CNC Twin-Spindle Precision Lathe

XW-50

Instruction Manual
(CE Specification, with FANUC CNC)

Safety Guide

Specifications

Installation

Operation

Maintenance

Loader System

Special Version

- Read and understand this Manual thoroughly before starting operation.
- This Manual includes the specifications and drawings for the standard machine. Therefore, the specifications and drawings in this Manual may differ from those of your customized machine. If you have any questions, please contact your local distributor.
- This Manual should be kept carefully.

Kept by; _____

TAKAMATSU MACHINERY Co., Ltd.

Introduction

Thank you for purchasing a Takamatsu CNC Precision Lathe. This machine is designed and manufactured giving first priority to safety precautions according to nationally recognized standards, so that it can be operated safely.
However, safe operation cannot always be ensured if an operator misuses the machine or ignores safety regulations. Failure to comply with these instructions will damage the machine and products as well as result in critical bodily injuries.

Read the attached manuals thoroughly and understand the correct procedures for operation so that the machine can be operated efficiently and safely.

Ignoring the safety precautions in this Manual will result in bodily injuries. Aside from these precautions, there are many "Don'ts" to be observed when operating the machine. It should be considered a "Don't" if not stated in this Manual.

In this Manual, safety instructions are classified into three levels of seriousness regarding personal injury or machine damage, as indicated by the following marks. Pay particular attention to the safety instructions regarding situations that are extremely dangerous.

Failure to follow the instructions will result in critical bodily injuries.

Failure to follow the instructions will result in serious bodily injuries.

Failure to follow the instructions may result in less serious bodily injuries or machine damage.

* The word "qualified" used in this Manual refers to persons who are qualified to perform operation and maintenance of this machine as authorized by a safety control supervisor.

* Outline drawings, dimensions, and types and quantities of parts described in this manual are subject to change according to modifications made to this machine. For part replacement, consult Takamatsu about the type and quantity of the replacement part and place an order correctly.

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About This Manual

This Instruction Manual describes the following model :

Model	XW-50 (CE Specification, with FANUC CNC)
Manufacturer	Takamatsu Machinery Co., Ltd.

Consisting of:

Safety Guide	Safety precautions
Specifications	Machine specifications, drawings
Installation	Machine installation procedures
Operation	Machine operation procedures
Maintenance	Inspection, oiling, trouble-shooting, adjustment, replacement
Loader System	Loader system operation and maintenance procedures
Special Version	Instruction to operate the optional equipment

If you have any questions or doubts about this instruction manual, feel free to contact us or your local agent at any time.

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Chapter 1 Basic Conditions for Safe Operation

The following are the basic conditions that must be strictly observed.

Only qualified personnel should do the handling of the machine.

Those who can operate and maintain the machine should be furnished with the necessary training, be knowledgeable about safe operation, and be qualified by an authorized person in safety maintenance.
Establish in-shop regulations for qualification standards. Electrical maintenance in particular should be carried out by qualified personnel as stated in nationally recognized safety standards and legal and governmental regulations.
Our company shall not be responsible for any incidental or consequential damages to the machine, or bodily injuries resulting from any abuse, misuse, misapplication or improper operation by unqualified personnel.

Read the instruction manual carefully and understand the contents thoroughly.

The machine is equipped with various manuals for safe operation. These manuals cover all the right procedures and prohibited items concerning machine operation, program creation and maintenance. These should be read carefully before starting operation. Our company shall not be responsible for any incidental or consequential damages to the machine or bodily injuries resulting from any abuse, misuse, misapplication or improper operation by an unknowledgeable operator.

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Always keep the attached manuals besides the machine.

Assign someone to keep the manuals at a designated place beside the machine so that they can be used by anybody anytime. If any of the manuals become illegible or lost, contact your local distributor for replacement. Inform us of the machine model and serial number so that the correct manual can be sent to you at your cost.

The keys should be kept securely by an authorized person.

This machine is equipped with keys as safety devices. For safe operation and maintenance, put someone who is knowledgeable about machine operation and safety regulations in charge of the keys.

All the persons in charge of machine operation should be aware of the emergency stop button locations, functions and operation.

Procedures for communication and necessary measures should be discussed in case of emergency, and stated in the in-shop regulations.

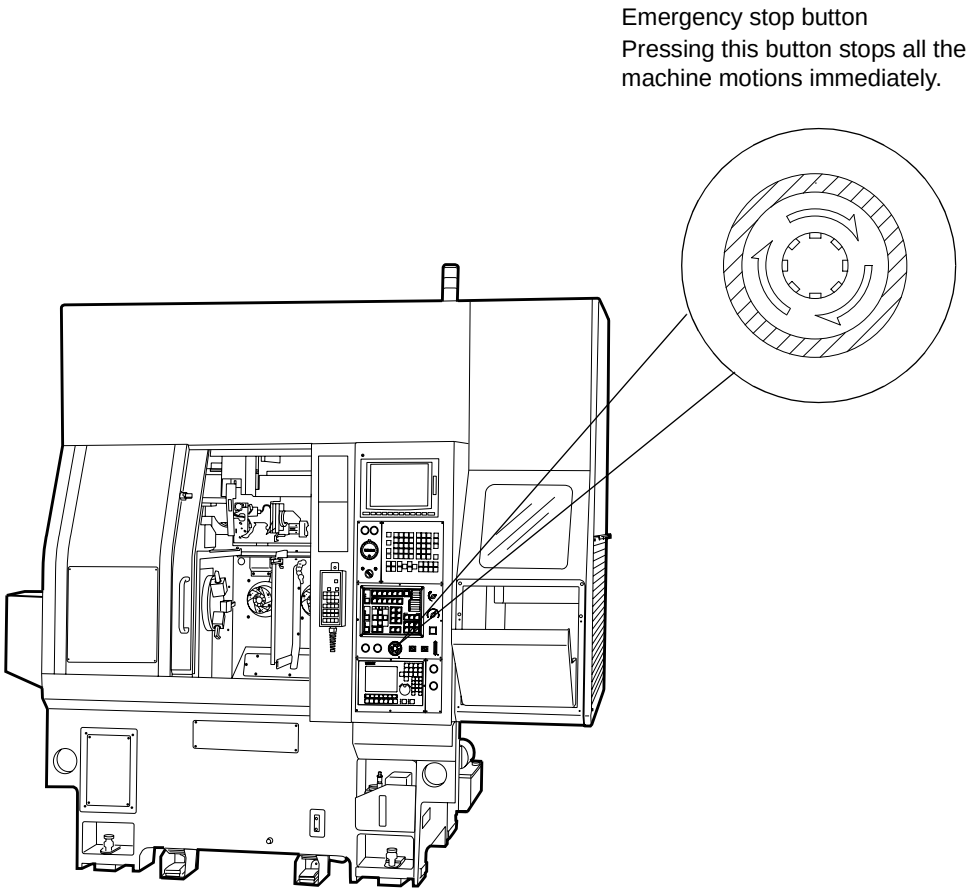

Fig. 1

* If you have any questions or doubts about the safety instructions described in this instruction manual, feel free to contact your local distributor at any time.

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Chapter 2 Preparation for Safe Operation

Check the following points to operate the machine safely.

Installation environment	• Avoid direct sunlight or heat source which will generate a partial temperature rise. - Ambient temperature: 0 - 40°C (20°C±2 is most recommended.) - Change in temperature: Max. 1°C/min. • Keep apart from other machines which may splash water, oil or chips. • Keep apart from press machines and forging machines to prevent transmission of vibration. - Installation site should be below 0.5G. Take anti-vibration measures if necessary. • Humidity should be below 75% without dew condensation. • Installation site should be free from dust, mist, salt, corrosive gas and other hazardous elements. • The foundation of the machine should have sufficient strength without inclination or unevenness.
Installation and relocation	• Use cranes and forklifts which have passed in examinations prescribed in nationally recognized safety standards and legal and governmental regulations. • Lifting unit and wire rope should be of the specified size without damage. • Handling of cranes, forklifts as well as slinging work should be done by qualified persons. • Lifting and transportation of the machine should be done without giving any vibration or shock.

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Power source and grounding	• Electrical connection should be done by qualified electrical engineers. Power voltage: 3-phase 200/220 V ± 10% Frequency: 50/60 Hz ±2 Hz Power cable: Min. 22 mm^2 (in the case of single-wire cables) • Keep apart from noise sources, such as welding machines, electric discharge machines, etc. • Comply with nationally recognized electrical standards and legal and governmental regulations on grounding. - Never use a grounding electrode together with a machine which may generate noise. - Independently ground the machine to an electrode. - Grounding resistance: Below 100 Ω - Grounding cable: Min. 22 mm^2 (in the case of single-wire cables) * For the optional specifications, the electric cables (power cable and grounding cable) to use may be different in thickness. Contact Takamatsu before connecting the electric cables.
Lubrication	• Use designated oil. • Never mix oils of different manufacturers. • Never use deteriorated oil or oil mixed with foreign objects.
Compressed air	• Use clean and dry compressed air. • Amount of air to supply should be over the designated level.
Machine environment	• The floor should be free from obstacles to machine operation. • The floor should be free from water and oil. • The working area should be bright enough to ensure safe operation. If not sufficient, use a work light. • When connecting the machine with other equipment such as robots and loaders, provide a cover or safety enclosure around the machine movable area to protect operators from touching the machine. • Installation site should be equipped with devices for air ventilation, deodorization and exhaust. • Provide the work place with appropriate ventilators or exhausting units to clear away dust or gas (flammable gas). If sufficient ventilation is not assured, do not use the machine. • Designated fire extinguishers should be provided at specified places near the machine. • Prepare a first aid kit at a designated place near the machine. • Keep sufficient maintenance area around the machine so that: - opening/closing of the doors can be done easily. - loading/unloading of workpieces can be done easily. - oiling, chip disposal and chip conveyor operation can be done easily.

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Operator's clothing	• Wear a protective helmet, safety shoes and safety goggles that comply with the necessary safety regulations. • Never wear gloves, a ring, a bracelet, a watch, or clothes that are baggy or loose and may be caught up by the machine. • Long hair should be tied or covered with a hat to avoid accidents during operation. • Those who feel dizzy and cannot judge properly due to drinking, medication or sickness should not operate the machine. • Use leather gloves or the like to protect operator's hands during setting up. However, the key and switch operation should be done with bare hands.
Safety control system	• The instruction manual and the safety guide should be kept by authorized personnel at a designated place near the machine so that they can be accessed at any time. • Keys attached to the machine should be kept by authorized personnel. • A supervisor for safety control should be responsible for training operators periodically so that environmental conditions can be checked at any time for safety operation.

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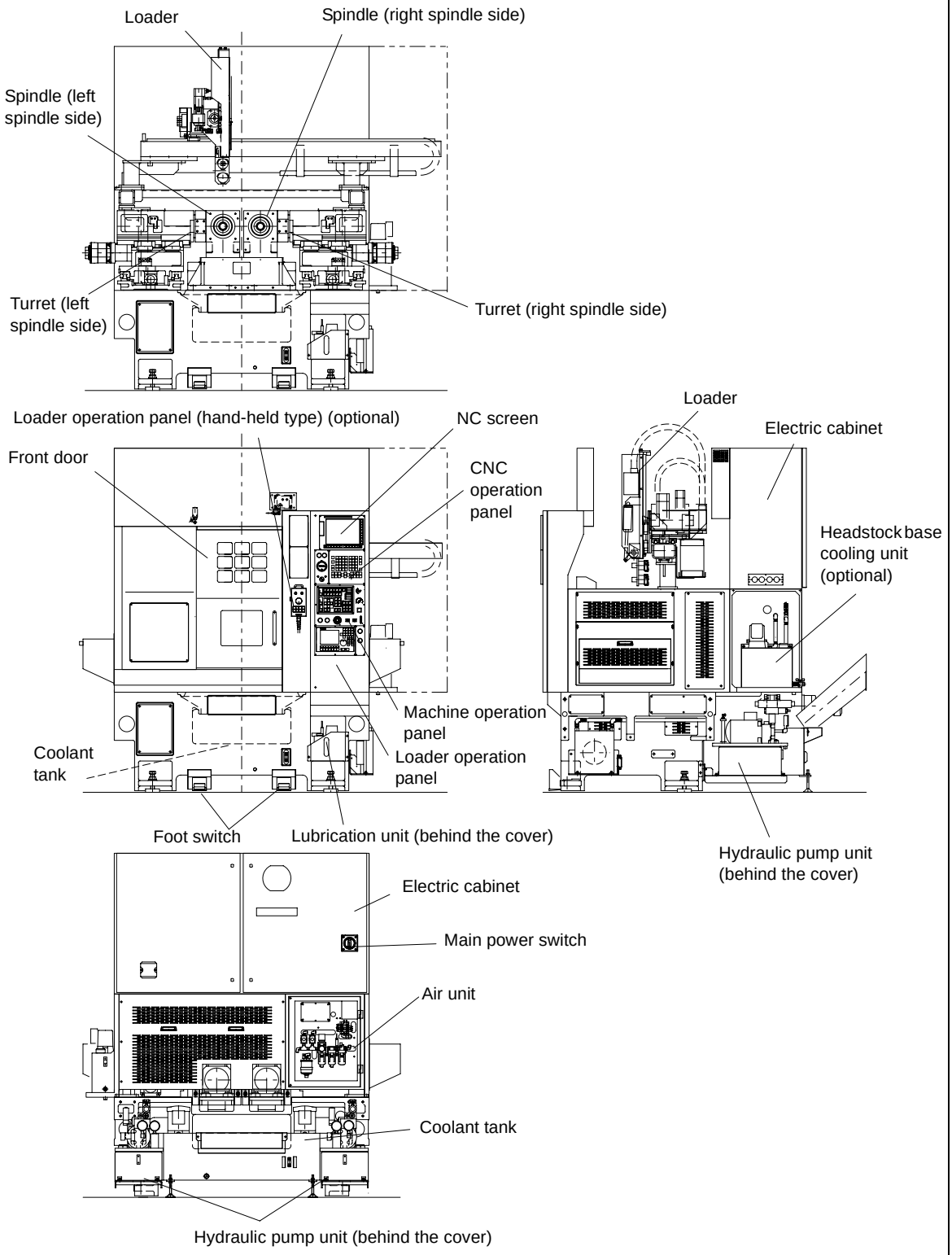
Chapter 3 Name of Each Component

* Location of components may differ slightly according to optional equipment and destination of shipment.



* The above illustration shows a machine equipped with optional features.

