and hold until safety cover is closed.

⇒ On completion of machining cycle, safety cover will retract and clamps will release automatically**.**

Safety Notice:
Pressing the STOP button will stop the machining cycle and all carriages will return to their home positions.

16.4 Machine shut down

⇒ Switch-off saw motors (2)

⇒ Switch-off machine control panel (1)

⇒ Set main power switch on side of machine to OFF position.

16.5 „Set-Up“ mode

16.5.1 Set-Up Button function during normal operation:

If the keyed selector switch is set to “Automatik”, the machine is in normal operating mode and the set-up button does not control any set-up functions.

To reduce the risk of injury, the machine table cylinders are not pressurized when the machine is started or when the emergency stop button has been activated.

The blue Set-Up button is used to manually pressurize the table cylinders and to bring both tables to their proper home positions.

Pushing the blue Set-Up button will first close the safety cover and then move both tables together to their respective home positions.

The machine is now ready for operation.

NOTE:
The Set-Up button must be pressed until the tables have closed all the way!

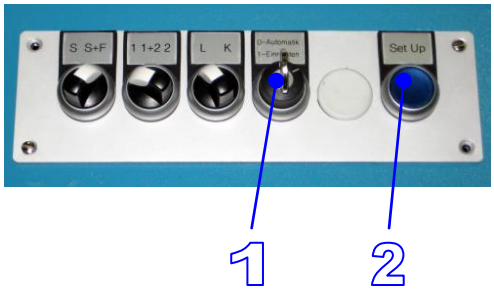
Machine will not operate unless tables are in their respective home positions.

16.5.2 Set-Up mode

Router bits are sharp and can cut – wear safety gloves when handling router bits.

Collet must always sit flush in collet nut.

Use sharp router bits only – dull bits result in unsatisfactory results and increase strain on router motors.



The set-up mode is used when a change or adjustment of the router bits is necessary.

The keyed selector switch (1) is used to switch from normal operation to set-up mode.

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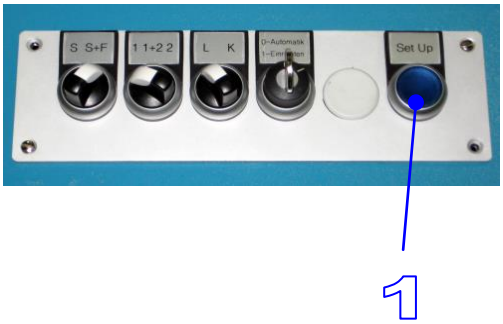
Step	Description	Notes
1	Push Set-Up button (2) to lower the front safety cover and to open both machine tables. The router motors will move upwards **as soon as** the tables are fully open!	Releasing the button will stop all movements immediately.
Once the router motors are positioned above the machine tables, the safety cover is unlocked and flipped open. Operator has now access to both router motors and router bits for adjustments and/or bit changes. Upon completion of adjustment procedures, safety cover is closed again and locked in place.		
2	Push Set-Up button (2) again to lower router motors and to close both machine tables.	Releasing the button will stop all movements immediately.
3	Moved keyed selector switch back to “Automatik”.	Set-up procedures are complete.

16.5.3 Indicator Light

The indicator light (1) is used to identify errors and faults. It is also used to indicate when the machine is in Set-Up mode.



Signal	Error - Fault	Remedy	Result
Blue indicator light blinks while machine is in normal operating mode	Initial machine start-up. Tables are not in home position.	Press blue Set-Up button to activate table cylinders.	Machine table move together.
Blue indicator light constantly on	Machine is in Set-Up mode.	Switch to normal operation	Switch keyed selector switch to “Automatik”

16.6 Faults – Errors - Emergencies

■ **Only qualified and trained personnel may perform troubleshooting and testing procedures!**

■ **Person not involved with trouble shooting shall remain a safe distance from machine until normal operation is restored.**

WARNING!
Shutting off machine or disconnecting electrical power supply will not disconnect compressed air supply. Pneumatic circuit remains under pressure even when main power switch is switched-off and locked!

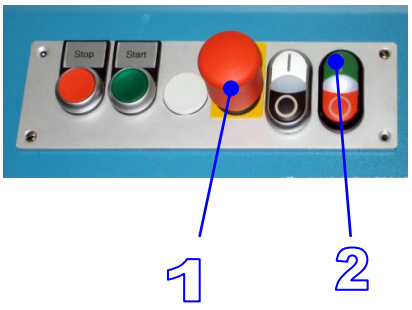
In case of emergency press Emergency Stop Button.
Activating the emergency stop button will stop saw and router motors and return all carriages back to their home positions.

The material clamping cylinders remain under pressure and must be deactivated separately.

16.6.1 Emergency Stop reset

Upon activating the Emergency Stop Switch (1) follow these steps to re-set the machine controls:

1. Release red E-Stop button (1).
2. Switch on machine control panel (2).
3. Press Set-Up Button (3) to bring all tables back to their home positions.



16.6.2 Trouble Shooting Chart

Error #	Indication	Reason	Remedy
1	Saw motors will not start	Motors have not been switched on No power to motors Overheated	Press saw motor start button. Check all electrical connections Check motor overload breakers in electrical cabinet. Allow motors to cools down.
2	Router motors will not start	Motors have not been switched on No power to motors	Check switches on motors Check power cords for internal damage. Check for proper connection
3	Saw and/or router speed (rpm's) decrease	Dull tooling Feed rate to high	Check and replace tooling (saw blades and/or router bits) Adjust feed rates with flow control valves in pneumatic control cabinet
4	Loud noise during machining cycle.	Dull or damaged tooling. Wrong saw blade rotation.	Check and replace tooling (saw blades and/or router bits) Change rotation.
5	Bad miter cut result.	Saw blades are dull or damaged.	Replace saw blades – use original HOFFMANN blades for best results.
6	Router won't move freely.	Guides and/or tracks dirty.	Clean tracks and guide rods.
7	Cutting angle off (not 45.0 degrees)	Dirt trapped between saw blade flange and saw blade Position of blade arbor blocks incorrect.	Remove blade and clean flange and blade. Adjust blade arbor blocks.
8	Keyway location offset from left to right hand work piece	Router stops not adjusted properly	Adjust keyway locations with digital counters.
9	Machine won't start	Machine tables are not closed completely	Press "set-Up" button to close tables
10	Machine tables won't open	Cylinder sensor does not trigger. Cylinder sensor defective.	Remove debris inside machine to allow saw carriage to travel to end position – DO NOT move cylinder sensor! Replace defective sensor.
11	Machine tables open too soon or too late for proper operation	Cylinder sensors misadjusted.	Adjust cylinder sensors.

17 Maintenance

During set-up and maintenance procedures, the following dangers exist in the above areas:

Danger of entanglement and pinching!

During set-up and maintenance work, especially when access doors must be opened, additional dangers of entanglement or pinching on belts, sprockets, saw station, router station, drilling station, etc. are present. Do not wear loose fitting clothing. Long hair must be covered with a hair net.

Danger of cutting of hands and fingers!

All sawing, routing and drilling areas present dangers of cutting of hands and fingers.

Danger of amputation!

All sawing areas present the danger of severe cutting or amputation of fingers.

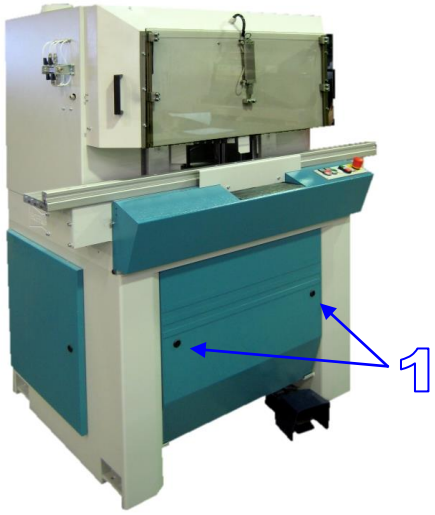
Machine operator and maintenance personnel may only perform activities described in this manual.
Persons working on or with this machine must be at least 18 years old, they must be thoroughly familiar with this operating manual and they must adhere to all local safety rules and regulations. All OSHA specified rules must be followed if applicable.

Persons working on or with this machine must wear suitable clothing designed to avoid entrapment in rotating machine components.
No loose fitting clothes e.g. ties or shawls, or bracelets, wristwatches, necklaces, etc. may be worn when operating this machine.
Persons with long hair should tie their hair securely and wear an appropriate hair covering to avoid entanglement.

17.1 Maintenance Schedule

Warning – Safety Hazard!
Always disconnect electrical and compressed air supply and follow proper Lock-Out/Tag-Out procedures

To access the inside of the machine including the scrap chute, use supplied four-square key to release locks (1) and remove front panel.



Frequency	Description
daily	Check tooling for wear and damage.
	Check all safety devices and motor brakes for proper function.
weekly	Clean debris from machine.
	Check wires, cable, switches, hoses, lines for damages.
	Drain condensate from air filter assembly.
	Check cylinder switches and sensor for proper function.
monthly	Remove dust and debris from all machine components.
	Clean cooling vents on all motors.
	Check belt tension and re-tighten is necessary
quarterly	Remove grease expelled from grease fitting or bearings.
	Refill linear bearing with grease.
	Refill air lubricator with BOSCH S OL 20 pneumatic lubricant.
Semi-annually	Check pneumatic circuit for leaks and repair if necessary.

17.2 Manual lowering of saw carriage

Warning – Safety Hazard!
Always disconnect electrical and compressed air supply and follow proper Lock-Out/Tag-Out procedures

The machine is equipped with a pneumatic safety valve to avoid the uncontrolled downward movement (dropping) of the saw carriage in case of sudden pressure drop.

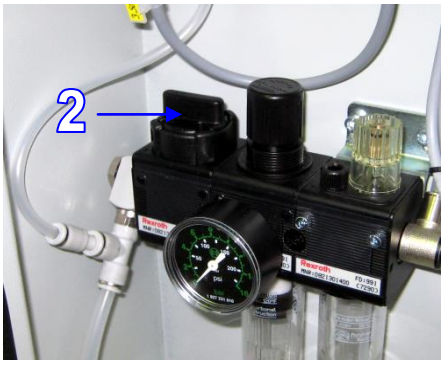
Follow these steps to manually lower the saw carriage:

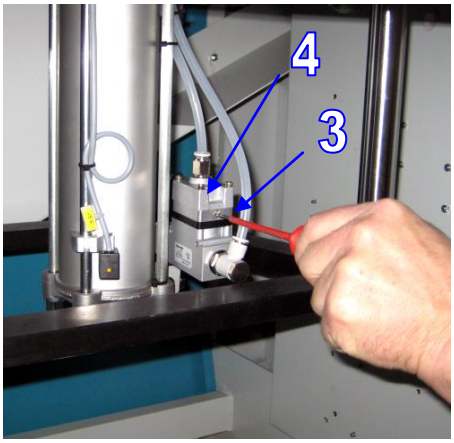
⇒ Open pneumatic cabinet by turning hand locks (1)

⇒ Close main supply valve (2) and lock-out by attaching a padlock.

⇒ To access pneumatic safety valve, remove rear machine frame cover.

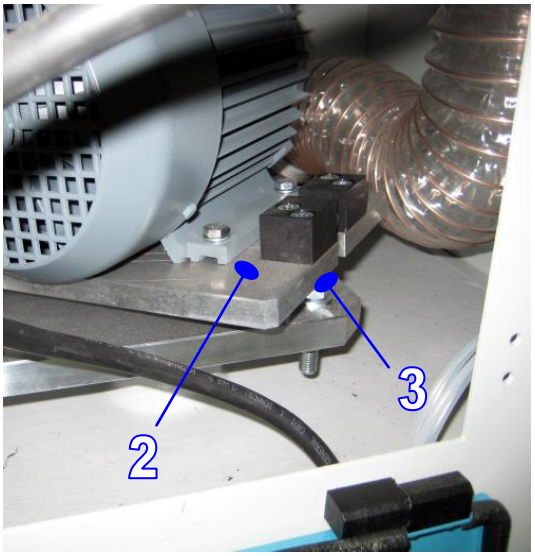
⇒ Open bleed valve (3) on safety valve (4) with screw driver until all air is bled from system and router carriage has come to a stop in the lowest position.





17.3 Drive Belt adjustments

Warning – Safety Hazard!
Always disconnect electrical and compressed air supply and follow proper Lock-Out/Tag-Out procedures



The saw motors are connected to the saw arbors with high-quality drive belts (1).

The belts are tensioned by means of adjustable motor mounts.

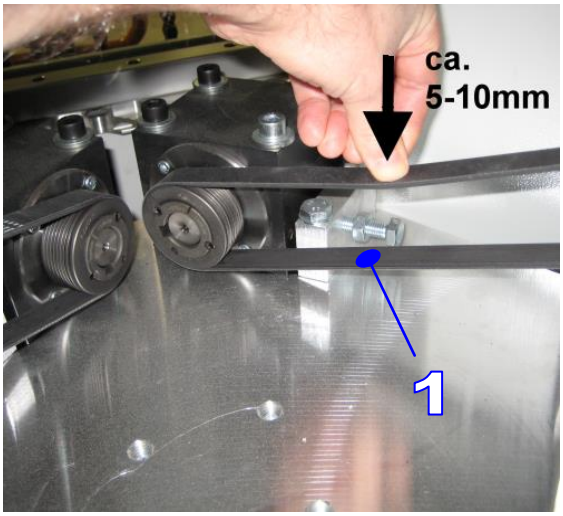
To adjust belt tension, loosen lock nut (3) and lower motor assembly to increase belt tension.

When tightened correctly, the belt can be depressed by hand approx. 5-10mm (1/4“ – 3/8“) in the center of the span (see photo).

If tension is too low, belt could slip and squeal in operation.

If tension is too high, undue stress is placed on motor and arbor bearings.

Belt tension should be checked frequently and adjusted if necessary.