Fig. 2

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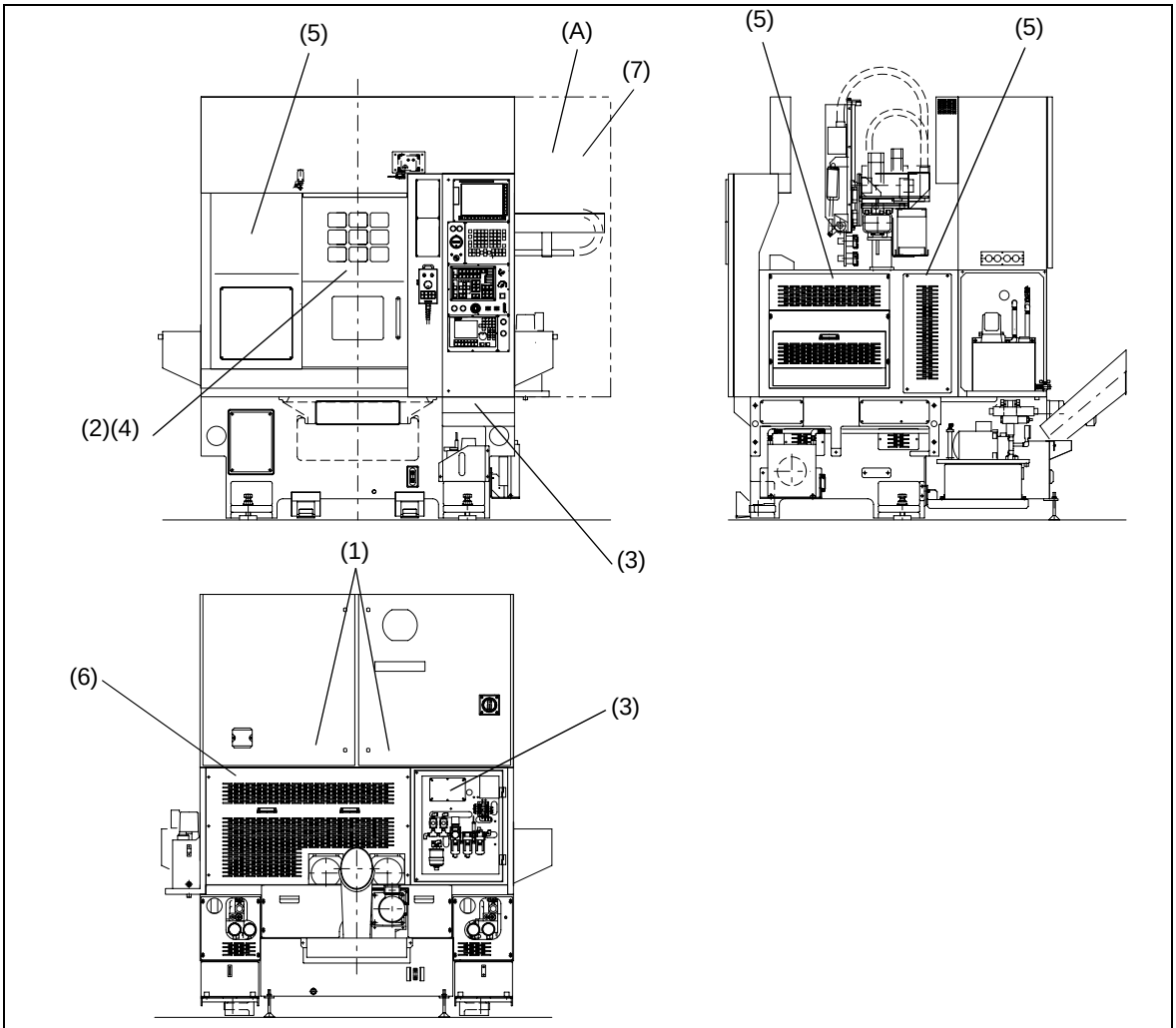
Chapter 4 Warning Labels

The machine is equipped with warning labels for safe and correct operation. Read and understand the cautions printed on the warning labels before starting operation.

If any of the labels become damaged and illegible, contact your local distributor for replacement.

WARNING Never remove or relocate warning labels.



* The above illustration shows a machine equipped with optional features.

Fig. 3

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(A)

Safety Instructions

1. NEVER allow anyone to operate and service this machine except qualified personnel trained for it.
2. NEVER operate this machine in any way until you have read the manuals provided with the machine.
3. ALWAYS understand and obey all instructions and recommendations on the labels attached to the machine and in the manuals provided.
4. Be sure that all personnel know the location of the EMERGENCY STOP BUTTON and how to use it properly.
5. ALWAYS shut off the machine before servicing.
6. NEVER remove warning plates. Keep them clean all times.

Failure to follow these instructions can result in personal injury or machine damage. If you have any questions or doubt on these instructions, contact your supervisor or distributor immediately.

TAKAMATSU MACHINERY CO., LTD.

(1)

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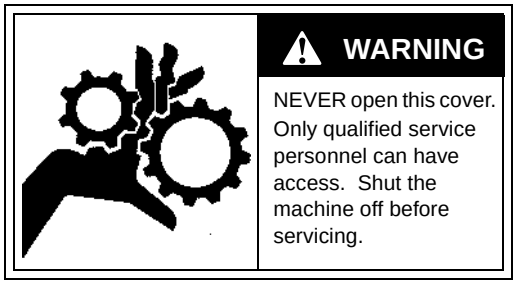

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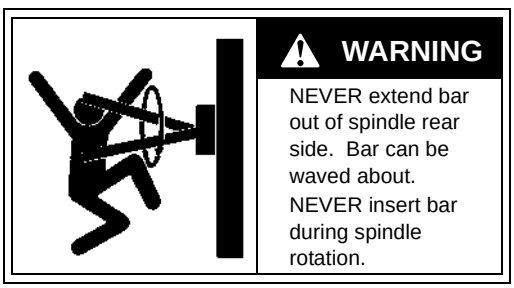

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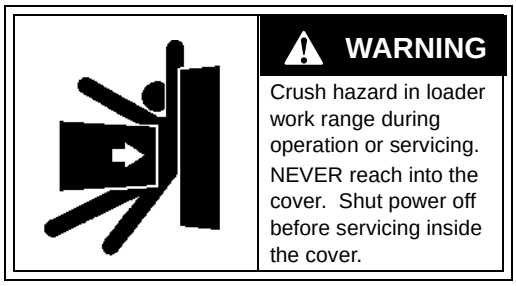

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Chapter 5 Safety Devices

5-1 Function of Safety Devices

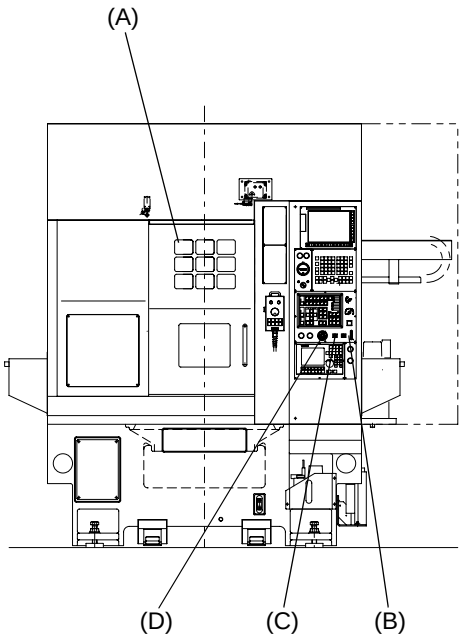
The machine is equipped with various safety devices as shown below to protect both an operator and the machine from injuries and damage. Check and understand the location of each safety device and its functions before starting operation.

DANGER

- Never remove or modify safety devices, or stop their functions without our permission in advance.
- The covers without open/close switch and the doors of the electric cabinet should not be opened by unauthorized personnel.

WARNING

- Before starting operation, check that each safety device can function properly. If there is any problem, contact your local distributor immediately.



(A)
Front door
Reinforced cover to prevent chips, work-pieces and jaws from splashing

(B)
Operation/program edit switch (with key)
Protects programs from being modified by mistake. It also protects the program even when the operation panel is accidentally touched.

(C)
Maintenance mode switch
Disables you to open the front door unless this switch is held down. During automatic operation or spindle rotation, the front door cannot be opened even if the this switch is held down.

(D)
Emergency stop button
Pressing this button stops all the machine motions immediately.

* The above illustration shows a machine equipped with optional features.

Fig. 4

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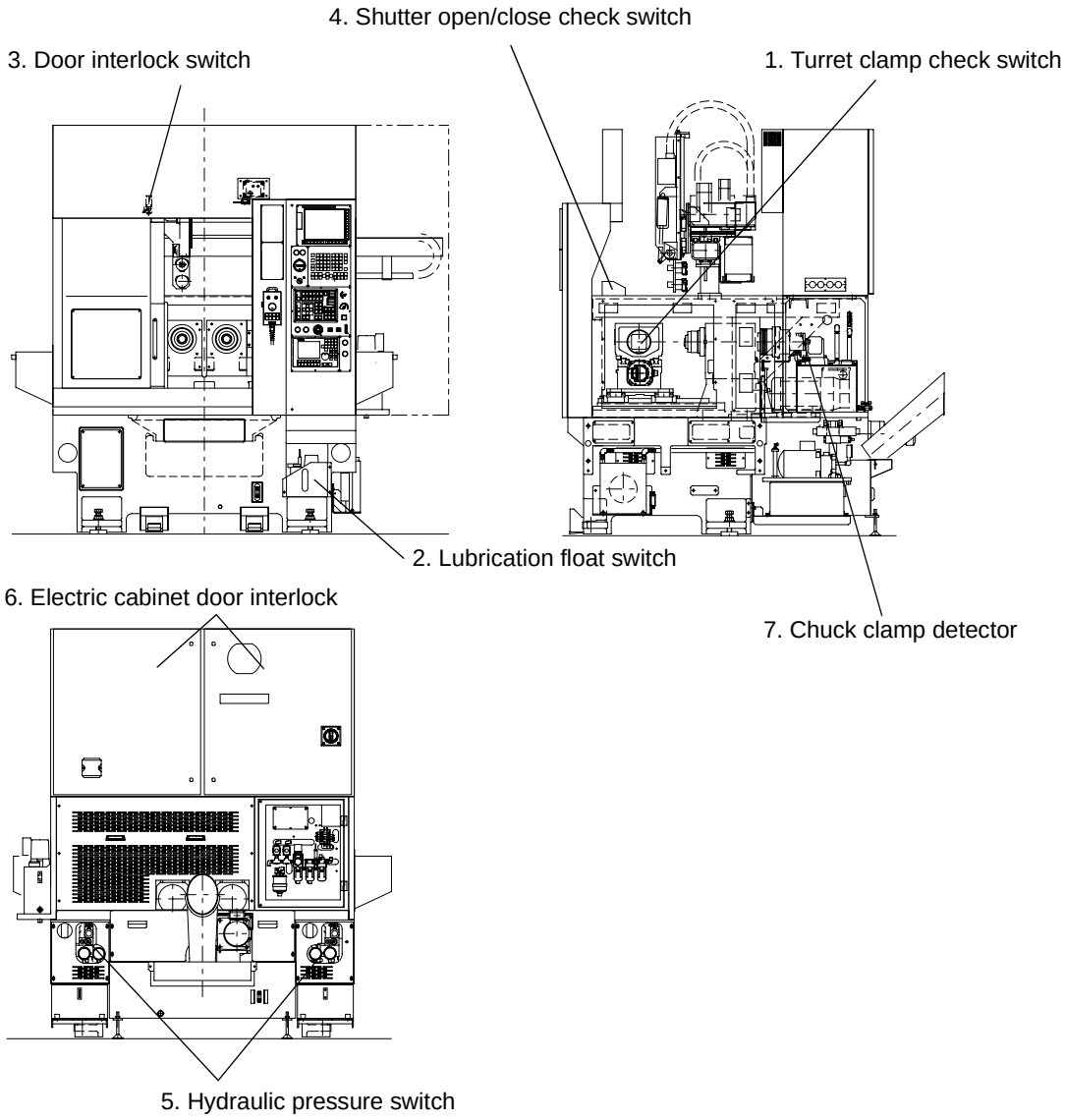

* The above illustration shows a machine equipped with optional features.

WARNING Never remove the door interlock switch.

1	Checks a clamping motion of the turret.	Automatic operation cannot be started without a clamp confirmation.
2	Checks a lubricant level.	Automatic operation cannot be started without lubricant.
3	Checks if the door is closed.	Automatic operation cannot be started if the door is open.
4	Checks if the shutter is opened or closed.	Loader operation is restricted if the loader is entering the machine.
5	Checks the hydraulic pressure.	The emergency stop function is activated if the cylinder pressure is low.
6	Checks if a door of electric cabinet is closed.	The primary power is shut off if the door is opened.
7	Checks if the chuck is opened or closed.	Automatic operation and spindle rotation are not allowed unless the switch is turned on.

Fig. 5

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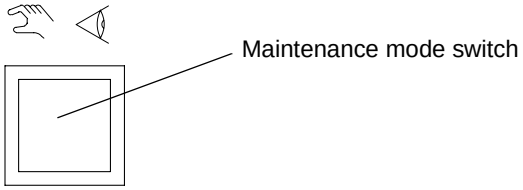
5-2 Door Interlock Function

The door interlock function restricts machine operation that can be performed the front door open.

* In this manual, explanations on machine operating procedures are given on the assumption that the maintenance mode switch is not held down (off). However, the front door open/close condition is not mentioned explicitly in the explanations. Refer to the following restrictions before operation.
* Some restrictions on machine operation by the door interlock function can be canceled by operating the maintenance mode switch on the operation panel.

WARNING When performing manual operation with the front door open, exert added care for your own safety.



Operations with the Front Door Open		Maintenance Mode Switch	
		OFF	ON (with the switch held down)
Automatic operation		Disabled	Disabled
MDI operation		Disabled	Disabled
Manual operation	Spindle rotation	Disabled	Enabled*
	Axis travel (X/Z)	Disabled	Enabled
	Rapid traverse (X/Z)	Disabled	Enabled
	Turret rotation	Disabled	Enabled
	Coolant discharge	Disabled	Enabled
	Air blow (optional)	Disabled	Enabled
	Chip conveyor operation (optional)	Disabled	Enabled

* Inching operation at 50 min^{-1} or less is obtained.