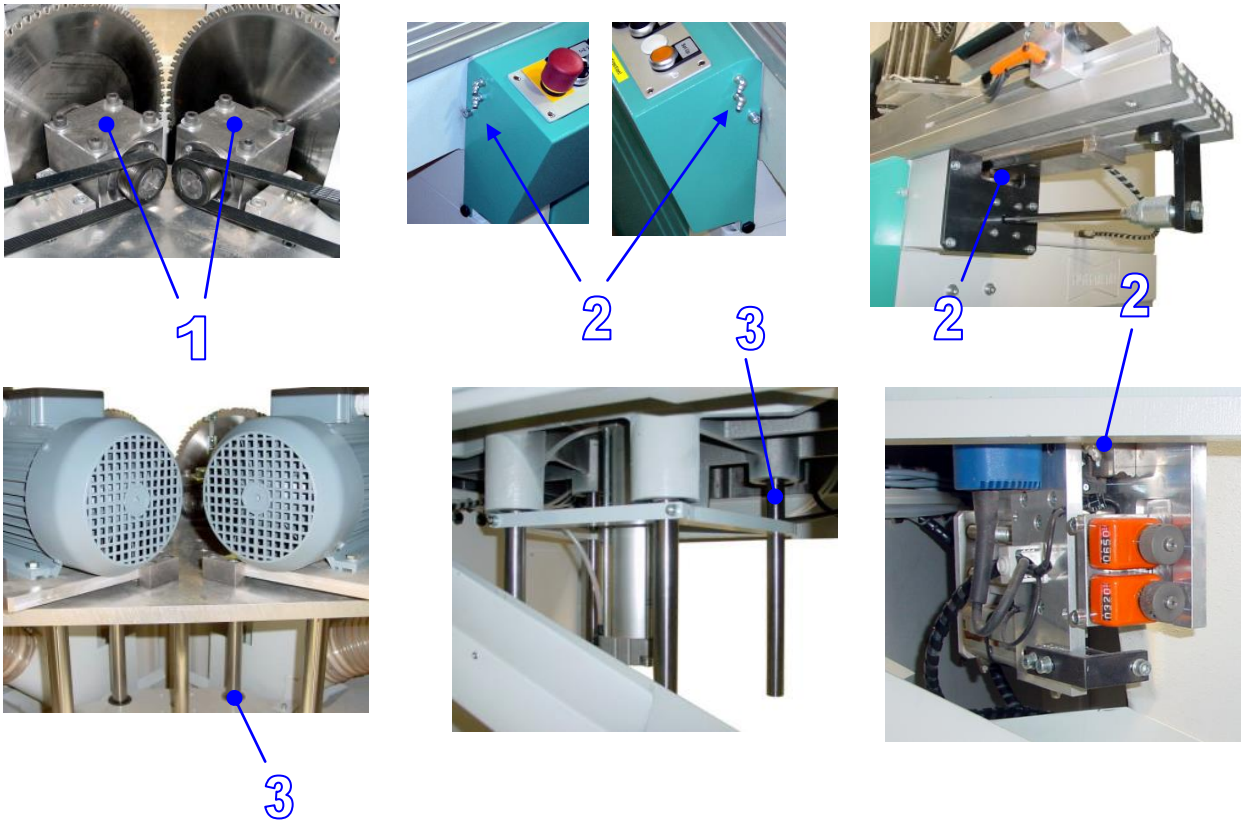


17.4 Lubrication Schedule

Warning – Safety Hazard!
Always disconnect electrical and compressed air supply and follow proper Lock-Out/Tag-Out procedures

Guide rods, tracks and bearings must be cleaned and lubricated in accordance with schedule below.

17.4.1 Location of lubrication points

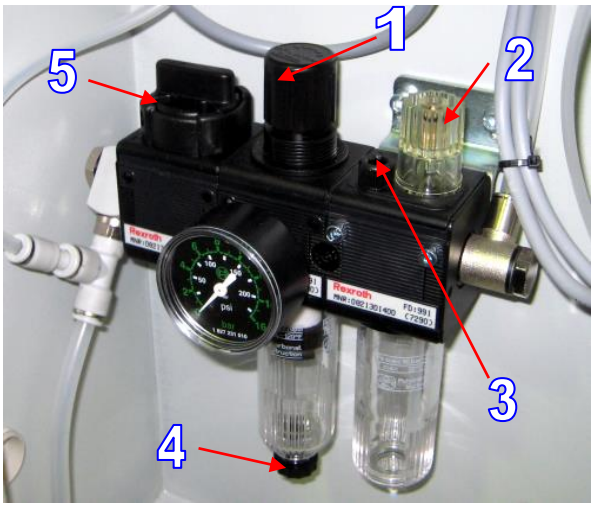


POS	Location	Procedure	Lubricant	Frequency
1	Saw arbor blocks	The arbor block bearings are filled with grease at the factory.	No additional lubrication is necessary	Maintenance free
2	Linear Bearings (THK-type)	Fill grease fitting with appropriate grease	Semi-Synthetic high performance multi-use grease DIN 51825 / KP 2 P-30 (e.g.. ESSO / Grease LT2) (kinematic viscosity at 40°C = 80mm²/s(cSt) - ISO-VG 68 → ISO-VG 100	Every 3 months or 500 hrs – whichever comes first.
3	Linear bearings Guide rod blocks	The guide rod bearings are filled with grease at the factory.	No additional lubrication is necessary	Maintenance free

17.5 Pneumatic circuit and air regulator-filter-lubricator assembly

The machine is equipped with pneumatic components for various operating movements and sequences.

Warning – Safety Hazard!
Always disconnect electrical and compressed air supply and follow proper Lock-Out/Tag-Out procedures



POS	Description	Info
1	Air pressure adjustment cap	Factory set to 90 psi(6 bar)
2	Lubricant control screw	Factory set
3	Lubricant filler plug	Use a 6mm Allen key to remove plug and refill lubricant. **Warning:** **Air pressure must be switched-off and locked out!** **Note: Only use BOSCH Type: S OL 20 lubricant**
4	Condensate separator	See maintenance schedule
5	Shut-Off valve	Must be shut-off and locked with padlock during maintenance procedures.

Cleaning:
Air pressure must be switched-off and locked out!
Use only water, mineral spirits or WD 40 to clean pneumatic filters and bronze exhaust mufflers.
Clean or replace filters if pressure drop is noted in system.

18 EG-Conformity Certification

EG-Konformitätserklärung
nach 2006/42/EG, Anhang II, Nr.1 A

Firmenanschrift:	**Hoffmann Maschinenbau GmbH** Mergelgrube 5, 76646 Bruchsal Deutschland

Herr Arnd Wenz ist bevollmächtigt, die technischen Unterlagen zusammenzustellen.
Anschrift: Hoffmann GmbH, Arnd Wenz, Mergelgrube 5, 76646 Bruchsal

Hiermit erklären wir, dass die Maschine

Bezeichnung:	**MS35-SF**
Type:	**Doppelgehrungssäge**
Typennummer:	**7.148**
Seriennummer:	_____
Baujahr:	**2010**

mit allen einschlägigen Bestimmungen der EG-Maschinenrichtlinie 2006/42/EG in Übereinstimmung ist.
Die Maschine ist auch in Übereinstimmung mit allen einschlägigen Bestimmungen der folgenden EG-Richtlinien:

2004/108/EG	EG-EMV-Richtlinie

Benannte Stelle:	**BG-PRÜFZERT** **Fachausschuss Holz**
Anschrift:	Vollmoellerstraße11 70563 Stuttgart
Kenn-Nummer :	0392
Zertifikat-Nummer:	XXXXXXXXXXX

Folgende harmonisierten Normen oder Teile dieser Normen wurden berücksichtigt:

EN 12100-1:2004-04	Sicherheit von Maschinen: Grundsätzliche Terminologie
EN 12100-2:2004-04	Sicherheit von Maschinen: Technische Leitsätze
EN 1870-16:2005-07	Sicherheit von Holzbearbeitungsmaschinen - Klinkschnitt-Kreissägemaschinen

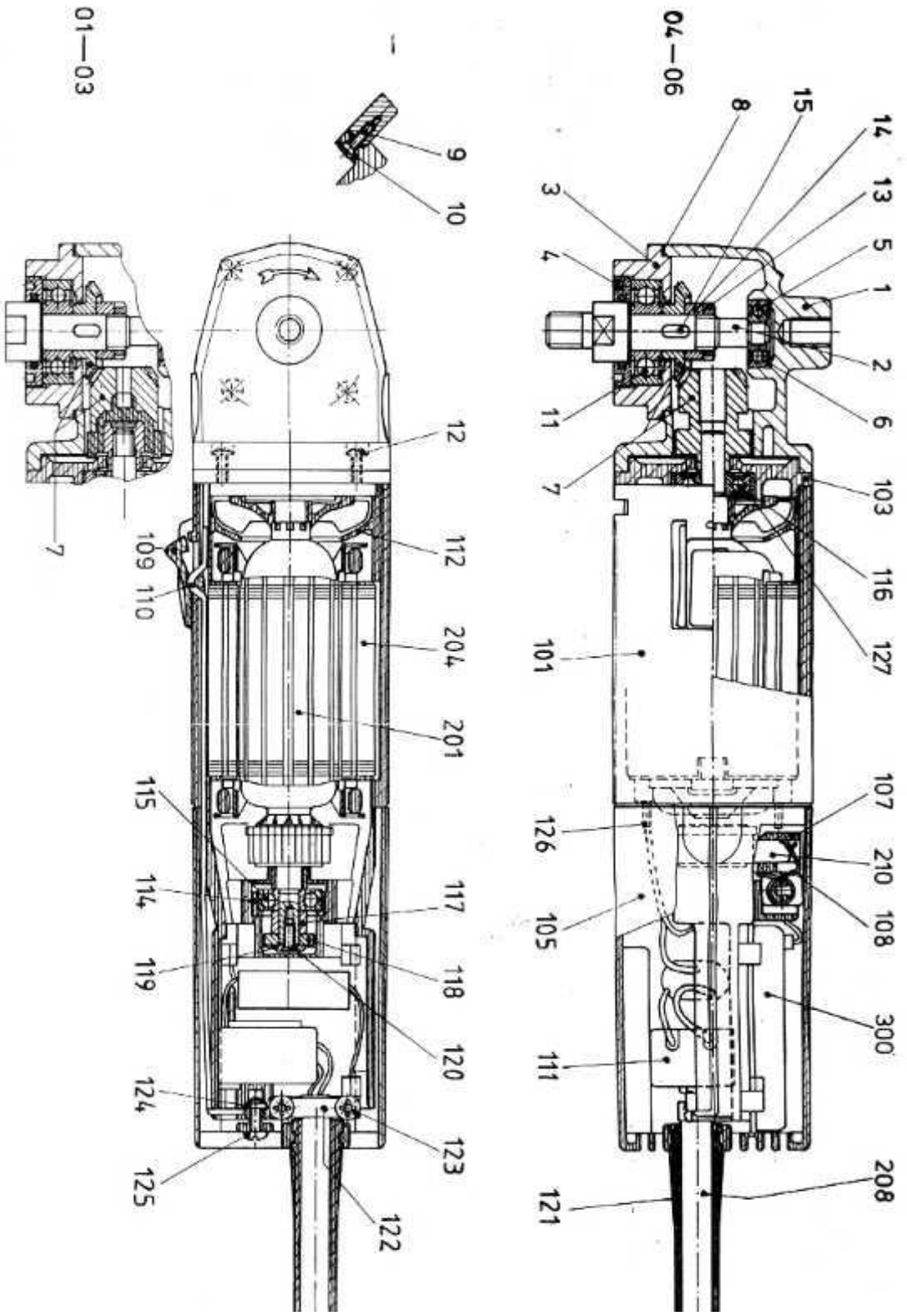
Ort / Datum: Bruchsal, 01.01.2010

Unterschrift:

Martin Hoffmann, Leiter der Technik

19 Parts List and Diagram

19.1 Router Motor UWC-24-R



19.2 Parts List – Router Motor UWC-24-R

STK	Benennung	Description	Désignation	Pos	Nr.
20	Blasolube 28035	Blasolube 28035	Blasolube 28035	-	27 985 01
1	Einmauklschlüssel	Jaw spanner sw 14	Clé à fourche sw 14	-	37 857 03
1	Elektr.m. Potentiom.	Electr. With potent.	Electronique avec pot.	300	57 962 01
2	Kohlebürste	Carbon brushes	Balai de carbon	211	57 267 01
1	Zuleitungskabel	Cable complete	Câble complet	208	25 615 01
1	Stator mit PTC	Stator with PTC	Stator avec PTC	204	57 272 01
1	Anker mit Lüfter	Armature with fan	Induit compl.	201	57 271 01
1	Sicherungsring	Circlip	Circlip	127	27 665 06
2	Litze m. Steckhülse	Strand with receptacle	Fil av.cossé enfich.	126	57 290 01
1	Linsenschraube	Ovel head	Vis á tête bombée	125	28 133 01
1	Vierkantmutter	Square nut	Ecrou carré	124	28 011 02
2	PT-Schraube	PT-screw	Vis-PT	123	27 997 12
1	Kabelbride	Cable clip	Collier de serrage	122	35 183 01
1	Knickschutz	Cable protect. cover	Gaine	121	28 029 01
1	Senkschraube	Flat head	Vis á tête fraisée	120	28 134 01
1	Scheibe	Disc	Disque	119	57 289 01
1	Ringmagnet	Magnetic ring	Animant torique	118	57 287 01
1	Distanzbüchse	Distance sleeve	Entretoise	117	57 314 01
1	Kugellager	Ball bearing	Roulement á billes	116	27 684 13
1	Kugellager	Ball l bearing	Roulement á billes	115	27 684 12
1	Dämmring	Dam-ring	Bague isolante	114	52 521 02
1	Lüfterabdeckung	Fan cover	Capot du ventilat.	112	57 276 02
1	Schalter kpl.	Switch complete	Disjoncteur complete	111	57 275 01
1	Schaltgestänge	Gearshift fork	Tringle de comm.	110	57 279 01
1	Schalterknopf	Control knob	Bouton de comm.	109	57 274 01
2	Schenkelfeder	Spiral spring	Ressort de maint.	108	57 263 01
2	Bürstenhalter	Brush holder	Porte-balais	107	57 262 01
1	Schalterkappe	Switch cover	Couvercle de l'interr.	105	57 278 01
1	Isolier-Zwischenfl.	Insulating flange	Flasque isolant	103	46 453 02
1	Isoliergehäuse	Insulating housing	Boìtier isoleté	101	57 265 02
1	Drehzahlschild	Speed plate	Plaquette de witesse de rotation	24	64 123 01
1	Hinweisschild	Attention plate	Plaquette pour attention	23	64 122 01
1	Leistungsschild	Data plate	Plaquette indicatrice	22	64 121 01
1	Namenschild	Name plate	Plaquette de firme	21	57 285 01
1	Kegelrad	Bevel gear	Roue dentée conique	19	78 969 01
2	Flachkopfschraube	Pan head	Vis á tête aplatie	17	64 124 01
1	Schutzkappe	Protection cap	Capouchon de protection	16	64 119 01
1	Passfeder	Feather key	Clavette	15	27 847 16
1	Distanzring	Distance ring	Entrétoise	14	78 876 01
1	Ringmutter	Groove nut	Ecrou á encoches	13	11 998 01
4	Blechschraube	Sheet metal screw	Vis á tôle	12	27 995 64
1	Kugellager	Ball bearing	Roulement á billes	11	27 671 03
4	Fächerscheibe	Teethed lock washer	Rondelle de eventail	10	27 801 57
4	Schraube	Screw	Vis	9	48 163 02
1	Ritzel	Pinon shaft	Pignon	7	78 968 01
1	Ausgleichsscheibe	Spring	Ressort	6	27 922 01
1	Kugellager	Ball bearing	Roulement á billes	5	27 684 05
1	Verschluss	Seal ring	Couvercle	4	10 996 01
1	Verschlussflansch	Closure flange	Flasque d'obturation	3	49 355
1	Arbeitsspindel ¼“	Spindle ¼“	Broche ¼“	2	49 370
1	Winkelkopf	Angle head	Tête d'angle	1	

20 Terms and Conditions of Sale and Warranty

1. Application and Scope:
The terms and conditions contained herein apply to proposals made, and to purchase orders received, by HOFFMANN MACHINE COMPANY, INC. (hereinafter called “Seller”), and sets forth the entire agreement between the parties hereto, and supersedes all communication, representations or agreements, whether oral or written, between the parties hereto with respect to the subject matter herein, and no agreement or understanding varying or extending the terms or conditions hereof will be binding unless expressly agreed to in writing by Seller. No conditions stated by Buyer in its purchase order or orders shall be binding upon Seller if in conflict with, inconsistent with, or in addition to, the terms and conditions contained herein, unless expressly accepted in writing by Seller. Seller’s failure to object to any provision contained in any communication or purchase order from Buyer shall not be deemed a waiver of the terms and conditions herein. All orders or contracts are subject to approval and acceptance by Seller at its main office in North Carolina. These Terms and Conditions are within the sole discretion of Seller and are subject to change with or without prior notice.

2. Quotations and F.O.B. Point:
Prices are quoted and all sales are made F.O.B. Sellers facility and, unless otherwise indicated in the proposal, prices quoted are effective for a maximum thirty (30) days after the date of any proposal.

3. Terms of Payment:
All invoices are due and payable as set forth on the front of the invoice. Each delivery shall be considered a separate and independent transaction and payment thereof shall be made on terms set forth on invoice covering same. If delivery is delayed by Buyer, payment shall become due when Seller is prepared to make delivery. If, in the sole judgment of the Seller, the financial condition of Buyer at any time does not justify continuation of manufacture or of delivery as originally specified, Seller may vary terms of payment by requiring full or partial payment in advance, or otherwise, or may ship to Buyer’s order against sight draft with bill of lading attached.
If payment is not received on or before payment due date and as set forth in terms on proposal and/or invoice, or if payment is delayed, or if payment amount is reduced, seller reserves the right to reduce or revoke equipment warranty, at seller’s sole discretion. Eventual payment of outstanding amount does not automatically reinstate warranty. Warranty can only be reinstated by seller and reinstatement must be confirmed by seller in writing to be valid.

4. Taxes:
Unless the quotation expressly provides otherwise, the amount of any present or future Federal, State or local sales, excise or other tax applicable to the products purchased hereunder, or to the manufacture or sale thereof (including, without limitation, state or local privilege or excise taxes based on gross revenue), and any taxes or amounts in lieu thereof paid or payable by Seller in respect of the foregoing (excluding, however, taxes based on net income), shall be added to the purchase prices and shall be paid by Buyer. In lieu thereof, Buyer may provide Seller with an appropriate tax exemption certificate acceptable to the taxing authorities.

5. Warranty:
The products covered herein are warranted, for a period of twelve (12) months from date of shipment, against defects in material and workmanship under normal use and service by Buyer. The liability of Seller under its warranty is limited to adjustment, in accordance with the Warranty Adjustment Terms set forth below, for products which are found to be defective by Seller in the form in which they were originally shipped. In no event will Seller be liable for collateral, consequential or other damages of any kind.
Parts replaced under Warranty are covered for a period of six (6) months from the date of shipment, unless otherwise specified on invoice, subject to the warranty adjustment terms set forth below.

SELLER MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

6. Warranty Adjustment Terms:
(a) Adjustments will be limited to claims which are presented promptly after the product is found to be defective, and within the aforesaid warranty period.
(b) All products claimed to be defective will be subject to inspection and test by Seller. Normally, Seller will request return of products for inspection and test, however, Seller reserves the right to make inspection and test on Buyer's premises. Returns are to be made only as and if authorized in writing by Seller.
(c) Buyer will pay all packaging, inspection, labor and transportation costs involved. Credit for the transportation costs only will be issued by Seller provided adjustment subsequently is allowed.
(d) No adjustments will be allowed for products which have been subjected to abuse, improper installation or application, alteration, accident or negligence in use, storage, transportation or handling; nor for products on which original identification markings have been removed, defaced or altered.
(e) Final determination as to whether any adjustment is allowable, and as to the extent thereof, rests with Seller. Full adjustment, if allowed, normally will be made by replacement in kind on an exchange basis. Pro rate adjustment, if allowed, normally will be made by the issuance of credit. In all cases, however, Seller reserves the right to make adjustment by repair, replacement or credit.
(f) Replacement for products found subject to adjustment, whether new or repaired, will be shipped F.O.B. city of destination with transportation charges prepaid by Seller.

7. Installation:
Buyer shall install machinery purchased from Seller at Buyer's cost and expense, unless otherwise expressly stipulated in writing.

8. Packaging and Shipment:
All products shipped hereunder will be packaged in accordance with standard commercial practice for domestic shipment. Seller's liability as to delivery ceases upon making delivery of products purchased hereunder to carrier at Seller's facility, in good condition, the carrier acting as Buyer's agent. All claims for damages must be filed with the carrier or Buyer's insurer as appropriate. Seller will select the method of shipment unless Buyer does so in writing at least ten (10) days in advance of the scheduled delivery date. Equipment held for Buyer because of Buyer's delay in acceptance, shall be at Buyer's risk and expense. Seller does not assume liability for shipping in the least expensive manner.

9. Deliveries:
It is the desire of Seller to meet requested delivery schedules, however, Seller shall not incur any liability, consequential, collateral or otherwise, due to any delay or failure to deliver for any reason, other than arbitrary refusal by Seller to perform. Any delivery indication furnished by Seller only represents the best estimate of the time required to make shipment.

10. Assignment:
Buyer shall not assign this purchase order or any interest herein or any rights thereunder, without the prior written consent of Seller

11. Termination:
Seller may terminate the purchase order or any part thereof herein referred to or any other purchase order or orders then outstanding by written, telegraphic or electronic mail notice to Buyer if Buyer becomes insolvent or is subject to proceedings under any law relating to bankruptcy, insolvency or relief of debtors. Upon such termination Seller shall be entitled to receive reimbursement for reasonable termination charges.

12. Cancellations or Returns:
Buyer shall not cancel any order nor return any equipment without first obtaining the written consent of Seller. In any event, in case of refusal or inability of Buyer to accept a delivery, the Buyer shall nevertheless be liable for freight, express, storage, handling, restocking and any other expense resulting. In no event are orders for machines or parts built to customers' specification subject to cancellation and Buyer shall be liable for work done and materials used.

13. Specifications:
(a) Phone order specifications are filled at Buyer's risk unless confirmed in writing prior to commencement of manufacture.
(b) If equipment is found not the meet original specifications, Seller shall have a reasonable time to make adjustments.

14. Law Governing:
Buyer's purchase order shall be governed by and construed according to the laws of the State of North Carolina. The courts of the State of North Carolina shall have jurisdiction over any controversy that may arise out of the dealings between Buyer and Seller.

15. Force Majure:
Seller shall not be liable under this agreement by reason of its delay in the performance of or failure to perform any of its obligations hereunder if such delay or failure is caused by acts of God or the public enemy, riots, incendiaries, interference by civil or military authority, compliance with government laws, rules and regulations or any fault beyond its control.

16. Acceptance:
Payment for or a deposit made for the products shall constitute a contract embodying all of terms and conditions stated herein.

17. Ownership:
All products remain the sole property of the Seller until all charges, including all transportation, crating and installation costs, are paid in full.

18. Severability:
The provisions of these Terms and Conditions are intended to be severable. If, for any reason, any of the above provisions should be found unenforceable or invalid in whole or in part, in any jurisdiction, such provision be ineffective only to the extend the determination of invalidity or unenforceability in that jurisdiction. Any such determination shall not affect the enforceability or validity of the remaining provisions.

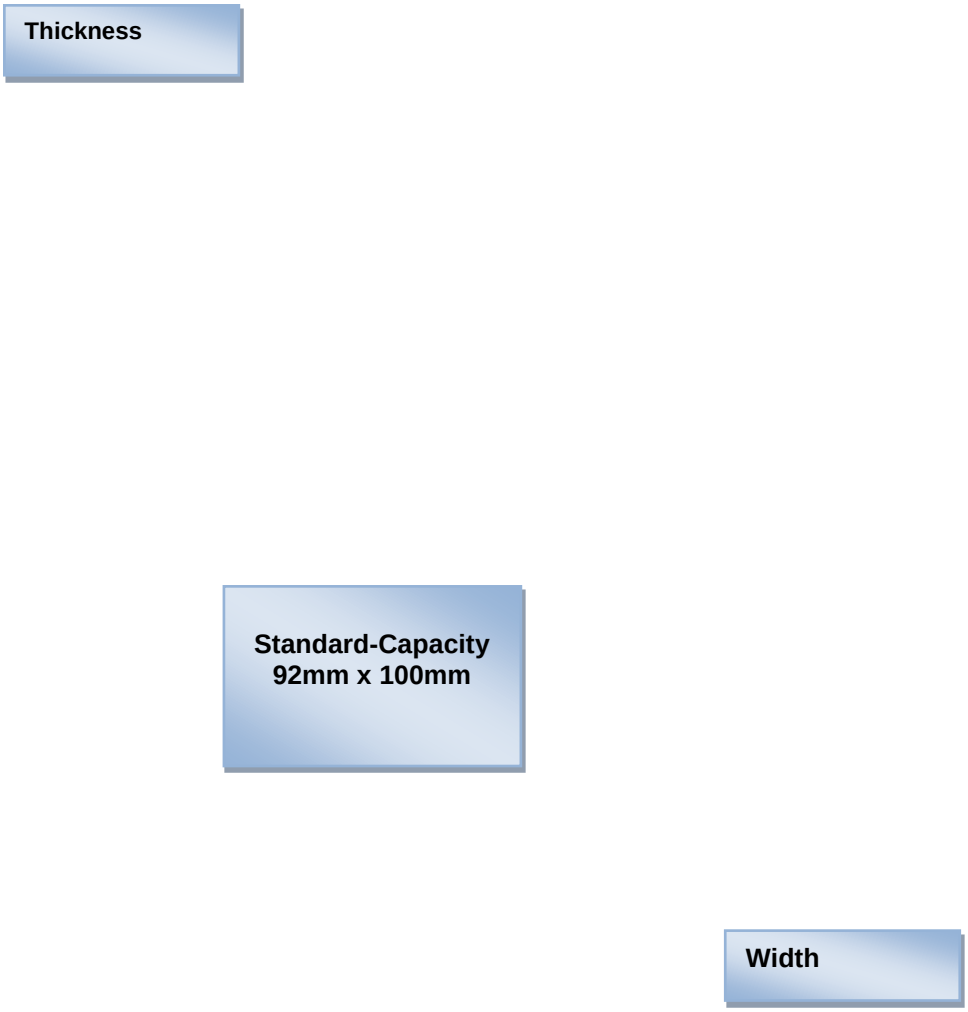
20 Technical Support Documentation - Addendum

20.1 Addendum Overview

Enclosed with the Machine Manual are the following documents:

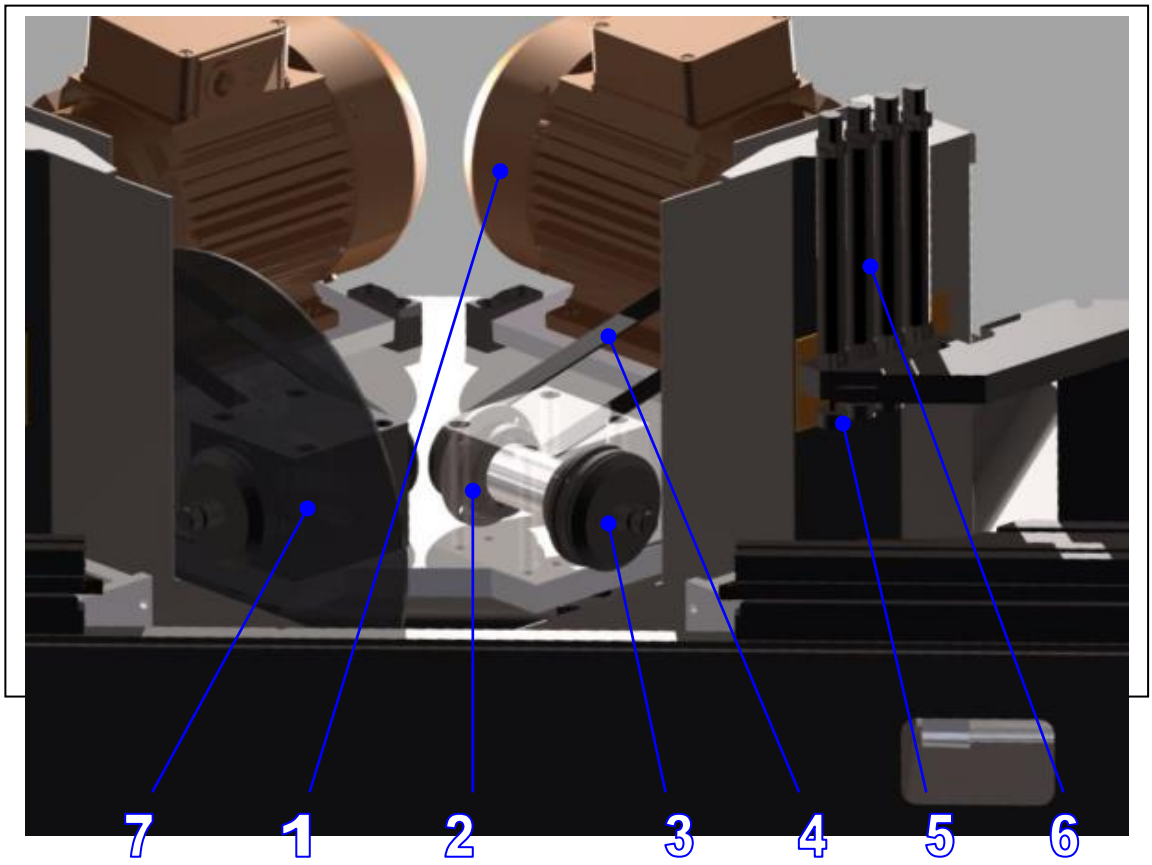
- ⇒ Machine parts list
- ⇒ Electronic circuit diagrams
- ⇒ Pneumatic circuit diagrams
- ⇒ Saw head parts list
- ⇒ Machine drawings

20.2 Cutting Capacity Diagram MS 35-SF



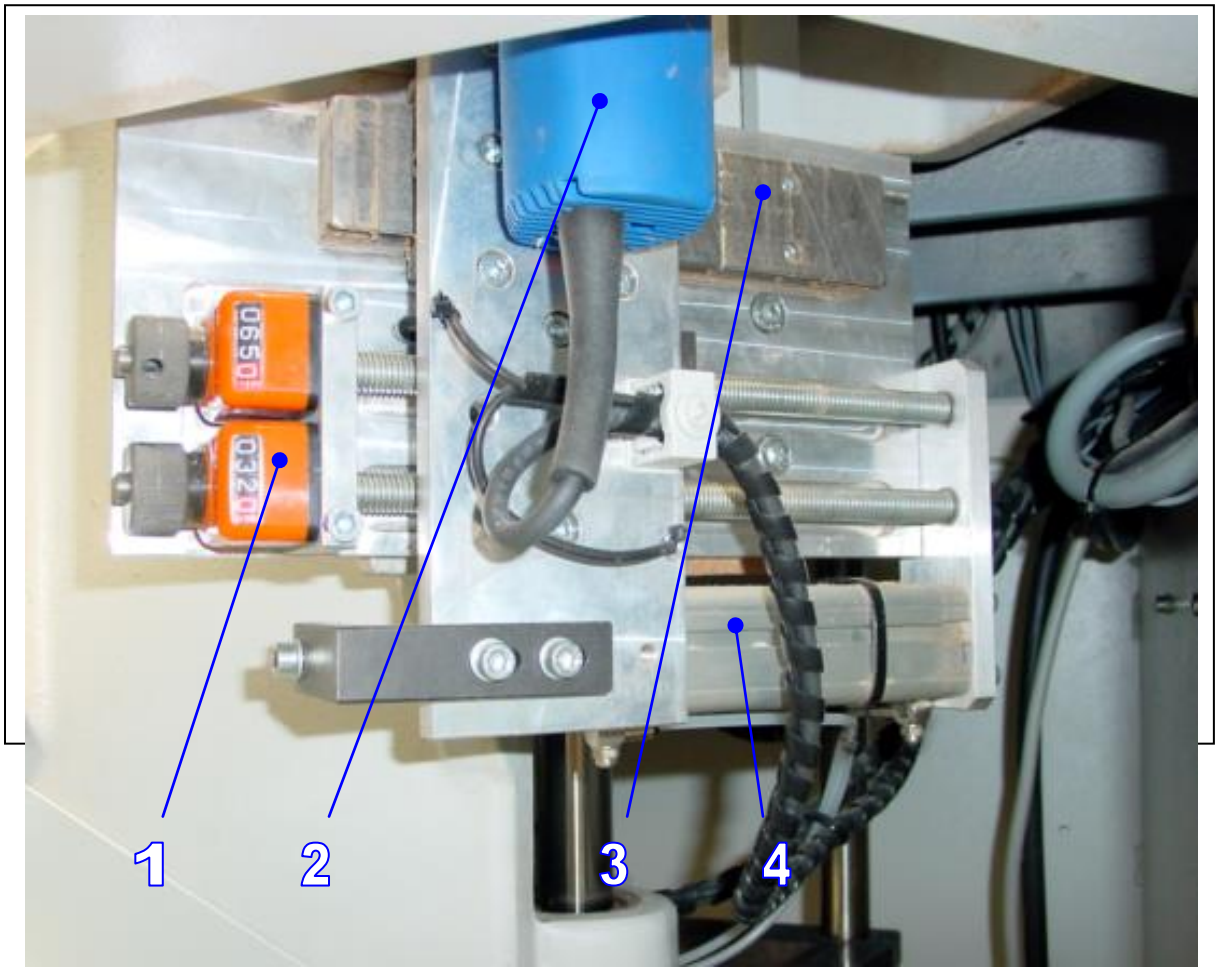
20.3 Spare Parts List MS 35-SF

20.3.1 Saw Units



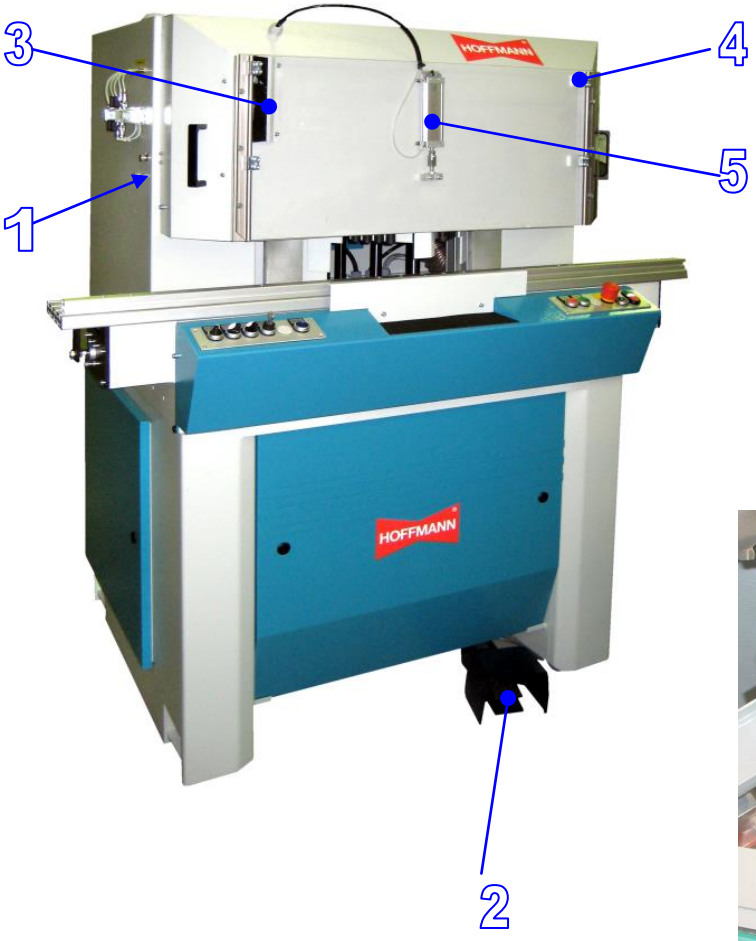
POS	Part Number	Description
1	K21R90S2AH	Saw Motor
2	6206.2RS1 / C2	Arbor bearing
3	7.112006-05-4	Flange
4	PJ-813-8	Drive Belt
5	10x10-M6x6	Rubber bumper
6	0822032205	Material clamping cylinder
7	D350-B30	HOFFMANN saw blade, 350mm x 30mm

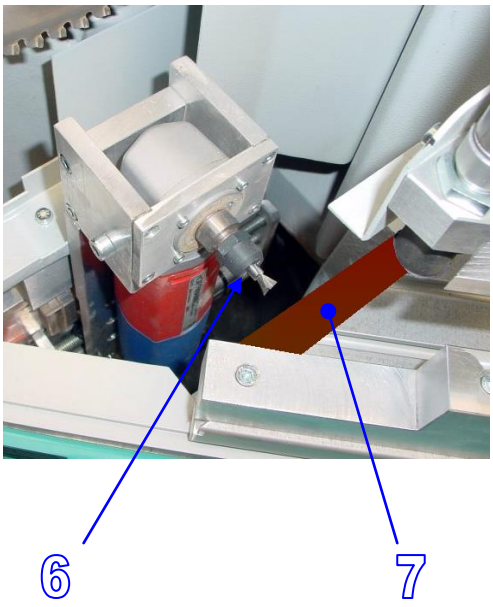
20.3.2 Parts List for router unit



POS	Part Number	Description
1	OP3-A-1.7/5-SX-F14-R-P6-01	Mechanical counter
2	UWC-24-R	500 watt router motor with gear head
3	KUVE-20-W-H200	Carriage unit
4	KPZ-9-25	Pneumatic cylinder

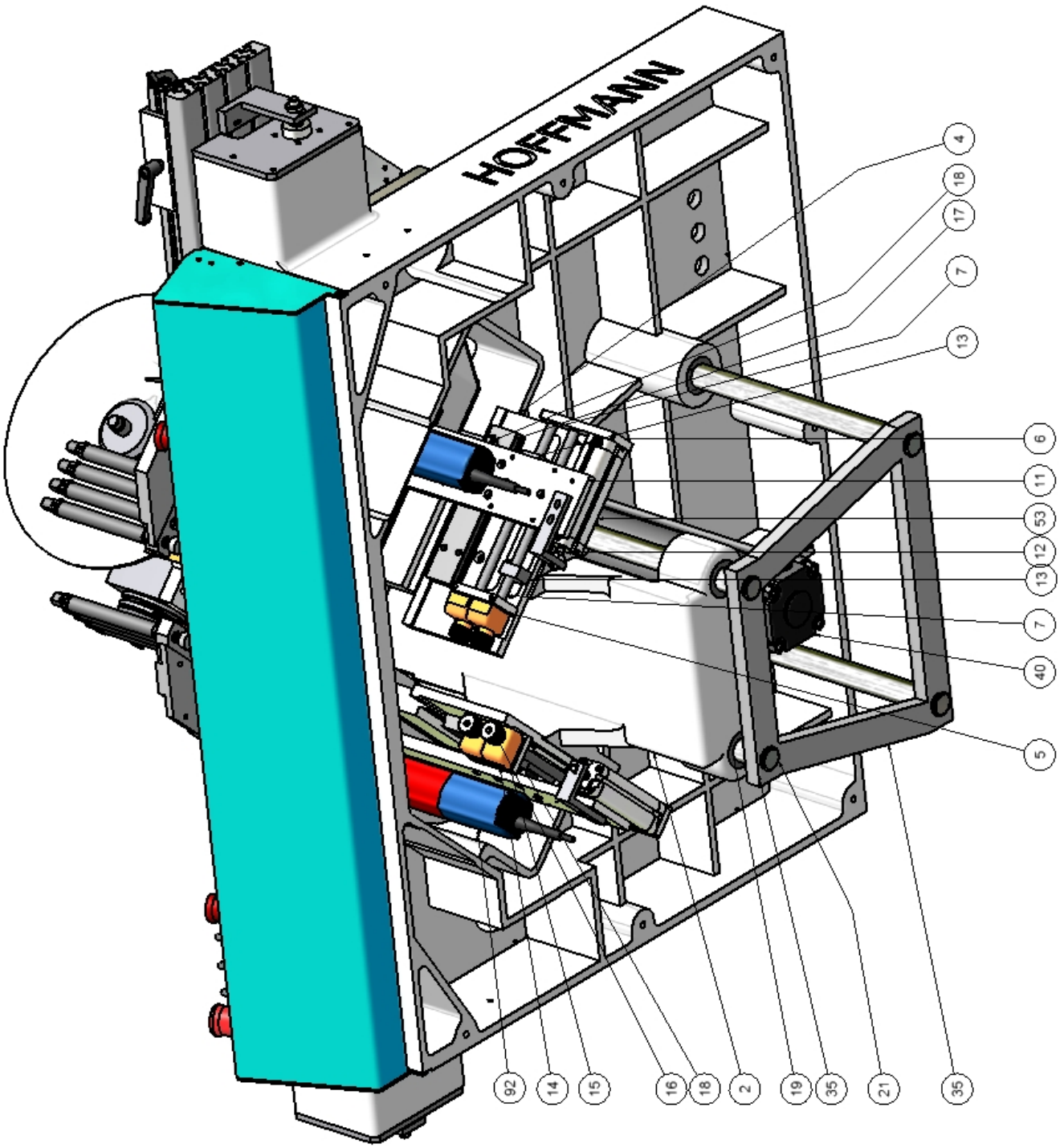
20.3.3 Parts





POS	Part Number	Description
1		Mechanical time-delay safety switch
2		Foot Switch
3		Switch
4		Guides for safety shield
5		Pneumatic cylinder
6	W1-W3	Hoffmann-router bits
7	E7113042	Chip breaker – table insert set