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Chapter 6 Hazardous Area

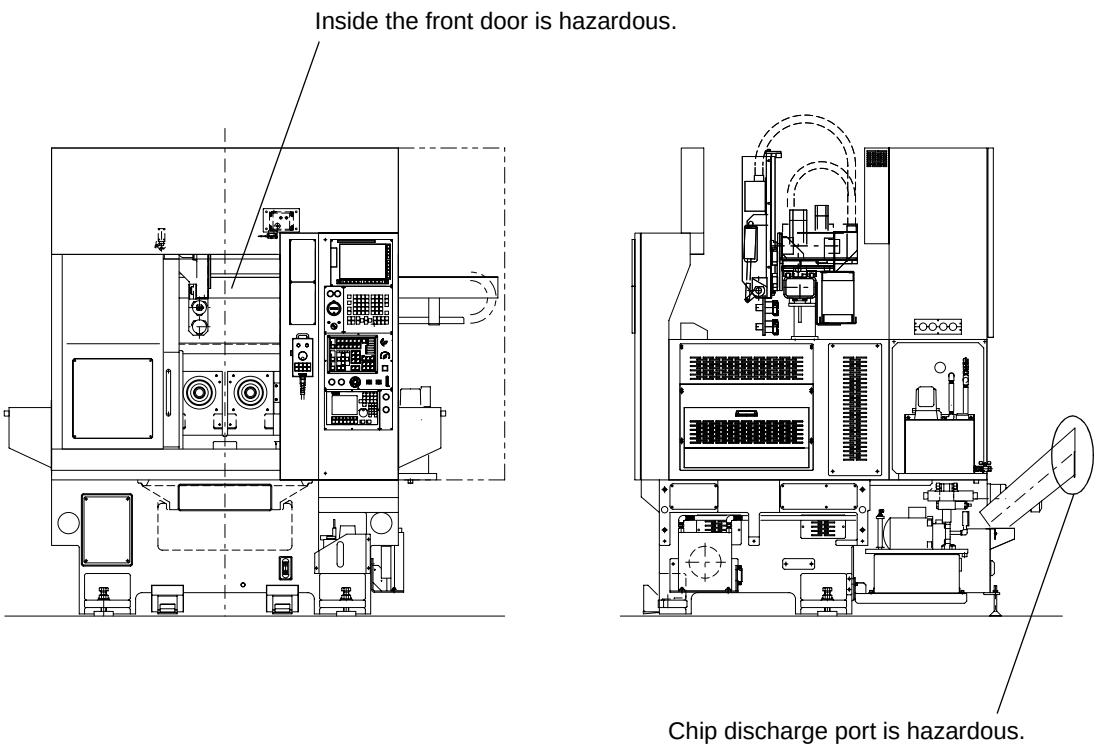
6-1 Machine Movable Area

It is very hazardous inside the machine during automatic operation because of high-speed spindle (chuck) rotation, X/Z-axis movements and turret rotation. Besides, chips and coolant splash in a hot and humid space.

WARNING

Never open any cover or door mounted on the machine during automatic operation and spindle rotation.

Even in any status other than automatic operation, utmost care should be taken if it is needed to enter such a hazardous area or touch movable sections for setting up or maintenance work while the power is turned on.



* The above illustration shows a machine equipped with optional features.

Fig. 6

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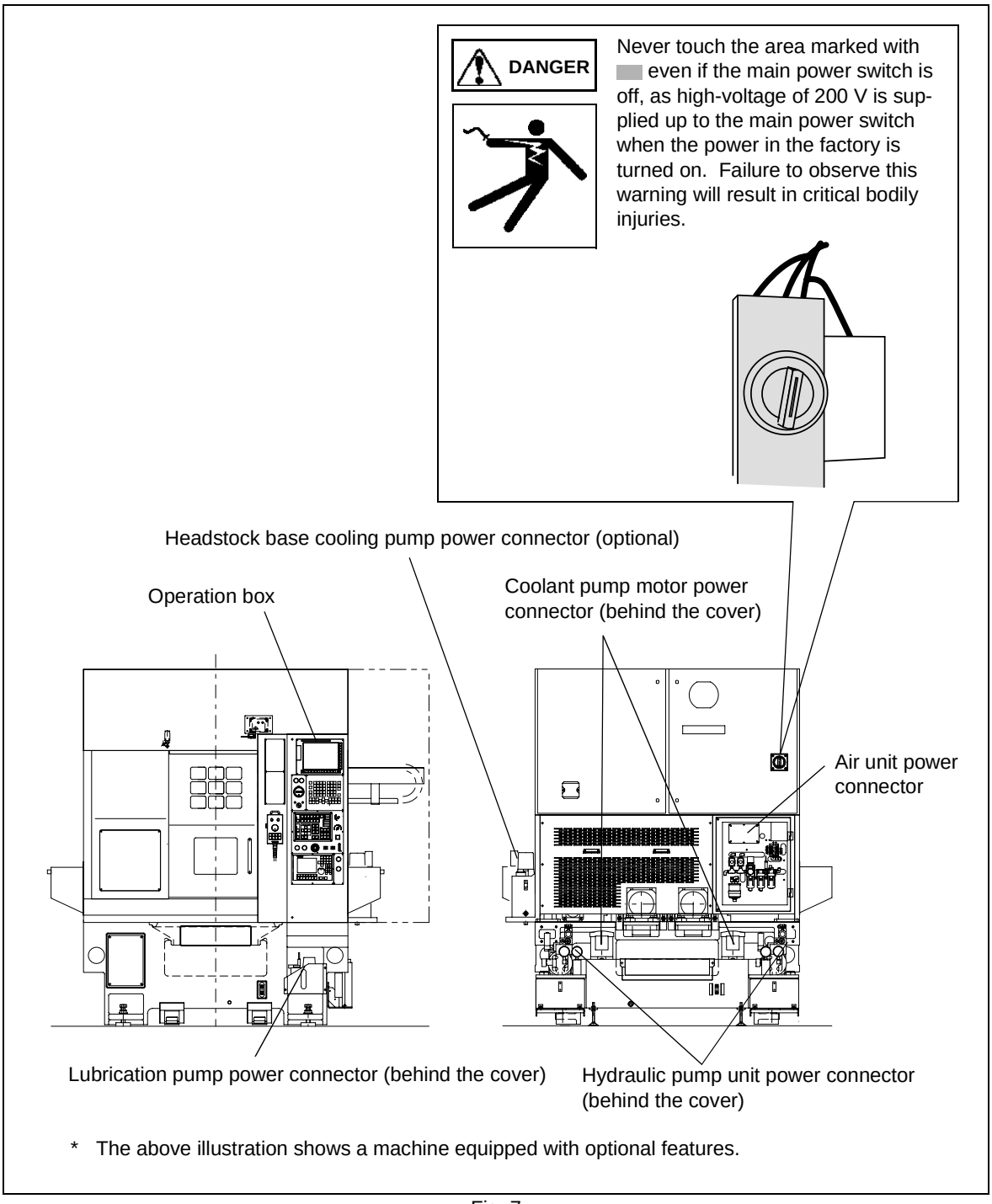
6-2 High-voltage Area

The electric cabinet, operation box, motors, transformers, and relay boxes (connectors) have high-voltage terminals. Maintenance of these units should be done only by the authorized personnel for electrical construction.



* The above illustration shows a machine equipped with optional features.

Fig. 7

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Chapter 7 Safety Precautions for Fire Prevention

To perform machine operation continuously in safety, follow the precautions for fire prevention described below.

When coolant is used for cutting, there is a possibility of catching a fire from high-temperature chips, frictional heat at the tool, sparks during cutting, etc.

Follow the safety precautions described below and take sufficient measures to prevent fire.

1. Coolant
   1) Use non-flammable coolant.

      Even if non-flammable coolant is used, lubricant may be mixed into coolant. Follow item 2) and take sufficient measures for safety.
   2) If oil-based coolant must be used unavoidably:
      a. Check the tool edge condition as well as possible tool life, and select cutting conditions under which no ignition will occur.
      b. An insufficient amount of coolant could cause fire. Always check the amount of coolant.
      c. To assure a sufficient amount of coolant at the point of cutting, clean the coolant filter at regular intervals, and check that coolant is sufficiently discharged from time to time.
      d. Provide a fire extinguisher nearby, and always stay alert to fire. Also, take additional precautions against fire by installing an automatic fire extinguisher, etc.
      e. Do not place any flammable things around the machine.
      f. Do not allow chips to accumulate.
      g. Clean the inside and surrounding of the machine at regular intervals, and check that every equipment is working in good order.
      h. Do not perform unattended operation.
      i. Install an automatic fire extinguisher.
2. Flammable Material Cutting

   When cutting flammable material (solid), resin, rubber or wooden material, understand properties of the material and take appropriate measures against fire.
3. Dry Cutting

   Do not allow chips to accumulate during dry cutting.
   Follow item 2) above and take sufficient measures for safety.

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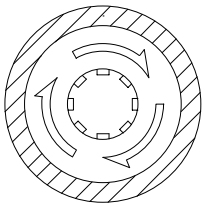
Chapter 8 Safety Precautions

8-1 Basics

DANGER  High-voltage mark	• The electric cabinet, motors, transformers, and relay boxes (connectors) have high-voltage terminals. Access to these by unauthorized personnel is strictly prohibited as it is very dangerous. • Never remove or modify any covers, switches or doors mounted for safety without our permission. • Understand the operation switches and relative machine motions thoroughly before operating them. • Never use machine in an atmosphere having a possibility of explosion. • Never touch on switches and keys with wet or dirty hand.
WARNING  Emergency stop button	• Never operate any switches before you have realized their resulting motions. • Check each switch and key before using them. • Never touch any key or switch if not needed, or lean against the machine unconsciously. • Always be aware of the emergency stop button locations and operation so that they can be operated quickly in emergency. This should be understood by all the personnel concerned. • Stop operating the machine in case of abnormal lightning or repeated power failure in order to avoid accidents. • Keep the floor clean and dry. Slippage can easily occur if there is oil or water on the floor. • Keep flammable materials and liquid away from the working area as prescribed in nationally recognized safety standards and legal and governmental regulations. • The machine should be operated only by one qualified operator. • Those who feel dizzy or cannot judge properly due to drinking, medication or sickness should not operate the machine.

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CAUTION	• Oil to use should be new and clean, and as designated in the instruction manual. Any oil other than specified may result in machine trouble. • Replacement parts should be as designated by Takamatsu. • Wear proper clothes for operation. - Never wear a ring, a bracelet, a necklace or a watch during operation. - Always wear a protective helmet, safety goggles and safety shoes. - Never wear baggy or loose clothes. • Turn off the main power switch immediately in case of power failure. • Never give an excessive shock to the machine operation panel or the electric cabinet. • Keep the tools and workpieces orderly in the following ways. - Keep them so that they may not fall. - When placing tools and parts upright or resting against something, take necessary measures to prevent them from falling. - When piling parts and workpieces up, take necessary measures to prevent them from falling off. • Never place tools and workpieces anywhere on the machine even if it is not a movable section. • Keep sufficient working area and remove obstacles from around the machine. • A work table to place cutting tools and workpieces should be rigid enough and so designed to prevent tools and workpieces from slipping or falling. • Coolant should not be handled with bare hands. • Never operate the machine while wearing gloves. (Use gloves when handling cutting tools, workpieces, chips and when cleaning the machine.)

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8-2 Installation

DANGER	• Power connection, crane and forklift operation and slinging work should be done only by qualified personnel. • Never put your body partially or wholly under the lifted machine. • When placing electric cables over the floor, use rigid covers to protect them from being damaged by chips and workers.

WARNING	• Transportation and installation of the machine should be done by qualified personnel according to “Installation”. • Power cables from the primary terminal in the factory to the main power switch should have a rated cross sectional area in order to supply stable power required for operation. • Check the following points to ensure safety at the installation site. - When foundation bolts are buried, mark these points clearly to protect workers from stumbling over and to protect the machine and carriages from bumping. - When a pit is provided for waste oil, chips and piping, mount a tentative cover to protect workers from falling down. - The floor should be clean and dry, and free from obstacles, oil and waste oil in order to protect workers from slipping or falling. • Use a stable step or platform when it is needed to reach a high level. • Never put your fingers between the bed and the floor when locating the machine at a designated place. • When lifting a machine, use wire rope, shackles and hoisting jigs that are rigid enough to withstand the machine weight. • When working in a team, choose a leader to give instructions. - Give signals with one another to check other workers’ safety before going to the next step. - Follow the procedures step by step. • Never give excessive shock to the machine during lifting and transporting.
CAUTION	• When rust preventive oil is applied to the slideways, remove it thoroughly with cleaning oil before starting operation. • Remove eye bolts used for transportation as well as other fixing jigs and wood used as shipping brackets. • Levelling of the machine should be accurate. (Adjust levelling referring to the attached inspection sheet.) • When installation is finished, check the following points before turning the power on. - All the bolts and connectors are securely tightened. - Hydraulic hose, air hose and other piping are securely connected and fixed. - New grease and oil are properly supplied to each section as instructed. - Water and dust on the machine are all wiped off. - There is no oil leakage around the machine.

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8-3 Turning Power ON/OFF

DANGER 	• Before turning the power on, check that all cables are properly insulated. Damaged or disconnected cables should be immediately repaired or replaced by qualified personnel, as they could cause an electrical shock or leakage later.
WARNING	• Turn the power on/off as described in “Operation”. • Check that all the safety devices are properly functioning. • Check that all the covers are free from damage and securely closed. • Check that all the cables installed on the floor have protective covers or other means to protect them from being damaged.
CAUTION	• Check the following items after turning the power on. - Check that there is no alarm display on the NC screen. - Check that hydraulic pressure and air pressure are correctly set. - Check that there is no abnormal noise generated from the motors or gears. - Check that the spindle and slideways are properly lubricated. • Check all the items for starting operation one by one as described in “Maintenance”. • After stopping the machine for a long period of time, check that the motions, noise and slideway lubrication are free from trouble. If any abnormality is found, turn off the power immediately and inform the person in charge, then take necessary measures.

8-4 Warming Up

CAUTION	• After turning the power on, perform warm-up operation sufficiently. - Mount no workpiece at this time. - Programs for automatic operation should include each function of the machine. - Change the spindle speed from low (500 min^{-1}) to intermediate (2500 min^{-1}), and warm up for about 10 minutes at each speed. - Before rotating the spindle with a chuck on it, check that the chuck and jaws are securely fixed.

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8-5 Setting Up

DANGER	• Operation of crane and forklifts as well as slinging work should be done only by qualified personnel. • Setting up should be done after turning the main power switch off. If the main power switch should remain on, be aware of the location of an emergency stop button to press at any time.
WARNING	• Always wear a protective helmet during setting up and cleaning. • When working at a high level, use a stable platform, steps or ladders. • When working in a team, give signals with one another and check given signals before going to the next step. Do not go to the next step if there is no response from your partner. • Never stand or work on the machine. If it is needed to stand on the machine, wear a protective helmet, leather gloves and other protective clothes. • Use proper hoisting devices to handle heavy items. • Wire ropes and slings are rigid enough for a designated weight. • Check that the wire rope to use is free from disconnection, abnormal deformation, corrosion, kink, etc. • Pay attention to the chuck when stepping on the foot switch so that a part of your body may not be caught in it. • Dull or unstable cutting tools will cause damage or accidents. Replace with proper tools in advance. • When mounting a workpiece, check that it is securely fixed by a chuck and a jig. Tightening and loosening of jigs and bolts should be properly done while keeping your balance so that you may not touch or fall over hazardous part of the machine. • Never stand in the rotating direction of the spindle, as the workpiece, jaws or tools may fall off during setting up or trial running and cause bodily injuries.
CAUTION	• Always wear leather gloves during setting up and cleaning. • The length and diameter of the cutting tools should be appropriate so that each cutting tool cannot interfere with the chuck, turret, cover, etc. • Never touch cutting tools with bare hands. • After finishing setting up, keep used tools and equipment in the designated place.