20.3.4 Machine diagram


HOFFMANN
4
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35

POS	Part Number	Description	Qty.
1	7.148001-07-0	MS35-SF-base frame	1
2	7.148003-03-1	Router carriage	1
3	7.148012-03-2	Base plate, left	1
4	7.148013-03-2	Base plate, right	1
5	7.148014-01-4	Plate, digital counter	2
6	7.148015-02-4	End plate	2
7	7.148016-00-3	Threaded rod	4
8	7.148017-01-4	Stop	2
9	7.148018-01-4	Motor mount	2
10	7.148019-04-4	Bracket, left	4
11	7.148021-04-2	Motor base plate	2
12	7.148022-01-4	Angle bracket	2
13	7.148023-02-4	Stop block – proximity switch	4
14	FIAMA-OP3	Gasket, digital counter	4
15	FIAMA-OP3	Digital counter	4
16	7.148042-00-4	Knurled knob	4
17	TKVD20W-L200	Guide track	2
18	KWVE20-W	Guide carriage	2
19	KT-KBS-3068	Linear bearing	12
20	7.148024-05-1	Base plate, saw carriage	1
21	D30x850-M8x20	Precision guide ords	4
22	7.148074-05-1	Guide rod reinforcement	4
23	7.148026-02-3	Arbor block	2
24	7.148027-05-3	Arbor, left hand thread	2
25	7.148030-00-4	Cover plate, front	2
26	7.148031-00-4	Cover plate, rear	2
27	7.148044-00-4	Stop block	4
28	7.148043-03-2	Motor plate	2
29	7.148046-01-4	Adjustment block	4
30	020020496	Saw motor	2
31	D57.5	Belt pulley 57.5	4
32	D=350mm-B30	Saw blade D=350mm	2
33	7.112006-05-4	Flange	2
34	7.148033-04-4	Cylinder plate	2
35	7.148040-02-2	Guiode rod brace	1
36	7.148032-01-1	Machine table, left and right	2
37	KWVE-25W	Table carriage	4

38	TKVD25-W-450	Table, guide track	2
40	TRB-1-80-A	Pneumatic cylinder	1
43	KPZ-9-63-A	Pneumatic cylinder	1
45	1826409003	Connector M12x1,25	1
46	7.148010-04-3	Mounting bracket f. clamp cyl.	1
47	7.148009-02-4	Support for mtg. bracket	2
48	7.113056-01-3	Cylinder bracket, left	1
50	TRB-5-40-A	Pneumatic cylinder	2
53	KPZ-9-25-A	Pneumatic cylinder	2
55	7.148050-02-3	Cylinder bracket, right	1
56	7.148051-02-3	Cylinder bracket, left	1
57	0822032205-A	Pneumatic cylinder	8
59	10x10-M6x6	Rubber bumper 10x10-M6x6	8
60	rail-30-30-723	Fence rail	2
61	PJ-813-8 Rippen	Drive belt	2
62	7.113045-01-4	Chip breaker	2
63	7.148011-04-3	Mounting bracket f. clamp cyl.	1
64	7.113055-01-3	Cylinder bracket	1
65	7.148029-01-4	Spacer	2
66	SKF 6206-2Z	Ball bearing	4
67	7.148057-01-3	Spacer bracket	2
68	7.148056-00-4	Spacer	2
69	7.148058-00-3	Bracket	2
70	7.148052-04-2	Dust collection, left	1
71	7.148053-04-2	Dust collection, right	1
72	7.148073-00-4	Safety guard, left	1
73	7.148072-00-4	Safety guard, right	1
74	7.148069-01-4	Dust chute cover	2
75	1827001632	Connector Zyl.D80	1
76	7.148002-06-0	Machine base MS35	1
77	7.148006-07-1	Operator console MS35-SF	1
78	7.148061-01-2	Scrap chute	1
79	7.148064-00-4	Adaptor	4
80	7.148065-00-4	Adjustment block	2
81	DIN 933 - M10 x 60	Bolt	2
82	DIN 934 - M10	Nut, M10	2
83	7.148071-00-4	Plate	2
84	7.148081-00-3	Angle	1
85	KT-Sensor-D12x32	Proximity switch	2

86	M12 x 100	Bolt M12 x 100	2
87	DIN 6319-13	Disc D13	4
88	14,2-Form D	Fitting D14,2	4
89	DIN 934 - M12	Nut M12	4
90	7.148082-00-3	Angle bracket	1
91	900784.00	Length Stop, complete	1
92	UWC-24-R	Router Motor, 500 watt	2
93	1823351016	Pneumatic fitting G1/4"	1
94	M20x1,5	Wire connector	21
95	M25x1,5	Wire connector	4
96	7.148068-00-2	Machine top	1
96.1	7.148004-05-1	Machine front cover	1
97	7.148048-01-2	Safety shield	1
98	06929-12001	Handle	2
99	GN300-63-M6	Locking lever	2
100	7.148063-00-4	Bracket, proximity switch	2
101	7.148062-00-4	Adjustment piece	2
102	7.148070-01-4	Angle	2
103	7.148084-00-4	Fitted part	2

Input Designation Hoffmann MS 35 SF double miter saw, ver. 2013

Component									
CPU	Power Supply	8*Input		8*Input		8*Input		8 Input / 4Output	
Module									
CP (1)	PS (2)	3		4		5		6	
Typ									
X20 CP 0201	**X20 PS9502**	**DI 8371**		**DI 8371**		**DI 8371**		**DM 9324**	
CPU	**PS**	**E0.1**	**E0.2**	**E1.1**	**E1.2**	**E2.1**	**E2.2**	**E3.1**	**E3.2**
		motor protection OK	control ON	selector switch sawing + routing (W 7.3)	selector switch routing pos. 1 (W 7.4)	cylinder sensor table right home position	cylinder sensor table right open position	cylinder sensor router UP home position	cylinder sensor router UP Pos. 1
		E0.3	**E0.4**	**E1.3**	**E1.4**	**E2.3**	**E2.4**	**E3.3**	**E3.4**
		clear safety shield closed	push button Start	selector switch routing pos. 2 (W 7.5)	optional selector switch long - short (W 7.6)	cylinder sensor table left home position	cylinder sensor table left open position	cylinder sensor router UP Pos. 2	safety switch clear front cover home position
X20 CP 0201	X20 PS9502	**E0.5**	**E0.6**	**E1.5**	**E1.6**	**E2.5**	**E2.6**	**E3.5**	**E3.6**
		push button Stop	keyed selector switch (W7.9)	foot switch clamping	cylinder sensor router UP brake	cylinder sensor router pos. R home position	cylinder sensor router pos. R end position	spare	spare
		E0.7	**E0.8**	**E1.7**	**E1.8**	**E2.7**	**E2.8**	**E3.7**	**E3.8**
		push button Set Up (W 7.7)	push button Set Up (W 7.8)	cylinder sensor saw carriage home position	cylinder sensor saw carriage end position	cylinder sensor router pos. L home position	cylinder sensor router pos. L end position	spare	spare

Output Designation Hoffmann MS 35 SF double miter saw, ver. 2013

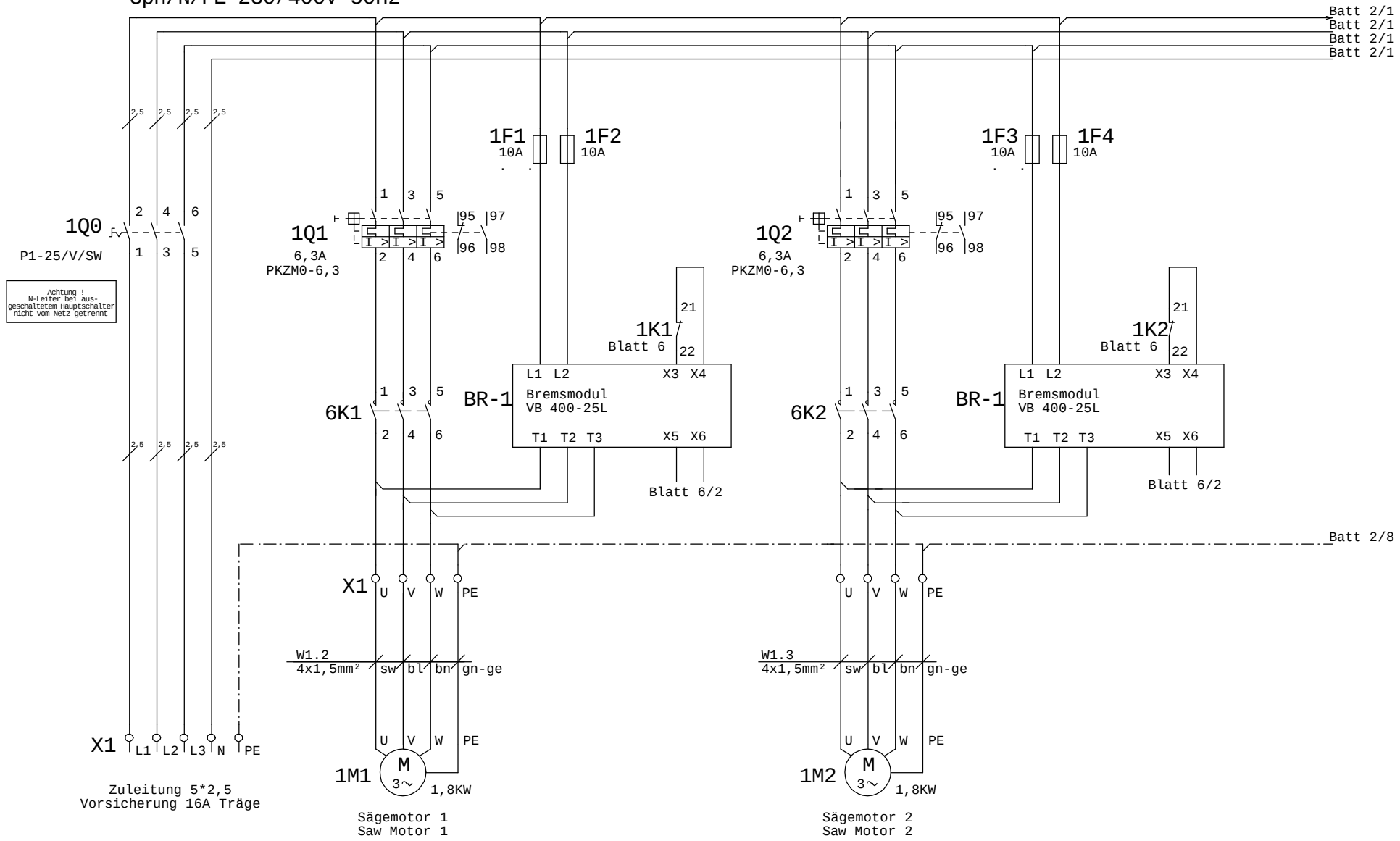
component									
8+4*Input/Output		8*Output		8*Output					
Module									
6		7		8					
Typ									
DM 9324		**DO 8332**		**DO 8332**					
A0.1 NAM	**A0.2 NAM**	**A1.1 NAM**	**A1.2 NAM**	**A2.1 NAM SS**	**A2.2 NAM SS**				
lamp - system ON (W 6.15) KL.25	lamp status (W 7.13)	Valve - clamp, close (R0./A1)) gray-pink	Valve - clamp, open purple	Valve - saw carriage R0.0/14 (brown)	Valve - pressure reversing brown, green brown, red				
A0.3 NAM	**A0.4 NAM**	**A1.3 NAM**	**A1.4 NAM**	**A2.3 NAM SS**	**A2.4 NAM SS**				
spare	spare	Valve - shield closed brown pink	Valve - shield open white pink	Valve - router UP yellow, red	Valve - router down green red				
		A1.5 NAM	**A1.6 NAM**	**A2.5 NAM SS**	**A2.6 NAM SS**				
		Valve, table R, close gray	Valve, table L, close red	Valve, table R open pink	Valve, table L open black				
		A1.7 NAM	**A1.8 NAM**	**A2.7 NAM**	**A2.8 NAM SS**				
		Valve - router pos. 2 L+R yellow	yellow pink	router motor R+L	spare				

Projekt:	Kunde:
Doppelgehrungssäge MS 35-SF / S07.148.01	Hoffmann GmbH Mergelgrube 5 76646 Bruchsal