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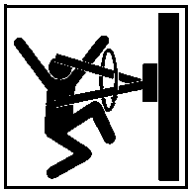
CAUTION	• When handling a heavy item of more than 20 kg, make a team for cooperative work or use proper transporters. • After mounting cutting tools on the turret, check that they are securely fixed without backlash and well balanced. • Tools used for setting up should be suitable for the machine specifications. Spanners to use should fit nuts and bolts to avoid accidental slippage

8-6 Operation

DANGER 	• Never remove a safety cover or safety device partially or wholly. It is strictly prohibited to operate the machine while exposing a high-voltage terminal. • Removing or relocating limit switches, dogs and interlocking mechanism should be strictly prohibited. • Never touch any switch or button with wet hands.
WARNING  	• High-speed moving sections, turret rotating section, and spindle rotating section should be isolated from operators during automatic or manual operation. Access or entry to these areas during operation is strictly prohibited. If it is needed to enter such an area for maintenance and other purposes, turn off the power in the designated procedures. • When machining a bar material without using a bar feeder, the bar material should not stick out from the spindle rear as it is hazardous when the spindle rotates. • When chucking a workpiece, apply most suitable pressure to the chuck and the turret according to the workpiece material, gripping amount and machining conditions. • Check that the chuck rotation speed does not exceed the allowable range. • Before starting unattended operation or leaving the machine for a long time, check the following points to prevent fire. - Check that used coolant is nonflammable. - Check that the amount of lubricant and coolant is sufficient, and its operation is properly done. - Check the tool cutting edge status, cutting conditions, cutting time and tool life. - Check there is no wood, paper, cloth and other flammables around the machine. - Check that the chip conveyor is properly operating and chips are smoothly disposed of. "Chapter 7 Safety Precautions for Fire Prevention"

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WARNING	• The following are strictly prohibited during machine operation. Stop the machine first if any of the following is needed. - Never adjust the coolant nozzle direction or coolant flow during spindle rotation. - Never remove chips around a tool during spindle rotation. - Never replace or tighten a cutting tool on the turret during machine operation. - Never remove chips or clean the machine during operation. - Never change the chuck pressure during machine operation. • Never change the chuck gripping direction while a workpiece is chucked. • Before unloading a finished workpiece, check that the spindle is stopped and that automatic operation is finished. • Never enter the chip conveyor working area during operation. • Turn the main power switch off when suspending operation and leaving the machine for a while. • Close the front door tightly before starting automatic operation. Keep the doors and covers on the machine closed during automatic operation. • Before starting operation, check that there is nobody or nothing inside the machine movable section. • If the machine stops during automatic operation for some reason, check the trouble status and take necessary measures before removing the cause. Restarting before taking proper measures must be avoided. • Noise during machining may exceed 70 dB, resulting in damaging your hearing ability. Use protective articles (headphones, etc.) as appropriate. • Never touch any switch or key if not needed. Never lean against the machine during automatic operation.

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CAUTION	• Never operate the machine while leaving a tool, cutter or measuring instrument inside or around the machine. • When starting automatic operation for the first time, check that the program is correctly made and all the switches for automatic operation (dry run, override, coolant control, etc.) are correctly set. • Discharge chips regularly so that they may not remain inside the machine. • When machining special workpieces, check the characteristics in advance and wear necessary protective clothes. • Note the following points so that you will not be caught in the machine movable section. - Long hair should be tied or covered with a helmet. - Tie the hem of loose and baggy pants. - Button up your clothes. • If any abnormality is found during operation, stop the machine immediately and inform the supervisor. • Modification of parameter setting should not be done without our permission. • When an alarm message is displayed or an alarm indication lamp is illuminating, take necessary measures immediately (such as informing a person in charge). • Chips should not be removed from the cutting edge with bare hands. Always use gloves and a brush. • Never touch tools or workpieces with hands immediately after cutting. These can be extremely hot. • Be sure not to touch the work light as it becomes very hot after operation for a long time. • Never touch any switch or button with gloves on, as it could result in malfunction or damage to the machine.

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8-7 Finishing Operation

DANGER	• After finishing all the operation, check that the primary power in the factory is completely turned off. • Before cleaning the machine and peripheral equipment, such as a chip conveyor, stop all the machine motions, turn off the main power switch and the primary power in the factory, and put a tag or a placard saying “Cleaning!”.
CAUTION	• Never use an air gun for cleaning the machine, as it may allow coolant to permeate into the spindle bearing and shorten the bearing life. Use soft and clean cloth and clean the spindle carefully. • When finishing operation, check that each section of the machine is in the initial status. • Wear gloves when removing chips and workpieces. • Handle the solenoid valve carefully as it remains hot for a while even after the power is turned off. • When stopping the machine for a long period of time, apply rust preventive oil slightly to ground surfaces.

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8-8 Maintenance

DANGER 	• Turn the main power switch off during maintenance work. The primary power in the factory should also be off for maintenance of the electric cabinet. Never open the door for several minutes even after the power is turned off, as residual voltage could cause critical bodily injuries. • When carrying out maintenance work, put a panel or a plate indicating "MAINTENANCE - KEEP AWAY FROM THE MACHINE." around the machine so that the power is not turned on or the operation panel is not touched by mistake. Failure to observe this warning will result in critical bodily injuries. • Never modify or remove safety devices such as limit switches, proximity switches and dogs for interlock without our permission. Failure to observe this warning will result not only in machine malfunctioning or damage, but also critical bodily injuries
WARNING	• The cover should not be opened by unqualified personnel for maintenance. Turn the main power switch off when it is needed to work inside the cover. • Wear a protective helmet during maintenance work. • Use stable ladders, platform, etc., when working at a high level. • Maintenance work should be done only by qualified personnel. • Mount the covers on the initial positions correctly after finishing maintenance work, and lock the doors with a key securely. • After finishing maintenance work, keep the used tools, etc. orderly, and remove all the obstacles, water and oil from the floor in order to restore proper working environment. • Procedures and methods described in "Maintenance" should be strictly observed. Contact your local distributor immediately when any question or doubt arises.
CAUTION	• Check each item after finishing maintenance work together with a person in charge. • Observe periodical check-ups as described in "Maintenance". • Keep a maintenance record, and report it to a person in charge for approval and examination. • Keep the maintenance record for 10 years. • Replacement parts (electrical and mechanical) should be as designated by Takamatsu.

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Specifications

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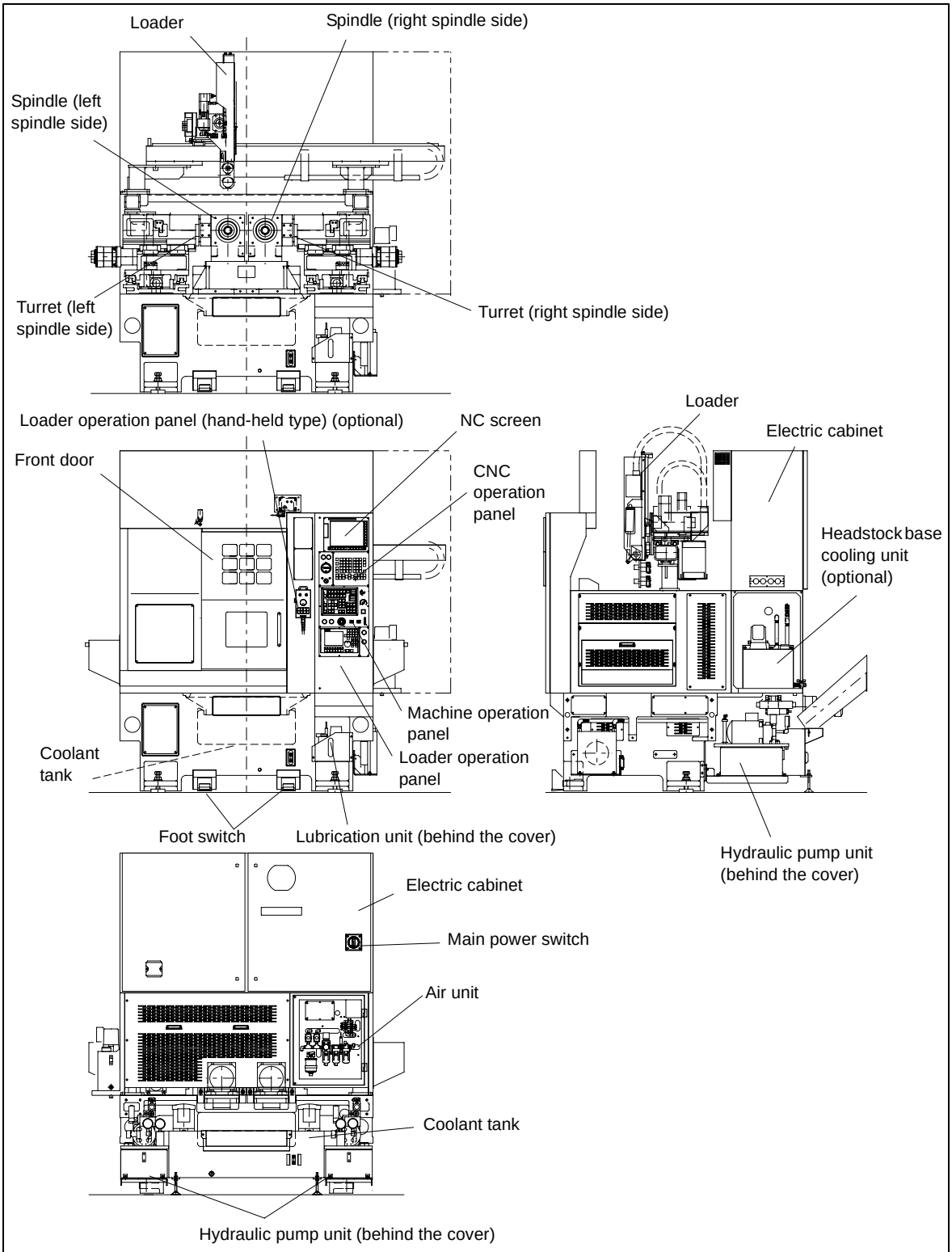
Chapter 1 Machine Appearance

1-1 Name of Each Component



* The above illustration shows a machine equipped with optional features.

Fig. 1 Machine appearance and name of each component

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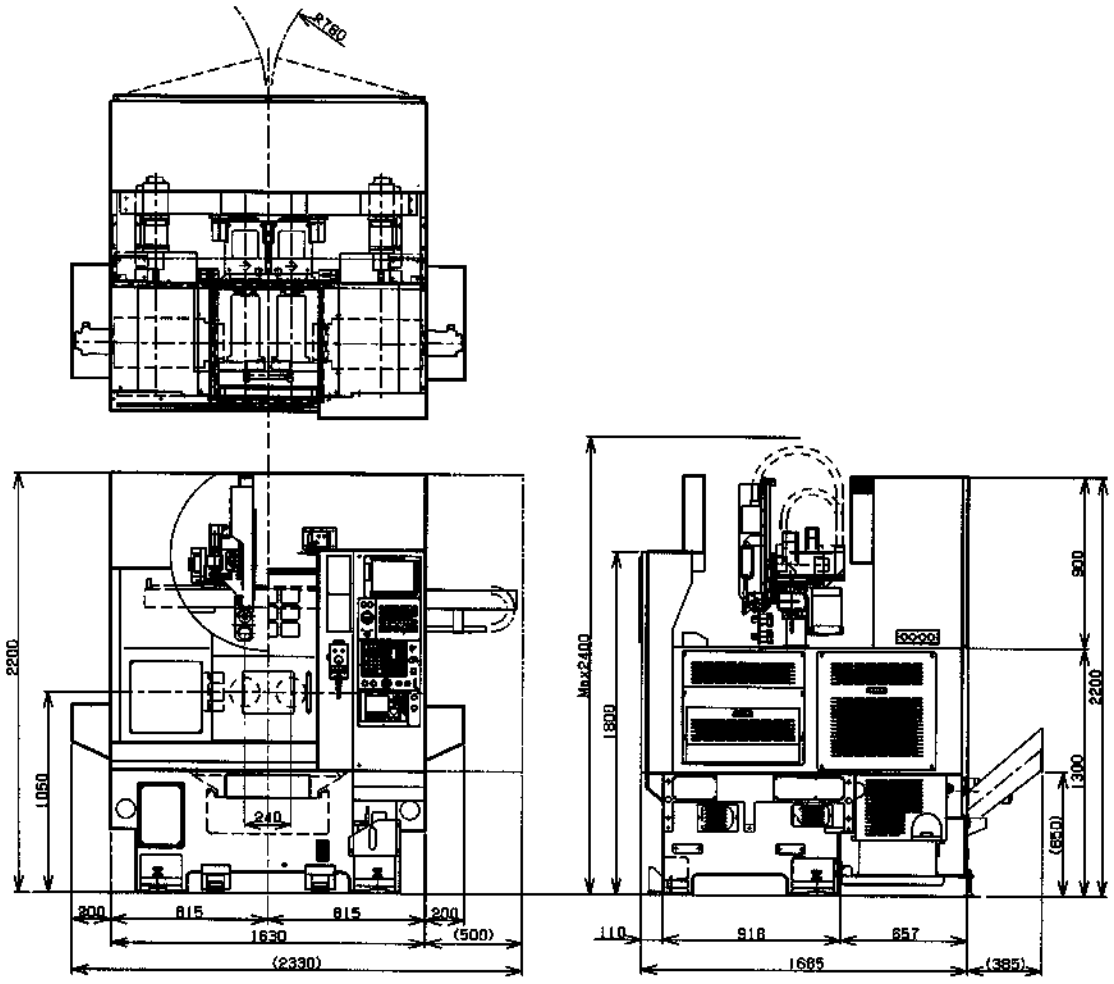
1-2 Dimensional Drawing



* Dimensions may vary depending on the specifications.