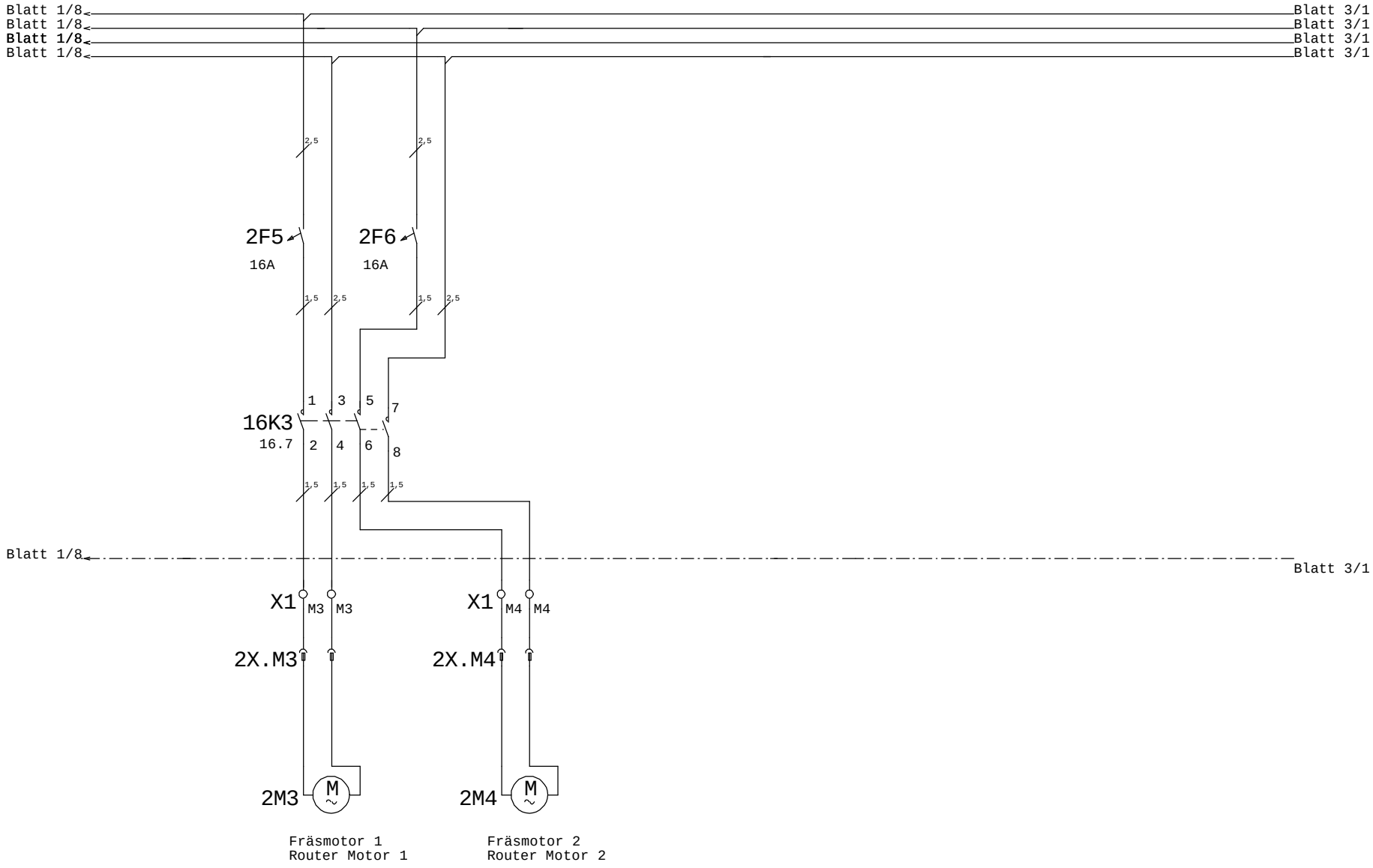
Com: 290710
Ausführung mit B&R Steuerung

Netz:	3ph/N/PE 230/400V 50Hz	VDE 0100/0113 IEC 60204-1
Betriebsspannung:	230/400V	Farben:
Steuerspannung :	24V DC	Hauptstromkreis: schwarz Neutralleiter: hellblau
Hilfsspannung :		Steuerstromkreis 24V DC: dunkelblau Steuerstromkreis 230V: rot
Anschlußwert :	5KW	
Vorsicherung :	16A Träge	
Schutzart :	IP 54	

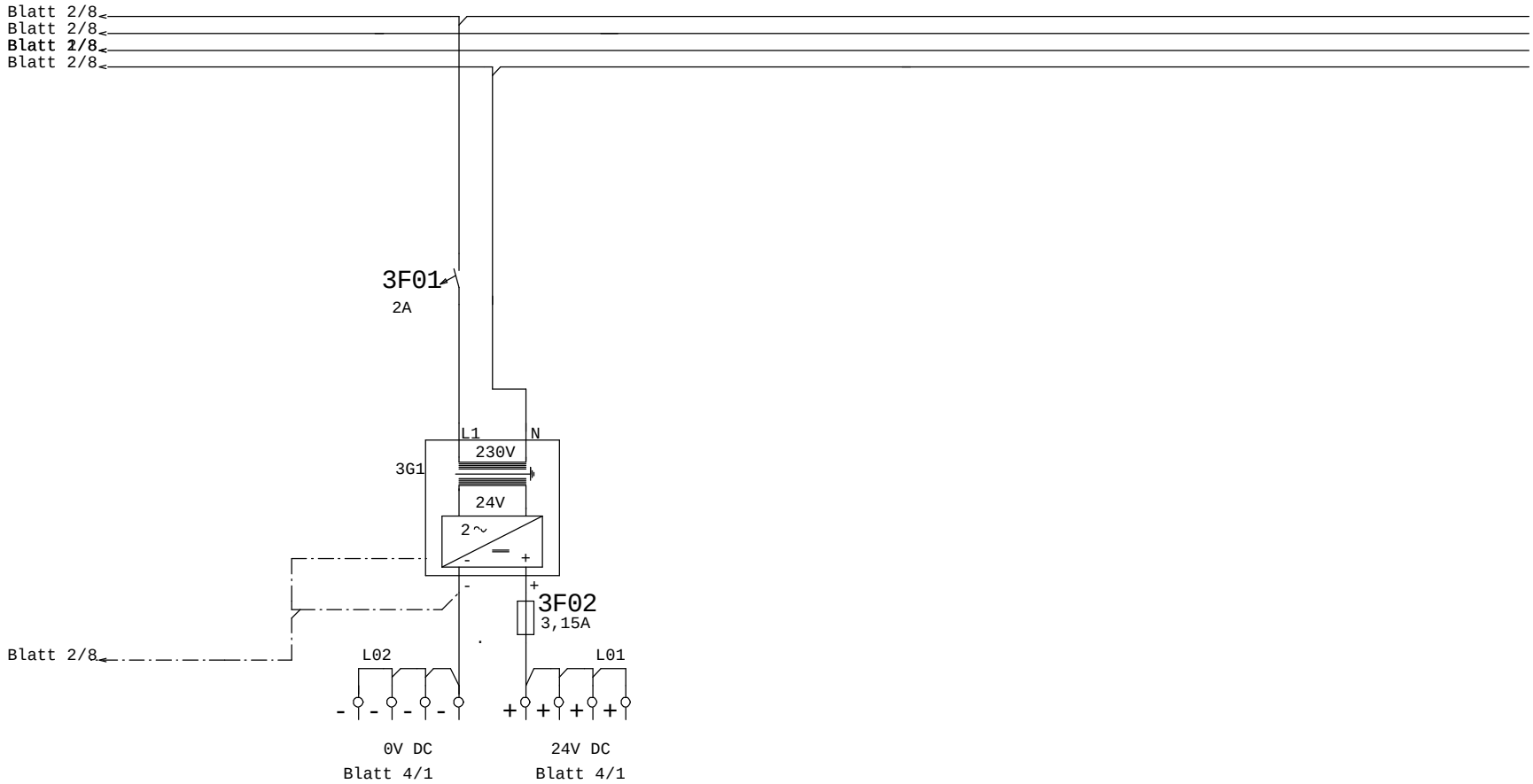
				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal			Deckblatt	Z-290710	=
				Bearb.							+
				Gepr.						290710	Blatt 1
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.			von 1Bl.



				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal	M.Freidel Steuerungs- technik	Hauptstromkreis	Z-290710	=
				Bearb.						+
				Gepr.					290710	Blatt 1
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		von 22 Bl.



				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs- technik	Hauptstromkreis	Z-290710 = +
				Bearb.						
				Gepr.						290710 Blatt 2
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		von 22 Bl.

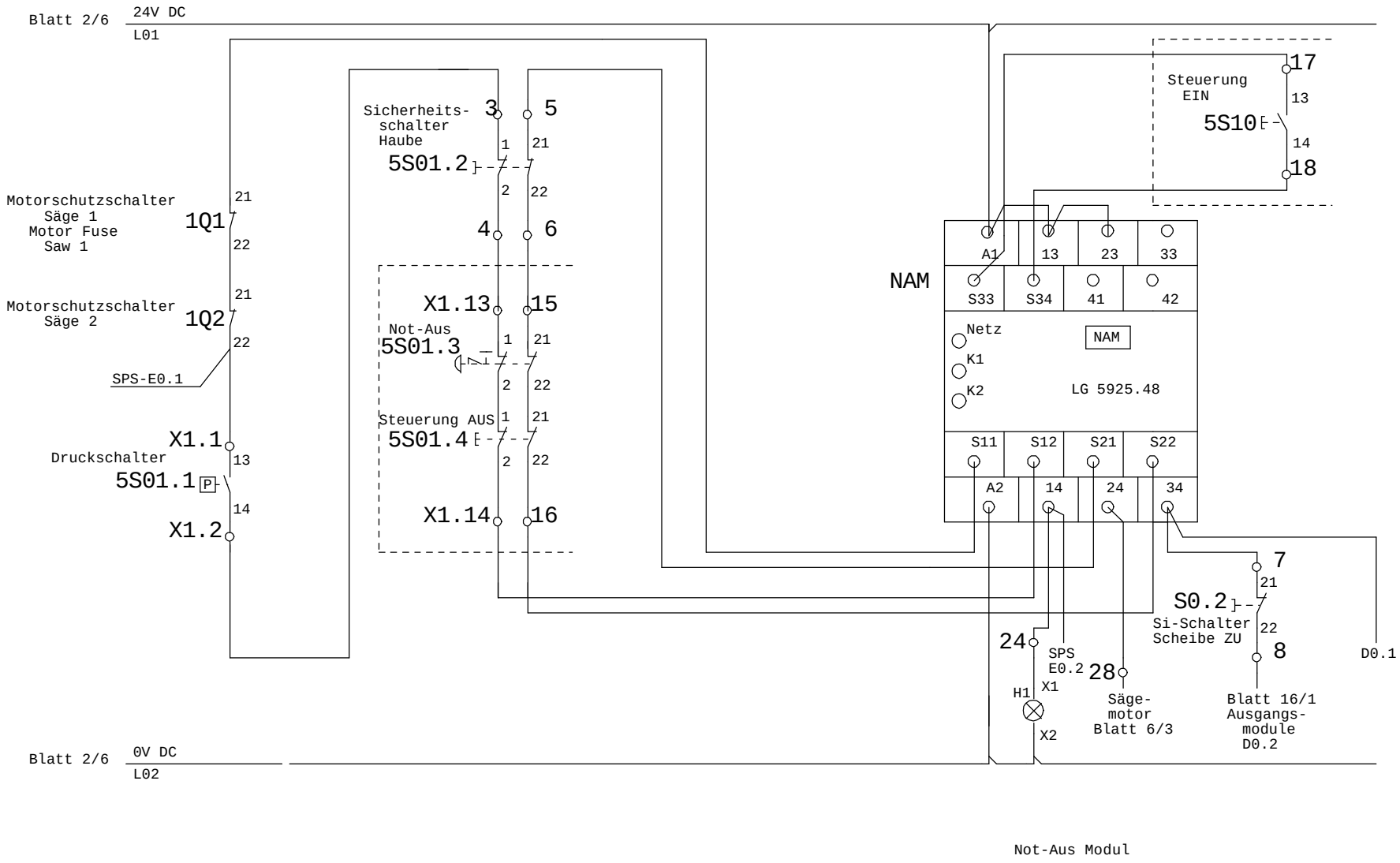


Gleichstromversorgung
DC Power Supply
24V DC

				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal	M.Freidel Steuerungs- technik	Gleichstromversorgung	Z-290710	=
				Bearb.						+
				Gepr.					290710	Blatt 3
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		von 22 Bl.

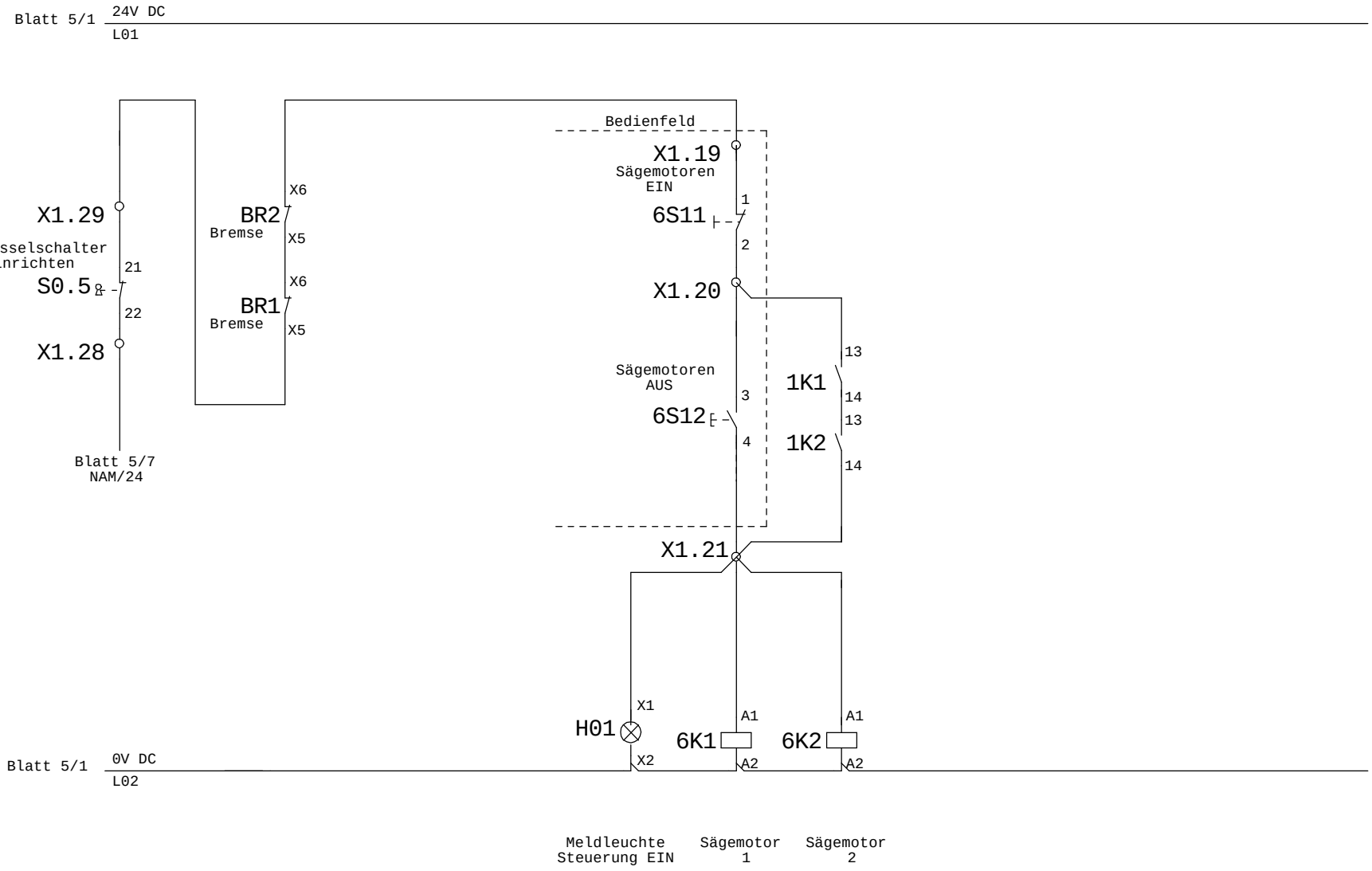
Reserve Blatt

				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs- technik	Reserve	Z-290710	=
				Bearb.							+
				Gepr.						290710	Blatt 4
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.			von 22 Bl.