Fig. 2 Dimensional drawing

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Chapter 2 Machine Specifications

2-1 Standard Specifications

Item		Unit	Specifications
Capacity	Chuck size	inch	4 (× 2), collet
	Optimum turning diameter	mm	ϕ30 × 50
	Max. swing over bed	mm	ϕ220
	Max. turning diameter	mm	ϕ150
	Max. turning length	mm	100
Spindle	Spindle nose	JIS	Special, flat type
	Spindle bearing ID	mm	ϕ65
	Hole through spindle	mm	ϕ37
	Spindle speed	min^{-1}	4500 (6000: option)
	Spindle motor	kW	AC5.5/3.7
Tool post	Type		6-station turret (× 2)
	Max. tool size	mm	20 sq., ϕ25
	Max. stroke	mm	X: 100, Z: 150
	Rapid traverse rate	m/min	X: 18, Z: 18
	Feed motor	kW	X: AC1.0, Z: AC1.6
Size	W × L × H	mm	2,030 × 1,685 × 2,200 (2,400)
	Machine weight	kg	4,000
	Hydraulic tank	lit.	12 (× 2)
	Coolant tank	lit.	154
Electrical capacity	Coolant motor	kW	AC0.25 (× 2)
	Hydraulic motor	kW	AC0.75 (× 2)
	Total power capacity	KVA	33
Controller			TAKAMAZ & FANUC

* The machine weight differs depending on the specifications.

* The total power capacity differs depending on the specifications.

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2-2 Loader Specifications

Item		Unit	Specifications
Capacity	Applicable workpiece	mm	$\phi 30 \times 50$
	Weight capacity	kg	0.5 (one side)
Loader	Stroke	mm	X: 150, Y: 400, Z: 1,540
	Rapid traverse rate	m/min	X: 45, Y: 75, Z: 110
Hand	Rotation angle	deg.	90
	Finger stroke	mm	4 (one side)

2-3 Standard and Optional Accessories

■ Standard accessories

Boring holder . . . . . 2 sets
OD holder . . . . . 2 sets
Collet chuck . . . . . 2 sets
Collet flange . . . . . 2 sets
Hydraulic chucking cylinder. . . . . 1 set
Servo loader (1 unit) . . . . . 1 set
Coolant unit (154 lit.) . . . . . 1 set
Thread cutting unit . . . . . 1 set
Service tool kit . . . . . 1 set
Instruction manual . . . . . 1 set

■ Optional accessories

Collet chucks
Hydraulic chucks
Spindle indexing device (electrical/mechanical)
Chip conveyor (rear)
(spiral type, floor type)
Front air blower
Rear air blower
Rear coolant unit
Cycle end signal light (1-color, 2-color, 3-color)
Automatic fire extinguisher
Automatic power shut-off device
Special color
Others

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Chapter 3 Controller Specifications

3-1 Standard Specifications

Item	TAKAMAZ&FANUC 32i-A
Controlled axes	2 axes (X, Z) × 2
Simultaneously controllable axes	Simultaneously 2 axes × 2
Least input increment	0.001 mm (X in diameter)
Least command increment	X: 0.0005 mm Z: 0.001 mm
Auxiliary function	M-3 digit
Spindle function	S-4 digit
Tool function	T-4 digit
Tape code	EIA (RS232C)/ISO (840) automatic recognition
Cutting feedrate	1 to 5000 mm/min
Command system	Incremental/Absolute
Linear interpolation	G01
Circular interpolation	G02, G03
Cutting feedrate override	0 to 150%
Rapid override	F0, 100%
Program file name	32 characters
Backlash compensation	0 to 9999 μm
Part program storage length	32 kbytes (80 m)
Tool offsets	16 sets × 2
Registered programs	63 programs
Tool geometry/wear offset	Standard
Canned cycle	G90, G92, G94
Radius designation on arc	Standard
Tool offset measurement input	Standard
Concurrent editing of multiple programs (Background editing)	Standard
Custom macro	Standard
Nose R compensation	G40, G41, G42
Programmable data input	G10
Clock function	Standard
Help function	Standard
Alarm history display	50 pcs.
Self-diagnosis function	Standard
Sub-program call	up to 5 loops
Decimal point input	Standard
2nd reference point return	G30
Stored stroke check 1	Standard
Input/output interface	RS232C, memory card
Alarm message	Standard

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Item	TAKAMAZ&FANUC 32i-A
Abnormal load detection	Standard
Constant surface speed control	Standard
Chamfering/corner R	Standard
Continuous thread cutting	Included in the thread cutting unit (G32)
Option function	Workpiece/tool counter, tool load monitor
English display	Standard

3-2 Optional Specifications

Item	TAKAMAZ&FANUC 32i-A
Spindle orientation	
Inch/metric conversion	G20/G21
Run hour/parts count display	
Multiple repetitive cycle	G70 - G76
Work coordinate system setting	G52 - G59
Graphic display	
Tool life management	
Direct drawing dimension programming	
Additional custom macro common variables	#100 - #199, #500 - #999
Multiple repetitive cycle II	Pocket shape
Stored stroke check 2, 3	
Multiple M codes in one block	Max. 3
Variable lead thread cutting	
Thread cutting retract	
Additional part program storage length	
Additional tool offsets	
Additional registered programs	

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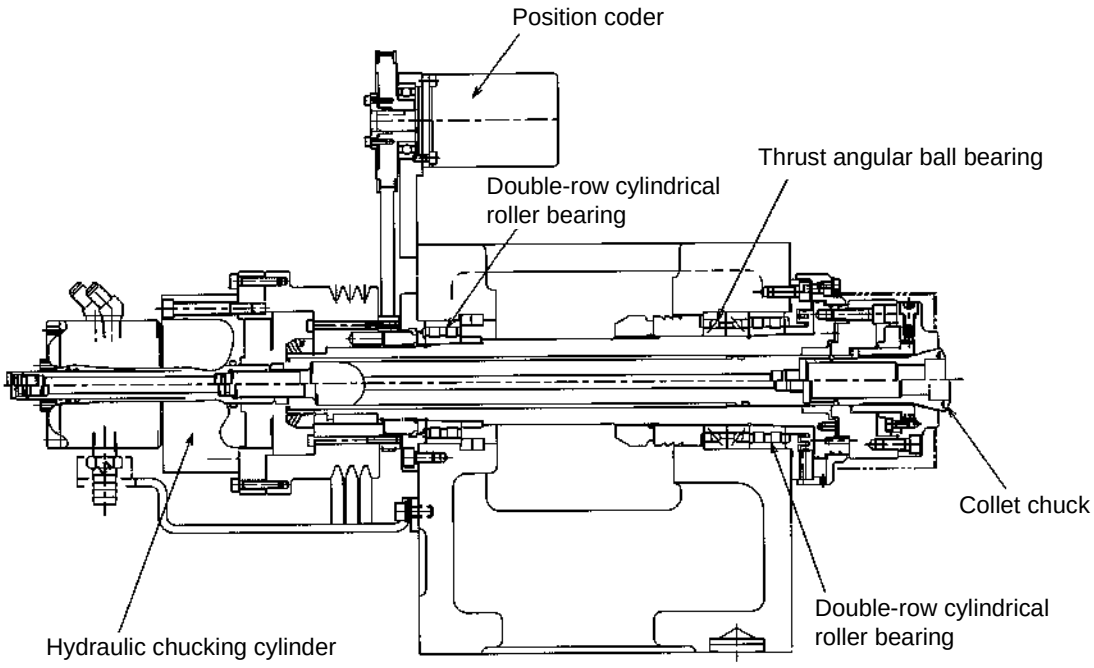
Chapter 4 Major Units

4-1 Headstock Unit

The headstock unit consists of the spindle, hydraulic cylinder, etc.
The spindle is driven by an AC spindle motor. The spindle bearing is grease-lubricated, and needs to be replaced every three years. Contact us when replacing the spindle bearing.

Spindle speed (Max.) 4500 min^{-1}
6000 min^{-1} (optional)

4-1-1 Spindle



* The above figure shows the collet chuck specification.

Fig. 3 Structural drawing of headstock

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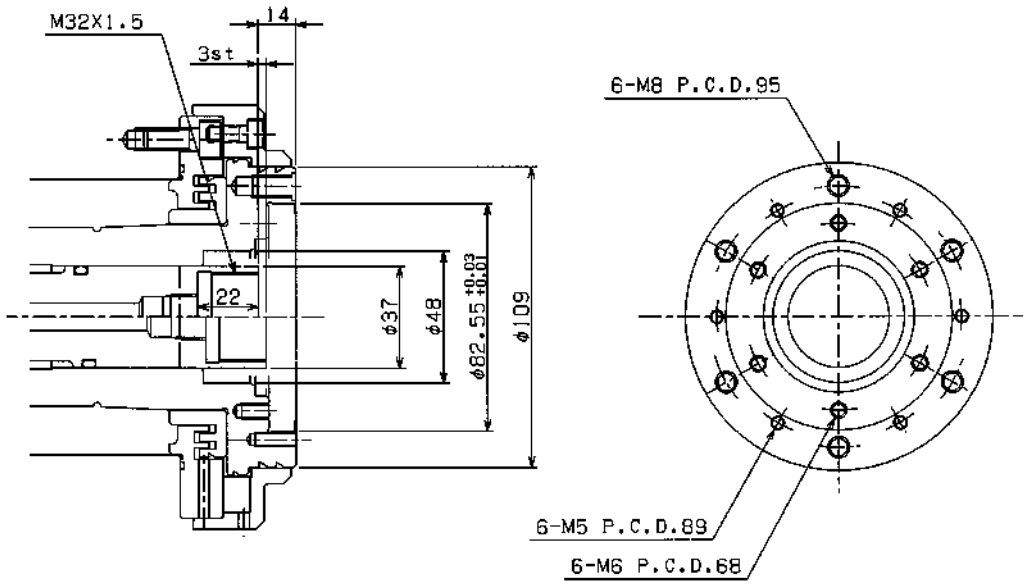
4-1-2 Spindle Nose Drawing

Collet chuck (hydraulic chucking cylinder: NIKKO FM5-3S)



Power chuck (hydraulic chucking cylinder: NIKKO FM5-17S)

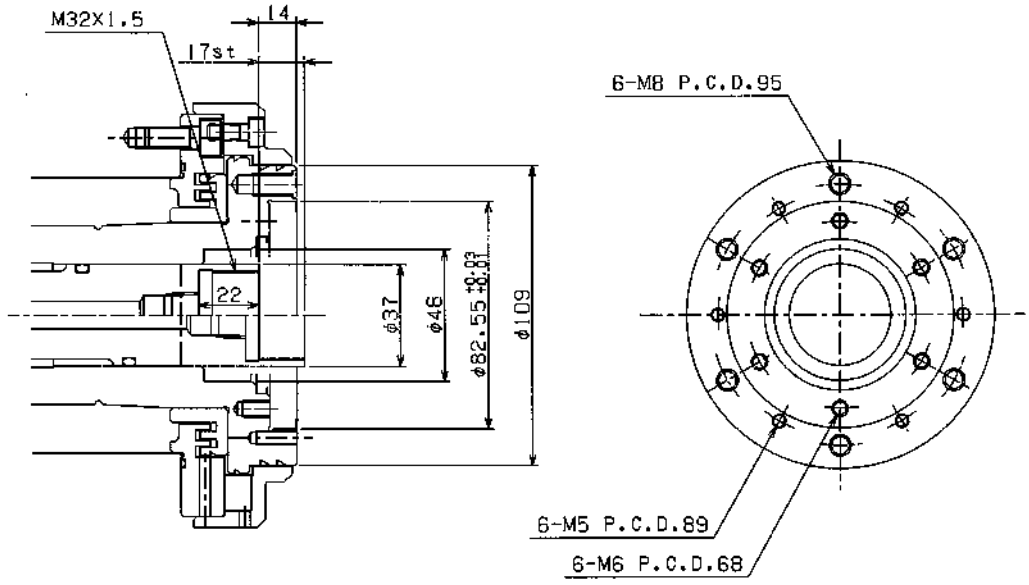


Fig. 4 Spindle nose drawing 1

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Power chuck (hydraulic chucking cylinder: SMW 130BHM)

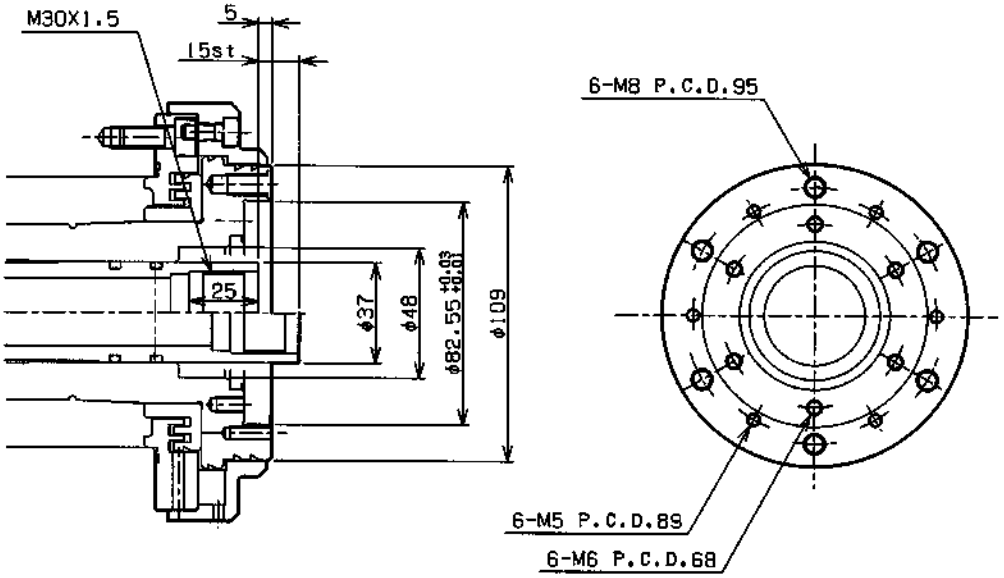
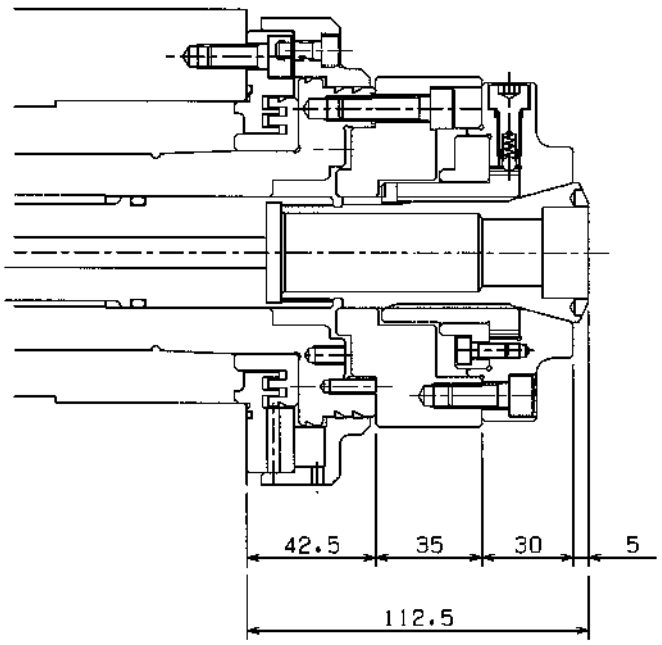