Not-Aus Modul

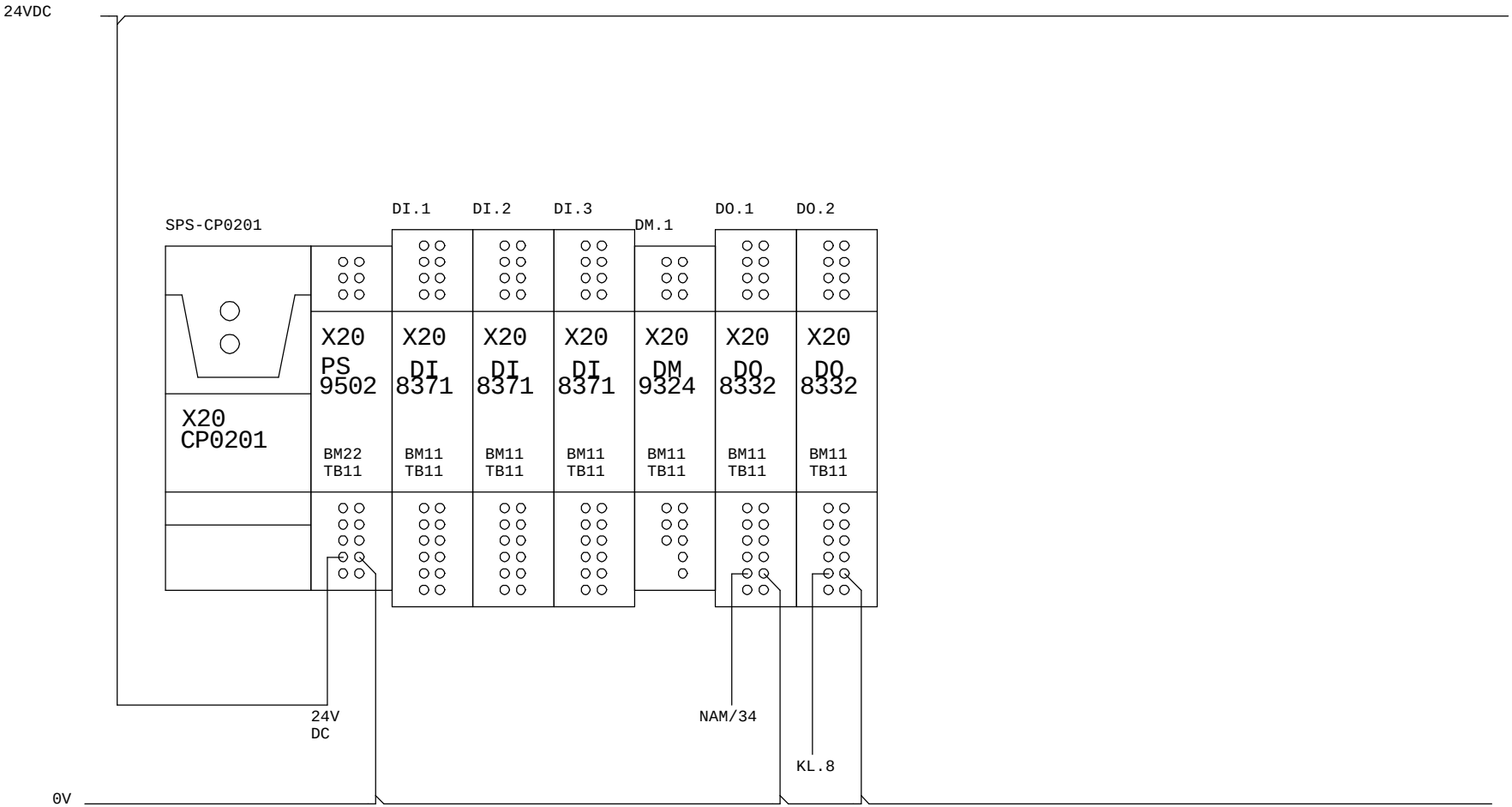
				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal	M.Freidel Steuerungs- technik	Not-Aus Kreis	Z-290710	=
				Bearb.						+
				Gepr.					290710	Blatt 5
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		von 22 Bl.



				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal	M.Freidel Steuerungs- technik	Sägemotoren	Z-290710	=	
				Bearb.						+	
				Gepr.					290710	Blatt 6	
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		von 22 Bl.	

Reserve Blatt

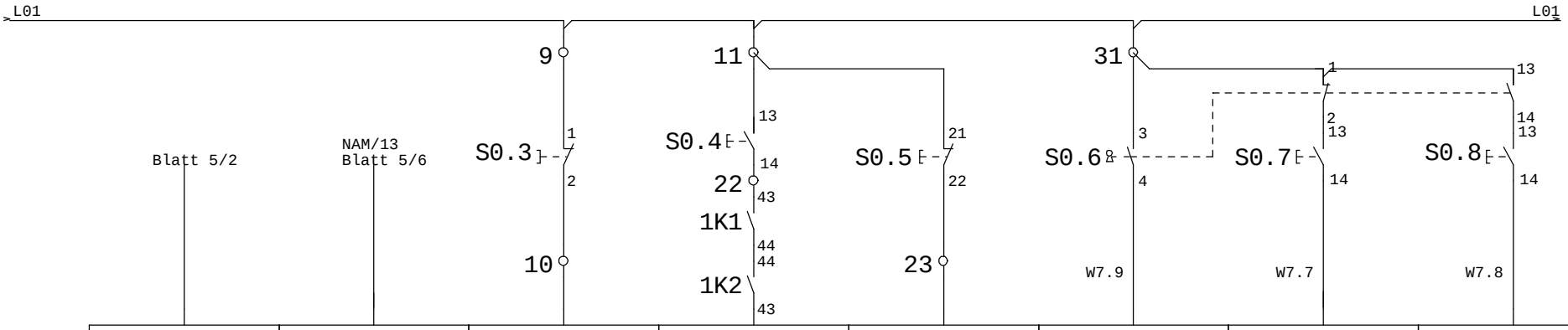
				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs- technik	Reserve	Z-290710	=
				Bearb.							+
				Gepr.						290710	Blatt 7
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.			von 22 Bl.



				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal	M.Freidel Steuerungs-technik	SPS Aufbau	Z-290710 = +
				Bearb.					
				Gepr.					290710 Blatt 8
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.	von 22 Bl.

Reserve Blatt

				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs- technik	Reserve	Z-290710 =
				Bearb.						+
				Gepr.						Blatt 9
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		290710 von 22 Bl.



E 0.1	E 0.2	E 0.3	E 0.4	E 0.5	E 0.6	E 0.7	E 0.8
Motorschutz+ Druckschalter	Steuerung EIN	SI-Schalter Scheibe ZU	Taster Start	Taster Stop	Schlüsselschalter Einrichten	Taster Set UP	Taster Einrichten
Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang

DI 8371

				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs-technik	SPS Eingangsbelegung
				Bearb.					
				Gepr.					
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.	

Z-290710

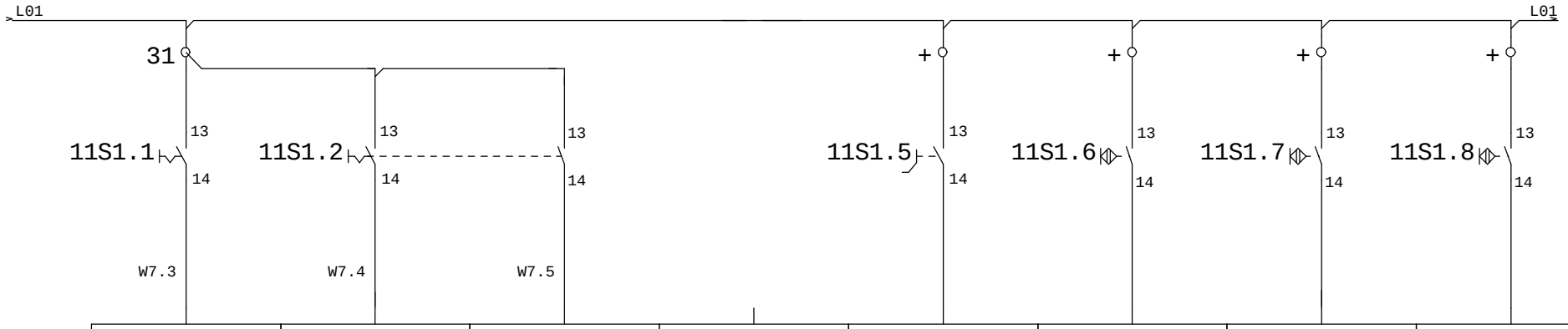
=

+

290710

Blatt 10

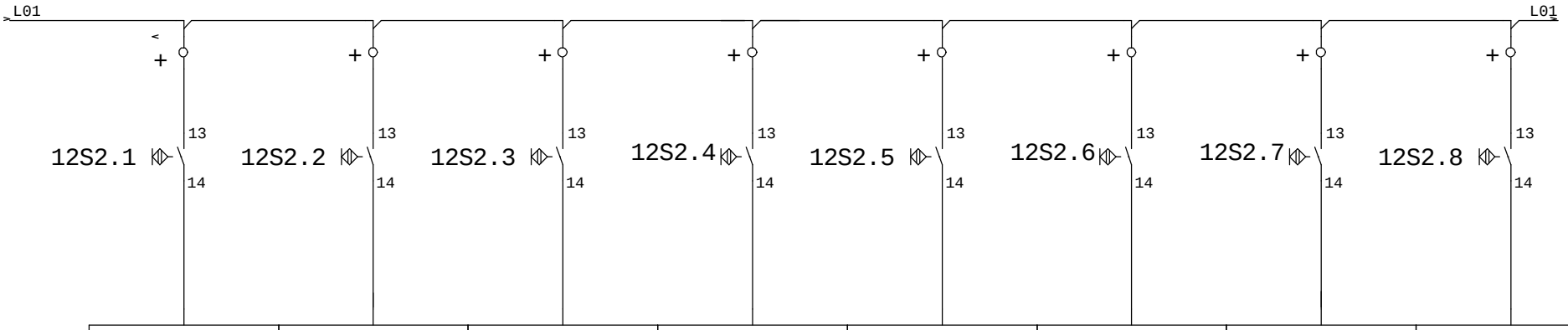
von 22 Bl.



E 1.1	E 1.2	E1.3	E 1.4	E 1.5	E 1.6	E 1.7	E 1.8
Wahlschalter Säge+Fräsen	Wahlschalter Fräsposition 1	Wahlschalter Fräsposition 2	Reserve	Fußschalter Spannen	Zyl.Schalter Fräse Bremse	Zyl.Schalter Säge Grundstellung	Zyl.Schalter Säge Endstellung
Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang

DI 8371

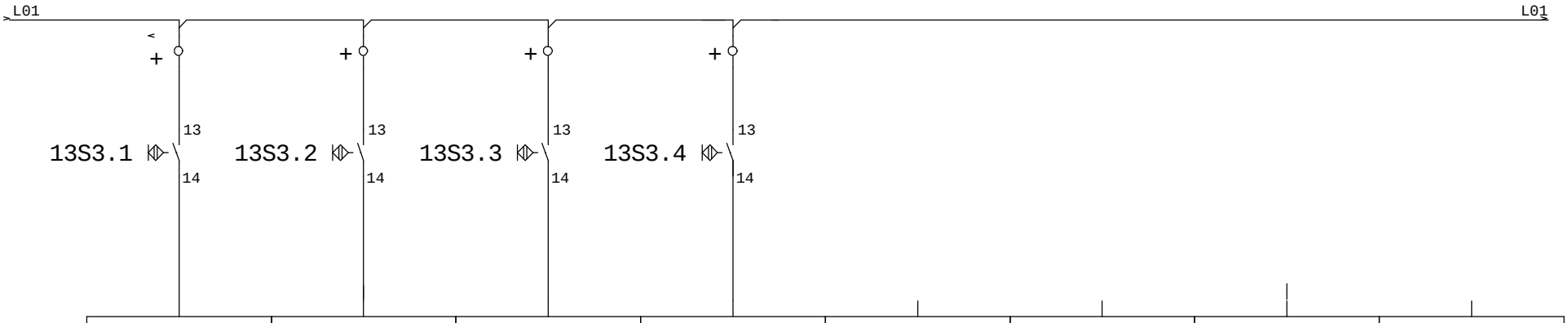
				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs-technik	SPS Eingangsbelegung	Z-290710	=
				Bearb.							+
				Gepr.						290710	Blatt 11
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.			von 22 Bl.