Fig. 5 Spindle nose drawing 2

Euro

4-1-3 Collet Chuck Mounting Drawing

Normal D850 collet chuck



ϕ60-auxiliary collet chuck

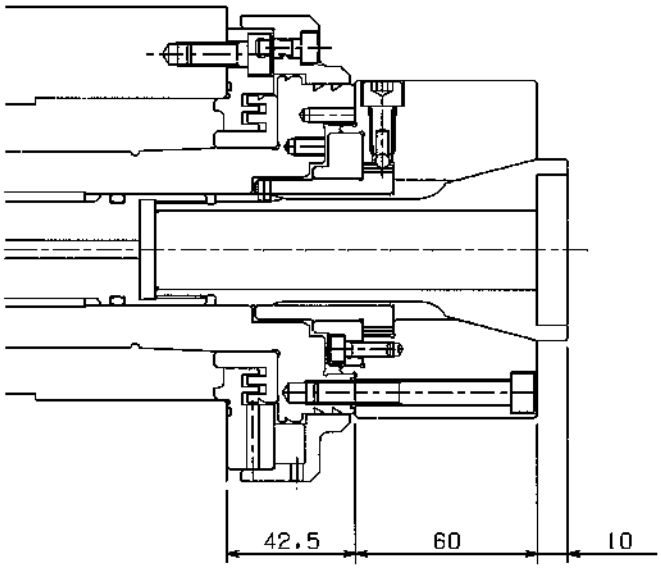
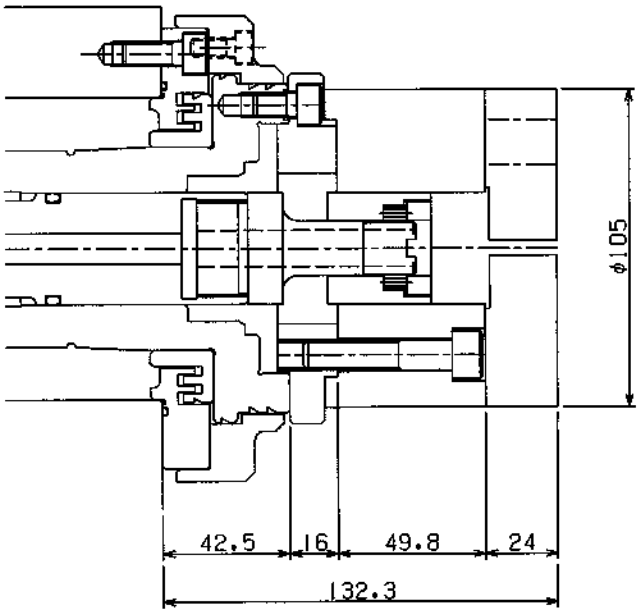


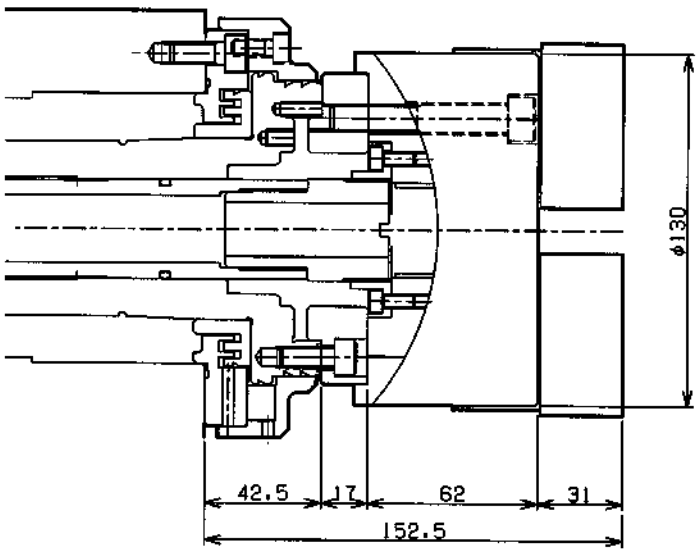
Fig. 6 Collet chuck mounting drawing

Euro

4-1-4 Power Chuck Mounting Drawing



Power chuck (NIKKO HF-4)

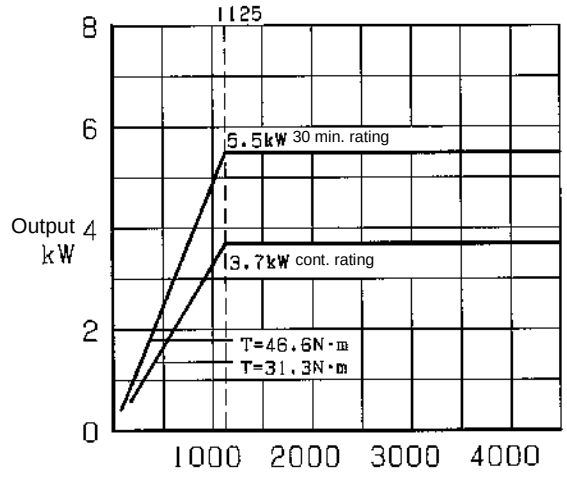


Power chuck (SMW 130BHM)

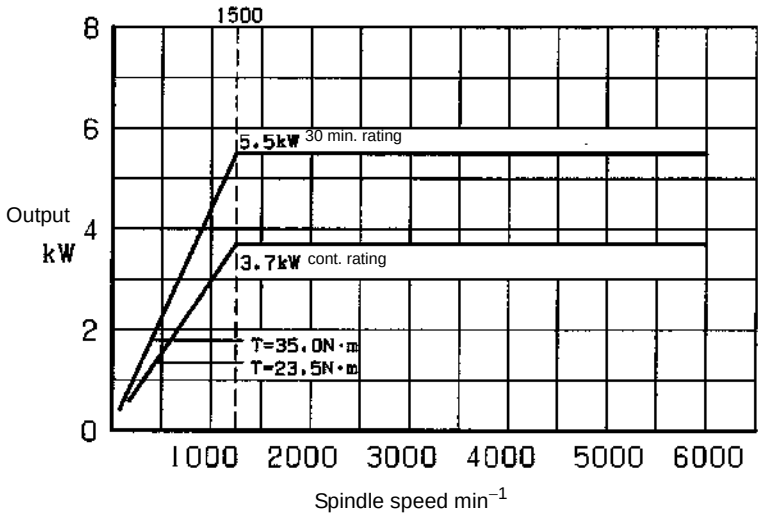
Fig. 7 Power chuck mounting drawing

Euro

4-1-5 Spindle Motor Characteristic Diagram



3.7/5.5kW (MAX. 4,500min^{-1})



3.7/5.5kW (MAX. 6,000min^{-1})

Euro

Fig. 8 Spindle motor characteristic diagram

4-2 Turret Unit

The turret has 6 stations to mount turning or rotating tools.
Clamping and unclamping motions of the turret are hydraulically controlled.
Indexing is driven by a servo motor, and high-speed indexing is assured due to a random selection system.

4-2-1 Tooling System Drawing

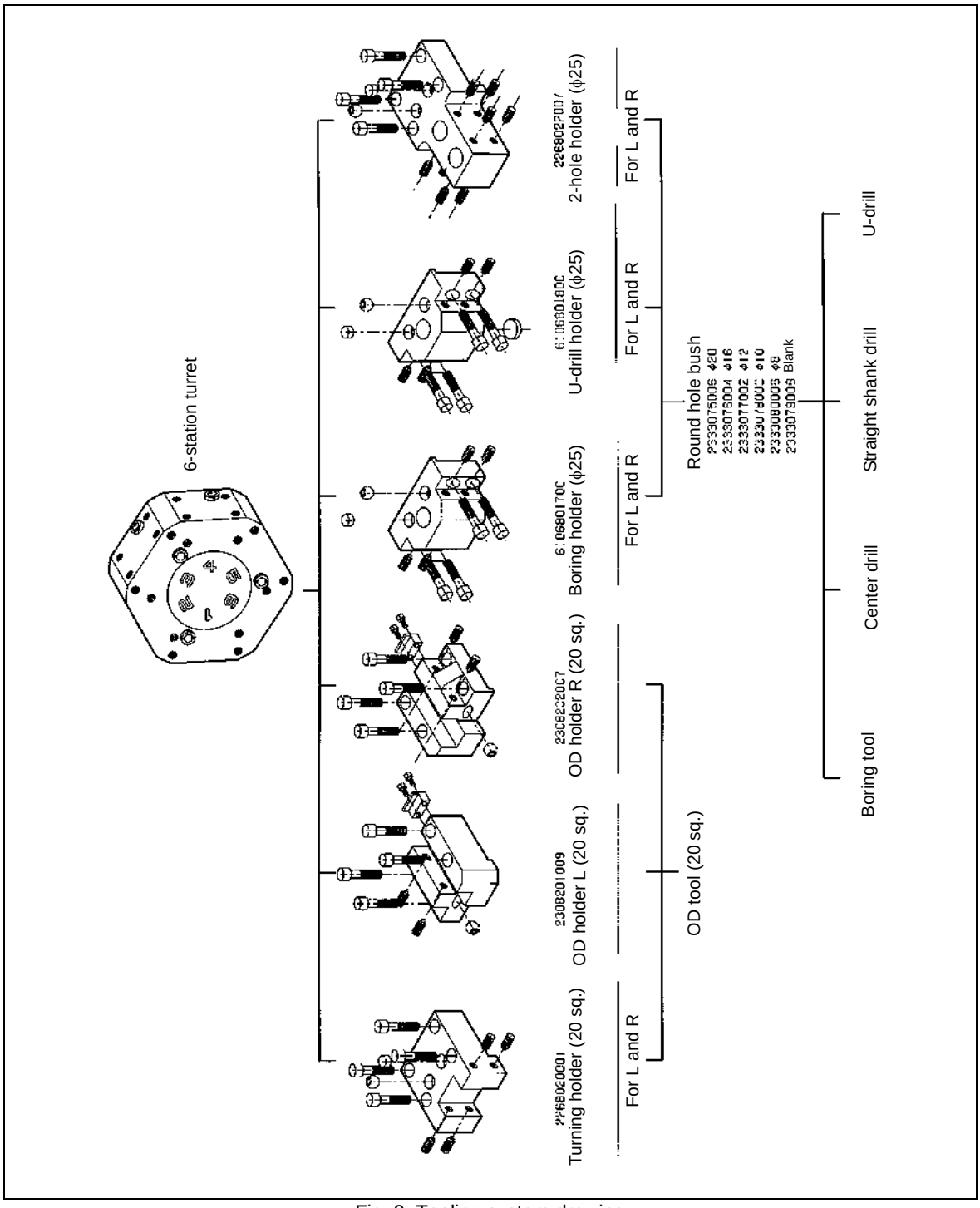
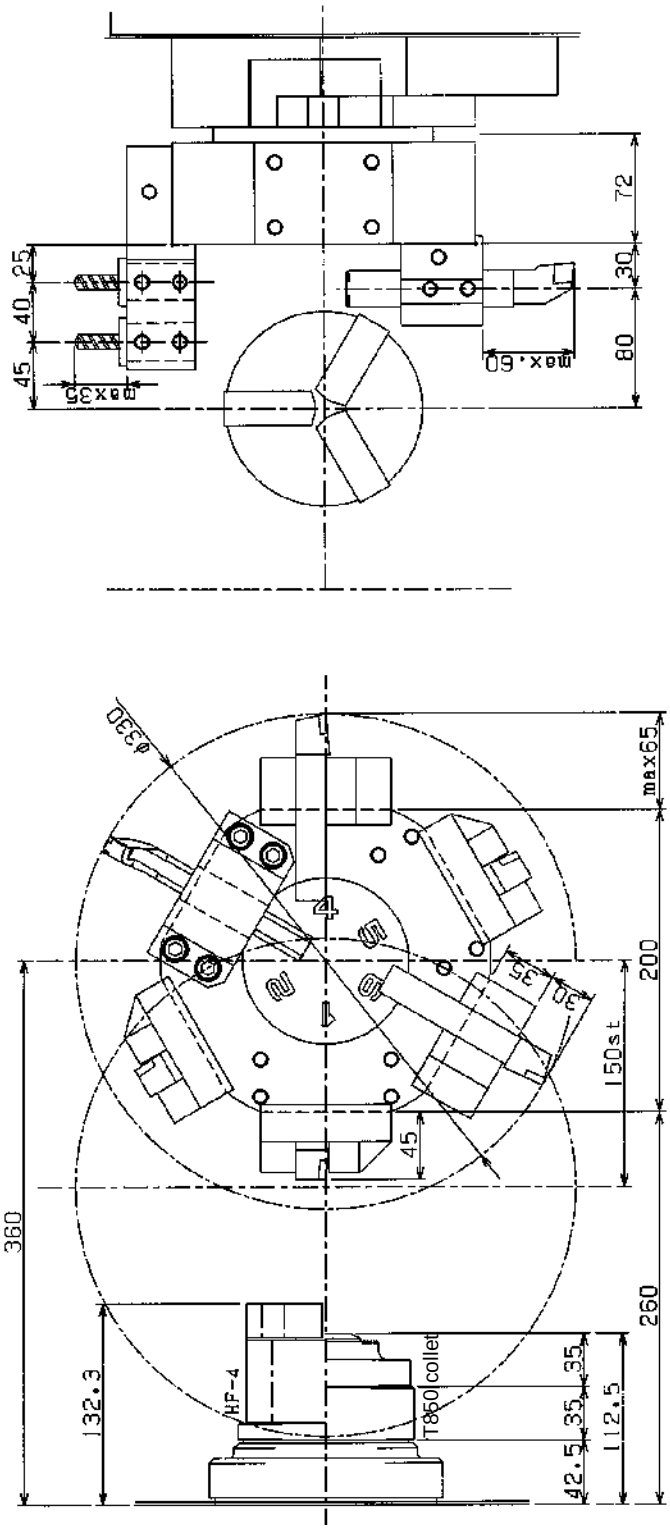


Fig. 9 Tooling system drawing

4-2-2 Turret Interference



* The specified tool protruding length must not be exceeded.
* A maximum of three boring holders can be mounted in every two positions.
* The limited number of 2-hole holders can be mounted to avoid collisions with the loader.

Euro

Fig. 10 Turret interference

4-3 Slide Unit

The X and Z axes are driven by AC servo motors via ball screws, thus moving on the square slideways.

Max. rapid traverse rate:	In the X-axis direction	18 m/min.
	In the Z-axis direction	18 m/min.

4-3-1 Stroke Diagram

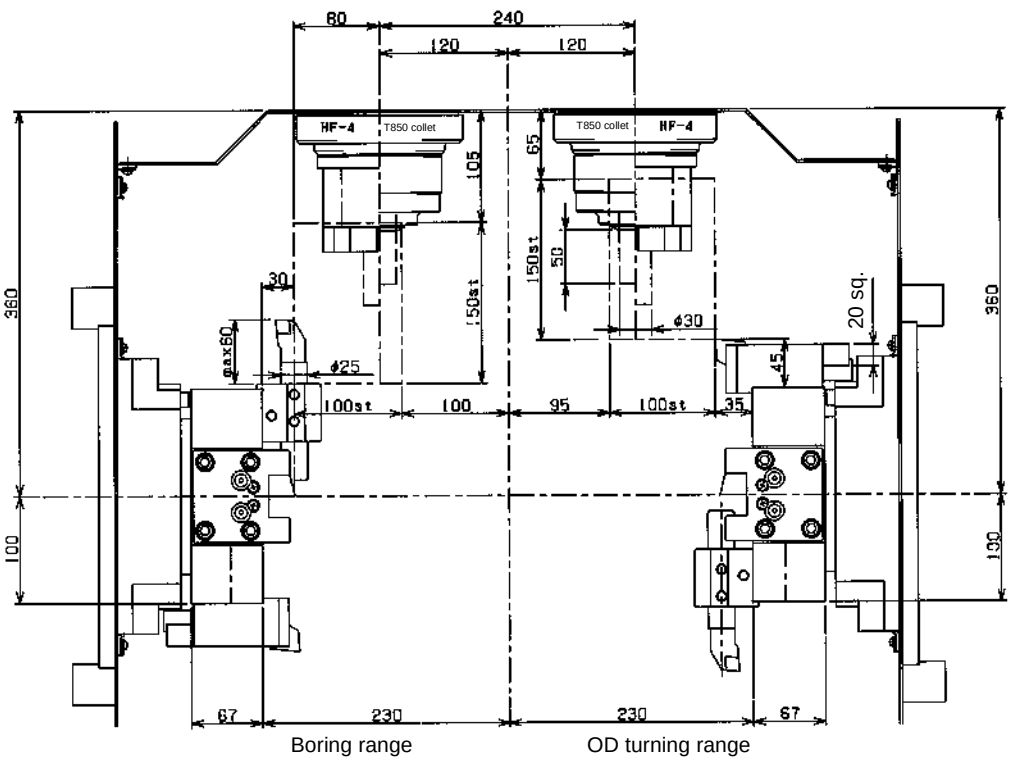


Fig. 11 Stroke diagram 1

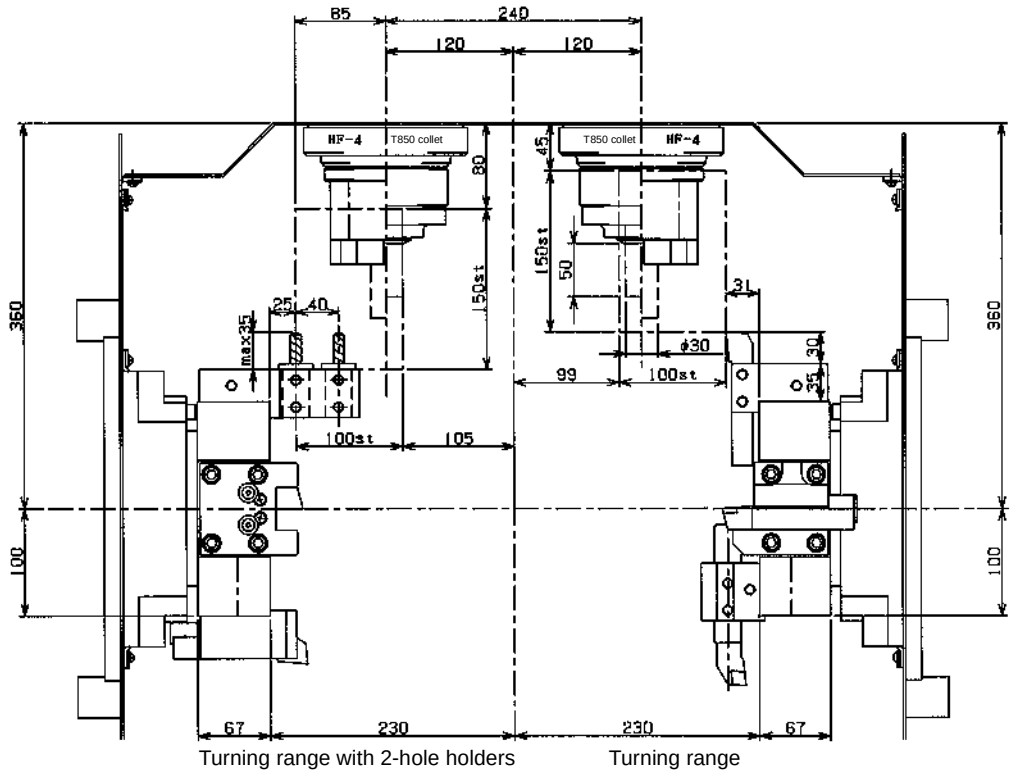


Fig. 12 Stroke diagram 2

Euro

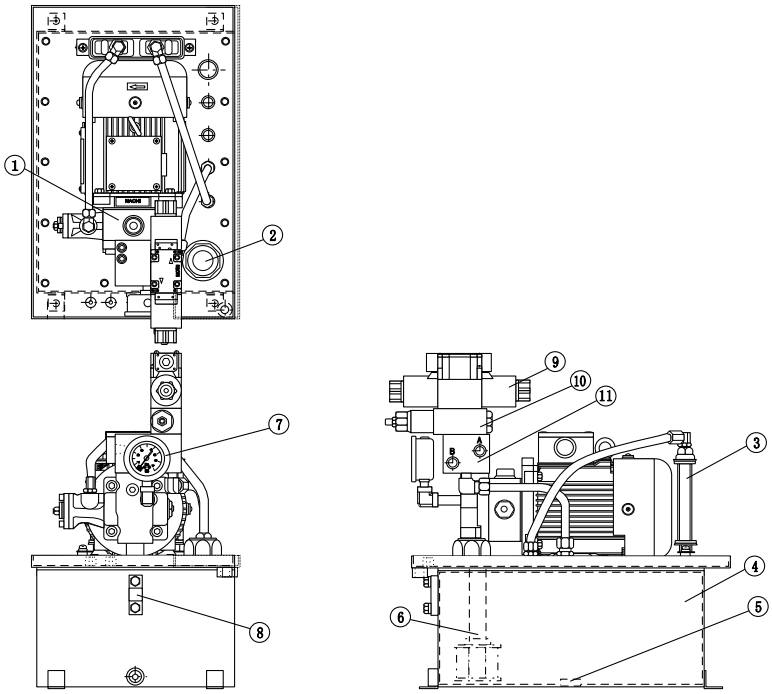
4-4 Hydraulic Pump Unit

The hydraulic pump is used to drive the spindle chucking cylinder (for clamping and unclamping motions) and the turret (for clamping and unclamping motions)

Tank capacity: 18 lit.

* Specifications are subject to change according to the improvement of the machine. For part replacement, consult Takamatsu about the type and quantity of the replacement part and place an order correctly.

4-4-1 Assembly Drawing of Hydraulic Pump Unit



No.	Part name	Type	Q'ty	Maker
1	UNI pump	UVN-1A-0A2-0.7-4-11	1	NACHI
2	Oil filler port/air breather	FA-35	1	Taisei
3	Oil cooler	1013-201-138C	1	NAJICO
4	Tank	18L	1	Kato Giken
5	Magnet separator	30 × 30 × 10T	1	Osaka Magnet
6	Suction strainer	SFT-06-150W	1	Taisei
7	Pressure gauge	GV50-173 × 7MPa	1	Nagano Keiki
8	Oil gauge	MY5 × 40-20	1	Maruwa
9	Solenoid valve	SE-G01-E3X-GR-D2-5453A	1	NACHI
10	Modular valve	OG-G01-PC-21	1	NACHI
11	Manifold block	TK-50-1	1	Kato Giken