E 2.1	E 2.2	E 2.3	E 2.4	E 2.5	E 2.6	E 2.7	E 2.8
Zyl.Schalter Tisch Rechts Gr.	Zyl.Schalter Tisch Rechts End.	Zyl.Schalter Tisch Links Gr.	Zyl.Schalter Tisch Links End.	Zyl.Schalter Fräsposition R Gr.	Zyl.Schalter Fräsposition R End	Zyl.Schalter Fräsposition L Gr.	Zyl.Schalter Fräsposition L End
Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang

DI 8371

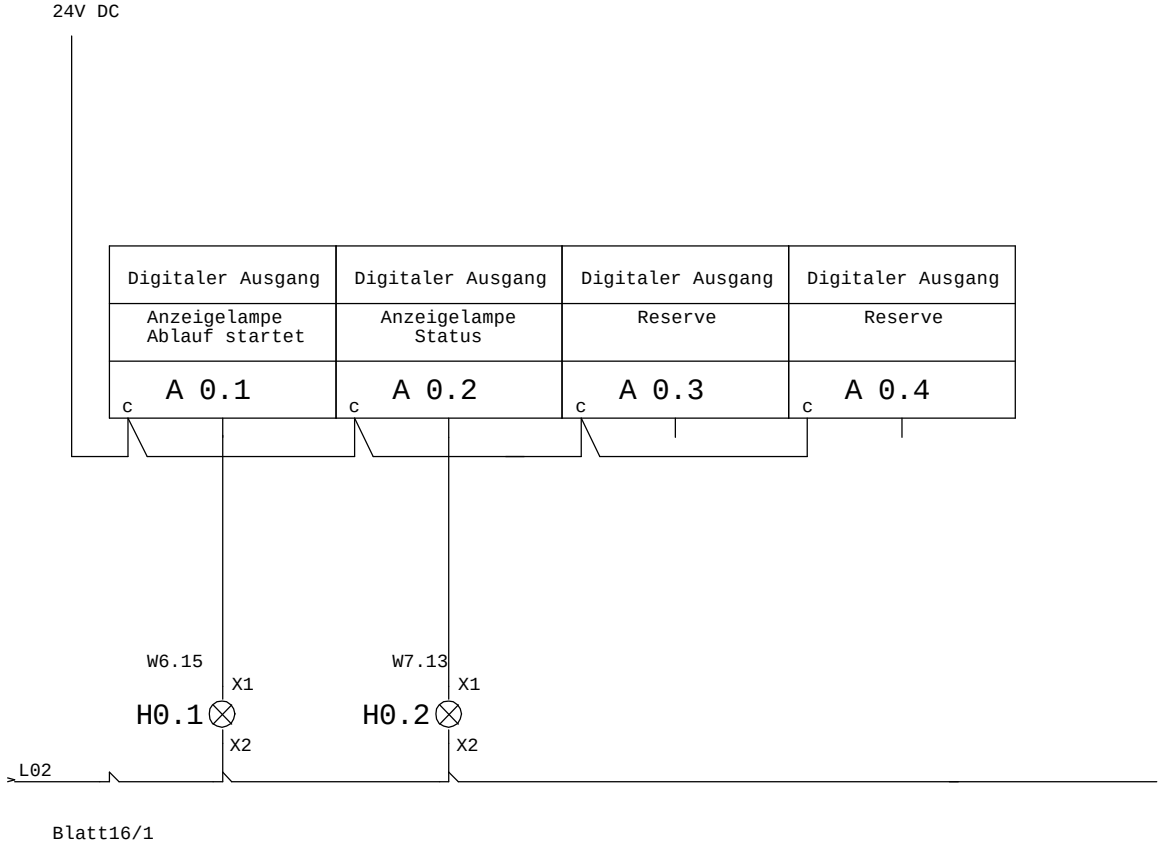
				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs-technik	SPS Eingangsbelegung	Z-290710	=
				Bearb.							+
				Gepr.						290710	Blatt 12
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.			von 22 Bl.



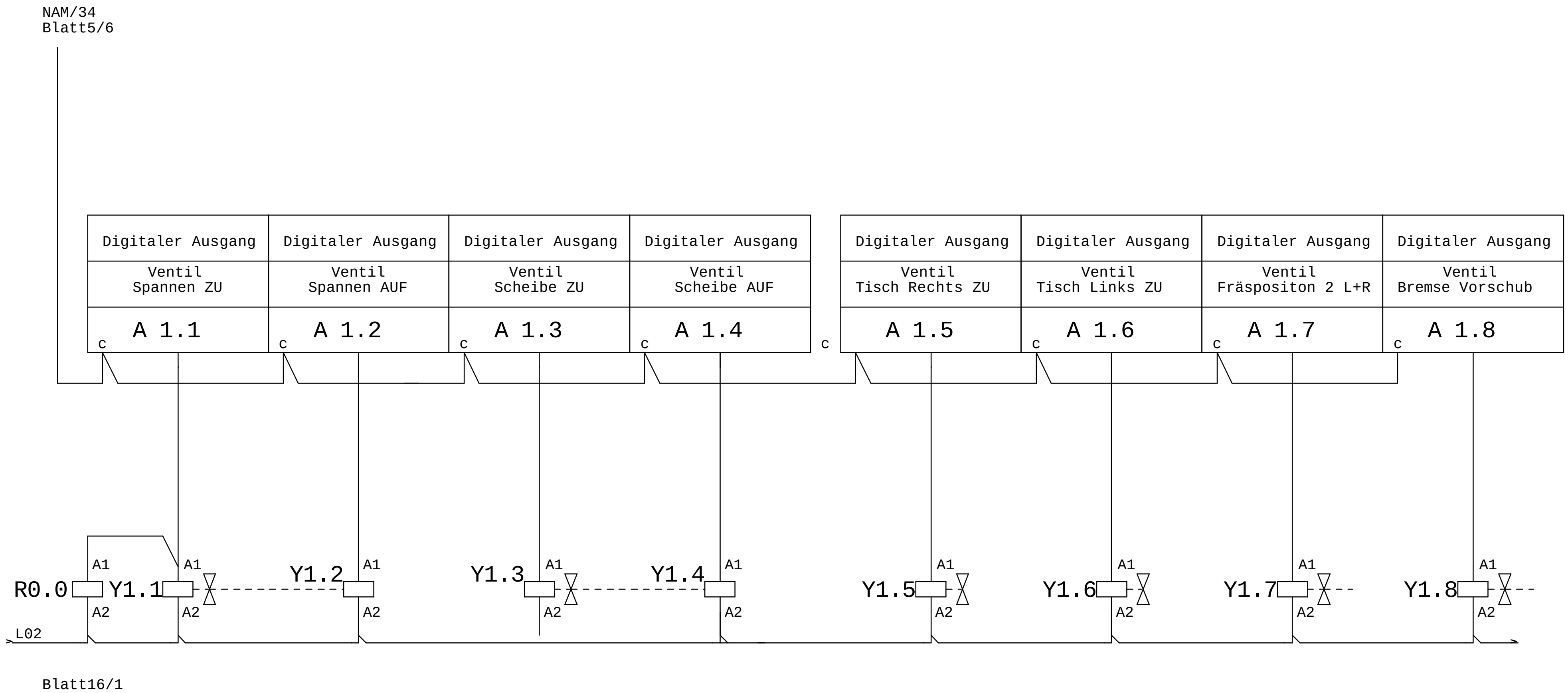
E 3.1	E 3.2	E 3.3	E 3.4	E 3.5	E 3.6	E 3.7	E 3.8
Zyl.Schalter Fräsvorschub Gr.	Zyl.Schalter Fräsvorschub End.1	Zyl.Schalter Fräsvorschub End.2	Zyl.Schalter Scheibe Grundst.	Zyl.Schalter	Reserve	Reserve	Reserve
Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang	Digitaler Eingang

DM 9324

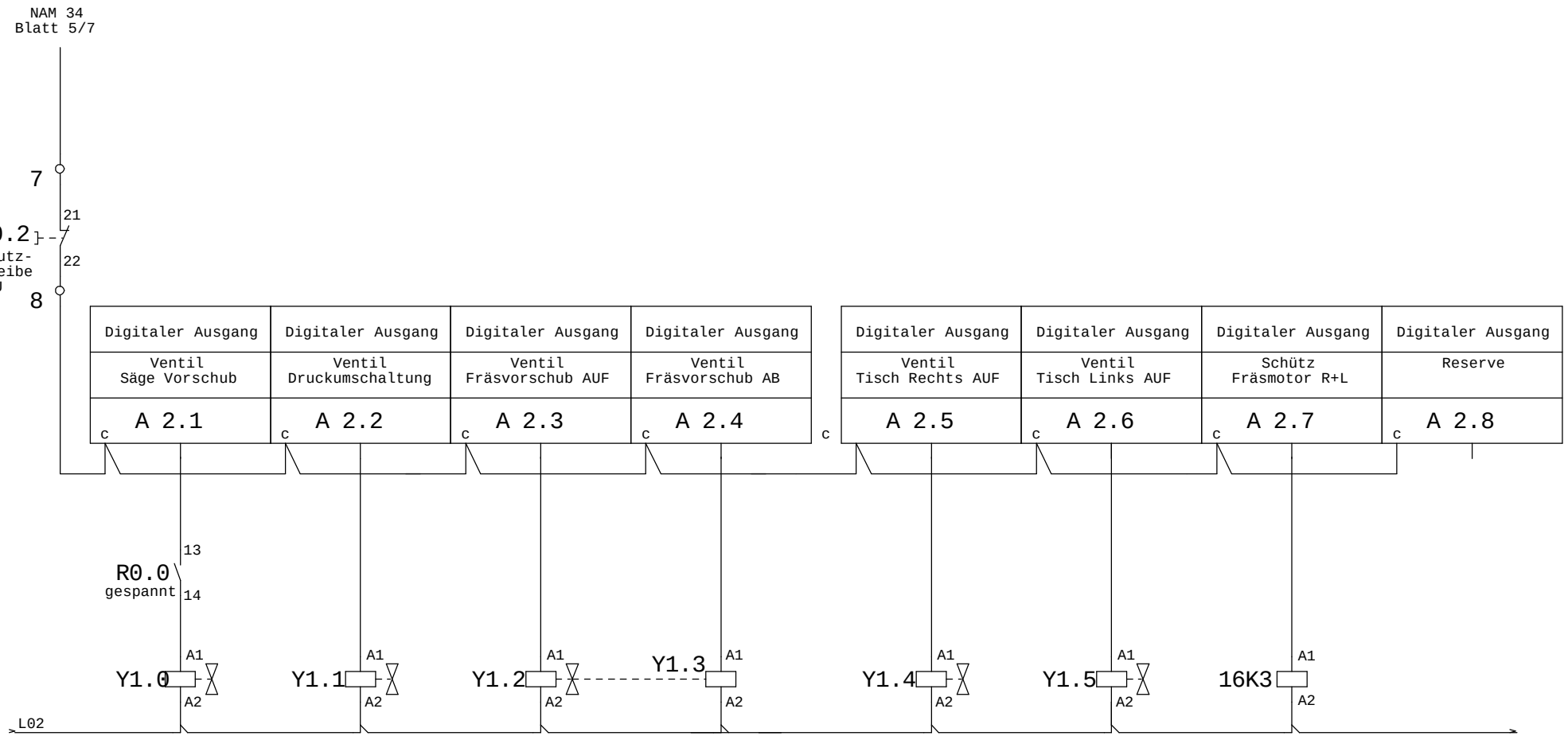
				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs-technik	SPS Eingangsbelegung	Z-290710	=
				Bearb.							+
				Gepr.						290710	Blatt 13
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.			von 22 Bl.



				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal	M.Freidel Steuerungs-technik	SPS Ausgangsbelegung	Z-290710 = +
				Bearb.					
				Gepr.					290710 Blatt 14
Zust.	Änderung	Datum	Name	Norm		Urspr. / Ers. f.	Ers. d.		von 22 Bl.



				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal	M.Freidel Steuerungs- technik	SPS Ausgangsbelegung	Z-290710	=
				Bearb.						+
				Gepr.					290710	Blatt 15
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		von 22 Bl.



				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal	M.Freidel Steuerungs- technik	SPS Ausgangsbelegung	Z-290710 = +
				Bearb.					
				Gepr.					290710 Blatt 16 von 22 Bl.
Zust.	Änderung	Datum	Name	Norm		Urspr. / Ers. f.	Ers. d.		

Reserve Blatt

				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs- technik	Reserve	Z-290710 =
				Bearb.						+
				Gepr.						Blatt 17
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		290710 von 22 Bl.

Reserve Blatt

				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs- technik	Reserve	Z-290710 =
				Bearb.						+
				Gepr.						290710 Blatt 18
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		von 22 Bl.

Reserve Blatt

				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs- technik	Tasterfeld Rechts	Z-290710 =
				Bearb.						+
				Gepr.						290710 Blatt 19
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		von 22 Bl.

Reserve Blatt

				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs- technik	Tasterfeld Links	Z-290710 =
				Bearb.						+
				Gepr.						290710 Blatt 20
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		von 22 Bl.

Reserve Blatt

				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs- technik	Reserve	Z-290710	=
				Bearb.							+
				Gepr.						290710	Blatt 21
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.			von 22 Bl.

Reserve Blatt

				Datum	24.09.2012	MS35SF Hoffmann GmbH Mergelgrube 5 76646 Bruchsal		M.Freidel Steuerungs- technik	Reserve	Z-290710 =
				Bearb.						+
				Gepr.						290710 Blatt 22
Zust.	Änderung	Datum	Name	Norm		Urspr.	Ers. f.	Ers. d.		von 22 Bl.