Fig. 13 Hydraulic pump unit

Euro

4-4-2 Hydraulic Circuit Diagram

Hydraulic unit TK-NY-03-A

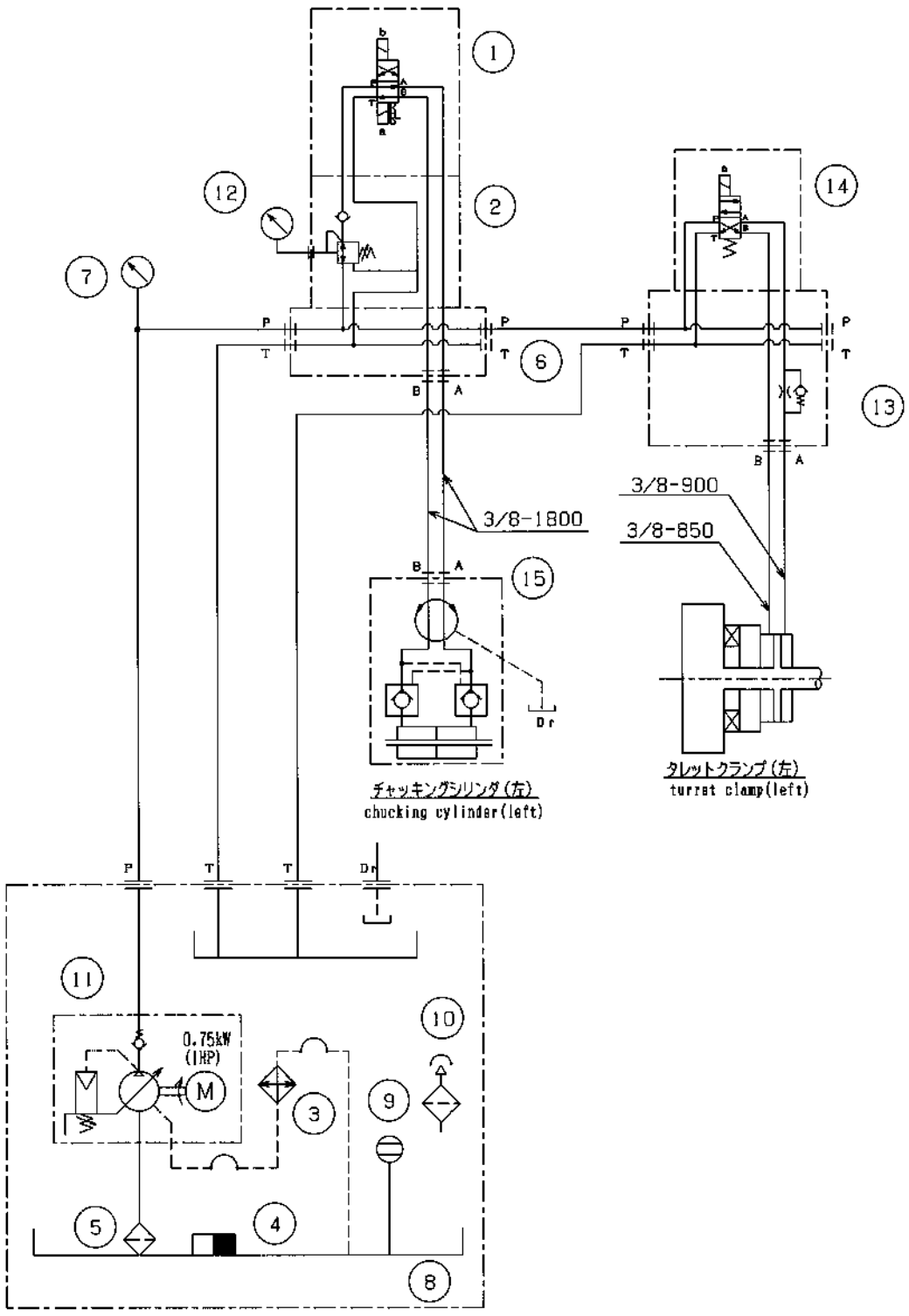


Fig. 14 Hydraulic circuit diagram 1

Euro

Hydraulic unit TK-NY-03-B

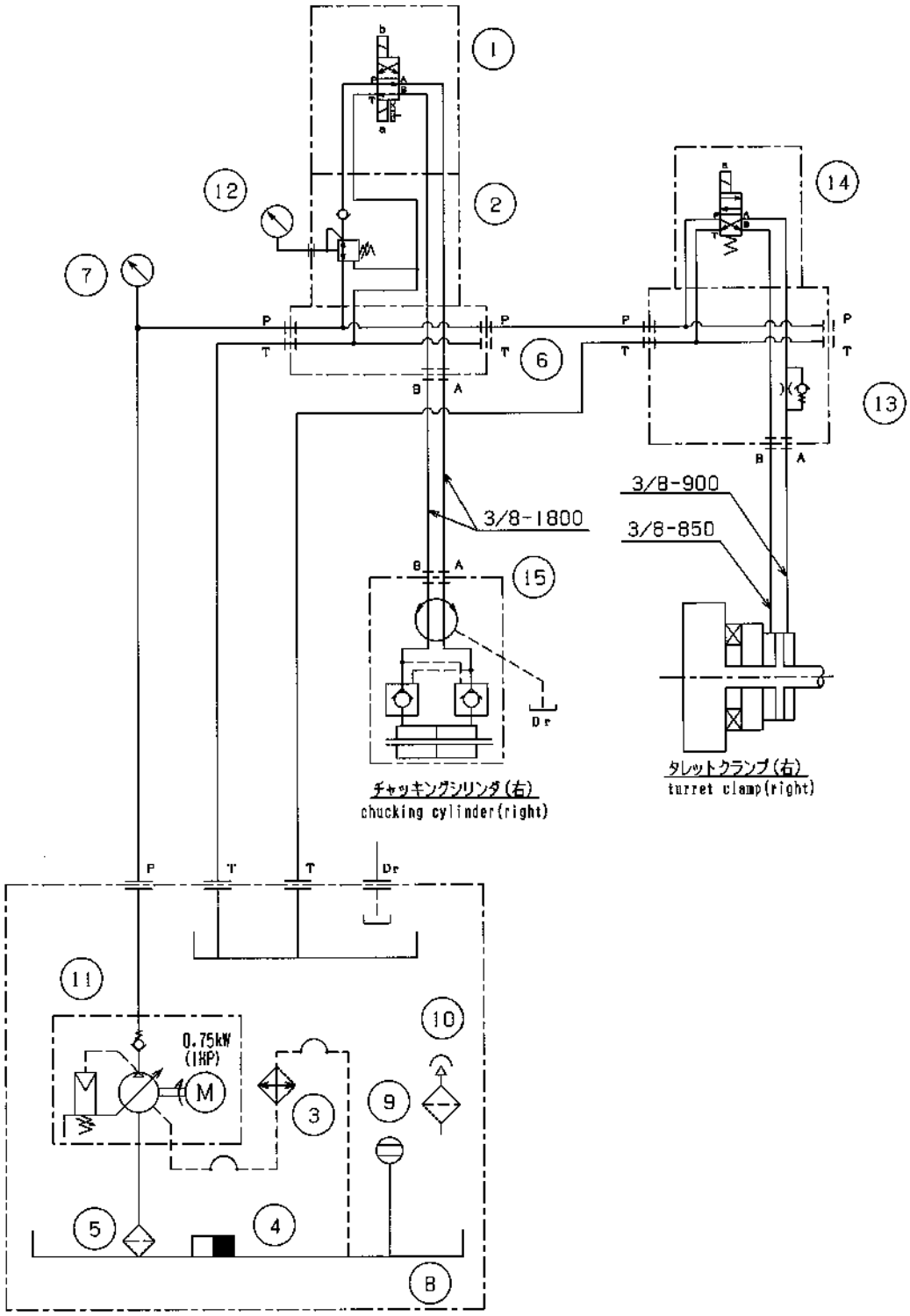


Fig. 15 Hydraulic circuit diagram 2

Euro

No.	品名 Part name	型式 Type	個数 Q'ty	メーカ Maker
1	ソレノイドバルブ Solenoid valve	SE-G01-E3X-GR-D2-5453A	2	不二越 NACHI
2	モジュラーバルブ Modular Valve	OG-G01-PC-21	2	不二越 NACHI
3	オイルクーラ Oil cooler	1013-201-138C	2	ナジコ NAJIKO
4	マグネットセパレータ Magnet seoarator	30X30X10T	2	大阪マグネット OSAKA MAGNET
5	サクションストレーナ Suction strainer	SFT-06-150W	2	大生工業 TAISEI
6	マニホールドブロック Manifold block	TK-50-1	2	加藤技研 KATO
7	圧力計 Pressure gauge	PT1/4X7MPa	2	
8	タンク Tank	18L	2	加藤技研 KATO
9	オイルゲージ Oil gauge	MY5X40・20	2	丸和工業 MARUWA
10	給油口兼エアブリーザ Oil feller port with Air breather	FA-35	2	大生工業 TAISEI
11	ユニポンプ Hydraulic pressure pump	UVN-1A-0A2-0.7-4-11	2	不二越 NACHI
12	圧力計 Pressure gauge	PT1/4X5MPa	2	
13	マニホールドブロック Manifold block	MBG-1C	2	加藤技研 KATO
14	ソレノイドバルブ Solenoid valve	SE-G01-H3X-GR-D2-5453A	2	不二越 NACHI
15	チャッキングシリンダ Chuoking cylinder	FM5-3S / FM5-17SB	2	日鋼商事 NIKKO

Euro

4-4-3 Arrangement of Valves

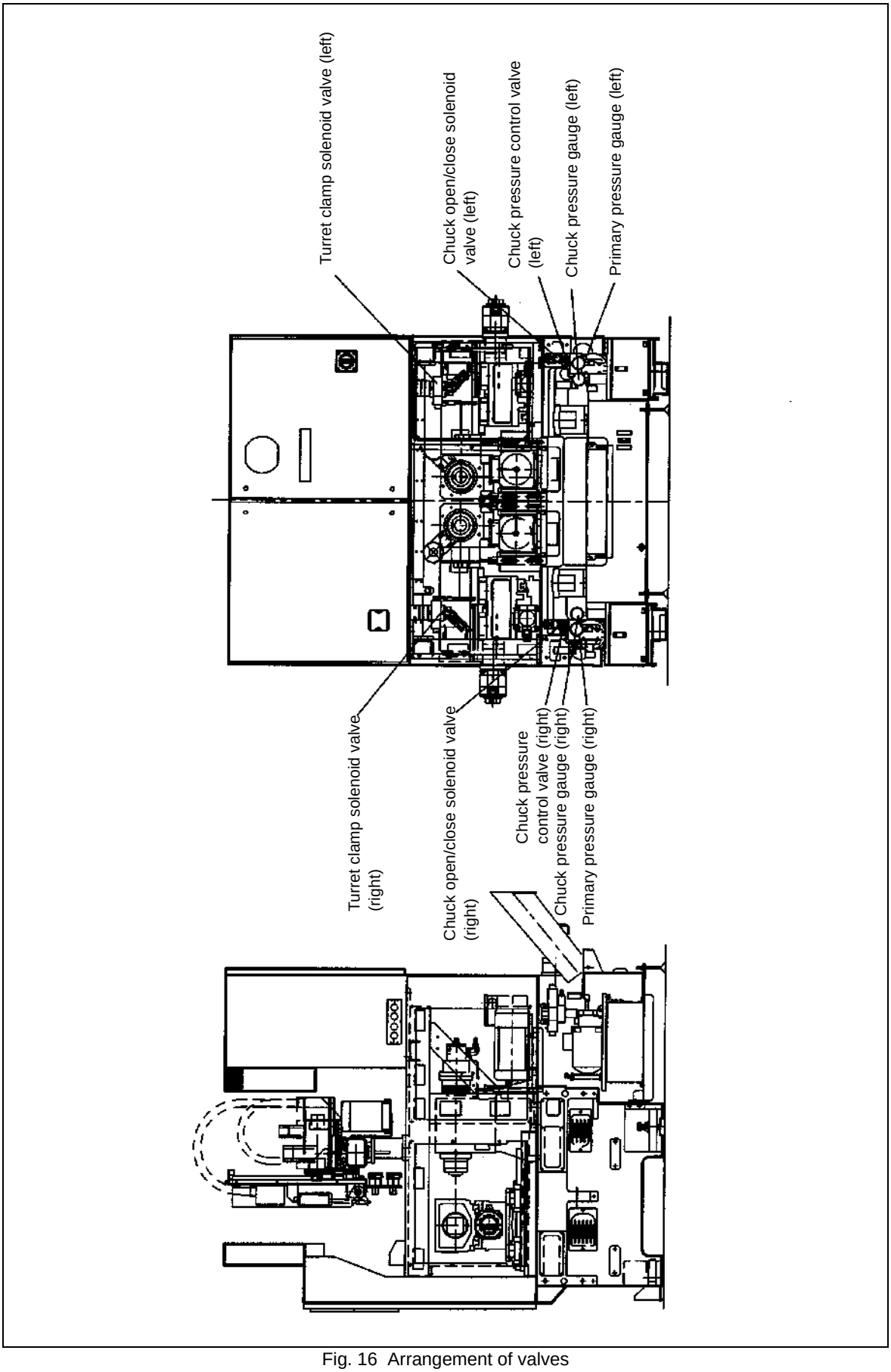


Fig. 16 Arrangement of valves

Euro

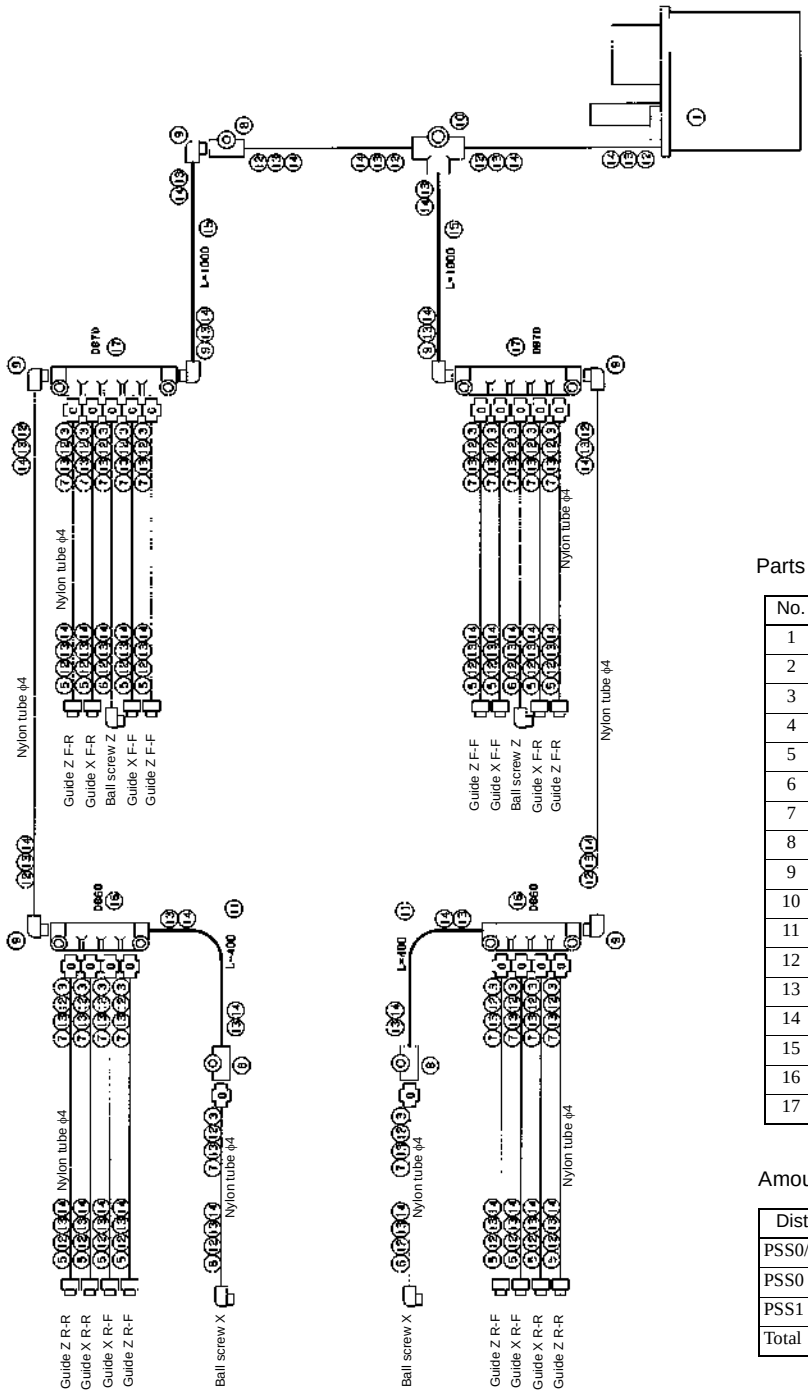
4-5 Lubrication Unit

This unit is used for lubricating slideways and ball screws forcibly at intervals of 15 min.

Tank capacity: 2 lit.

* Specifications are subject to change according to the improvement of the machine. For part replacement, consult Takamatsu about the type and quantity of the replacement part and place an order correctly.

4-5-1 Lubrication System Diagram



Parts

No.	Part name	Type	Q'ty
1	Semi-cycle pump	SMD3151A	1
2			
3	Flow distributor	PSS0	20
4			
5	Nipple	PD4	16
6	Elbow	PHD4	4
7	Distributor nut	PAN4	20
8	Junction	JD2	3
9	Elbow	PH4M8T	7
10	Junction	JD3	1
11	Flexible hose	FHC404	2
12	Tube insert	AL4	48
13	Sleeve	PB4	56
14	Tightening plug	PA4	36
15	Flexible hose	FHC410	2
16	Dester-uni	DB6D	2
17	Dester-uni	DB7D	2

Amount of oiling: 3 cc/15 min

Distributor nut	Oil amount	Q'ty
PSS0/2		
PSS0	0.15/cy	20
PSS1		
Total	3.00/cy	36

Euro

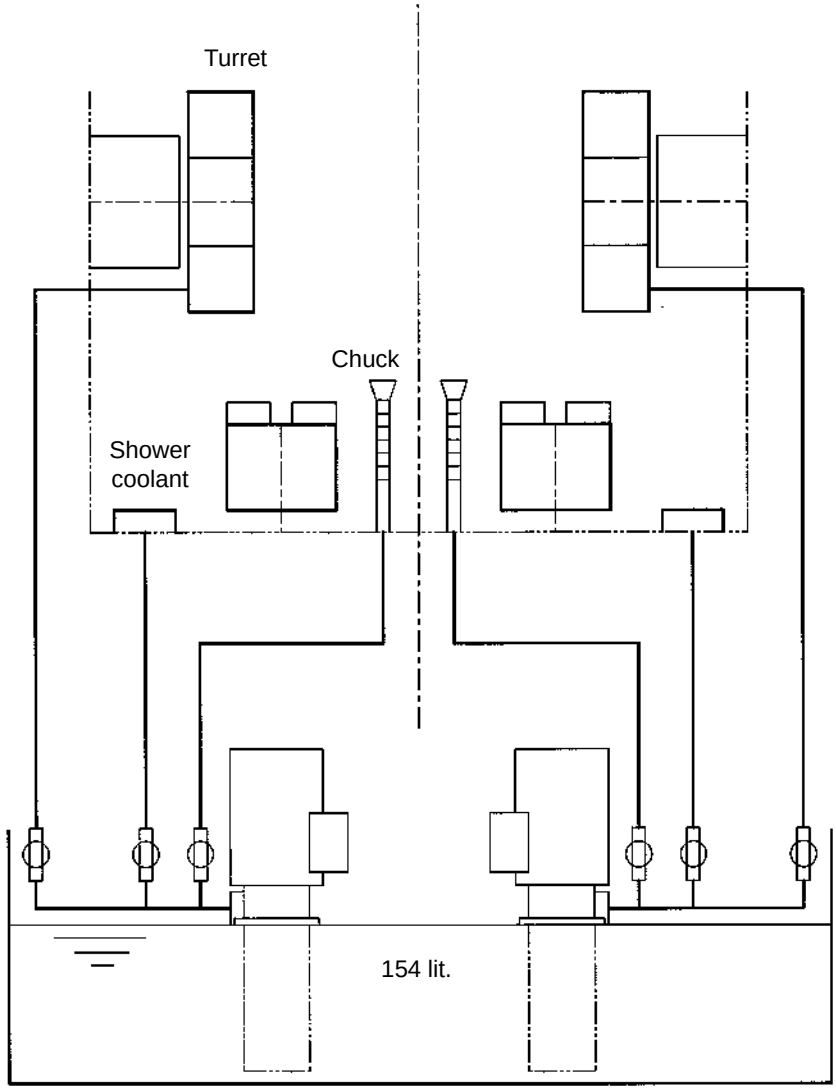
Fig. 17 Lubrication system diagram

4-6 Coolant Unit

This unit is used for cooling and washing workpieces and cutting tools as well as removing chips during cutting.
Priming the pump is not required because an immersion type pump is used.

Tank capacity:	154 lit.
Discharge:	30 - 40 lit./min.

4-6-1 Coolant system diagram



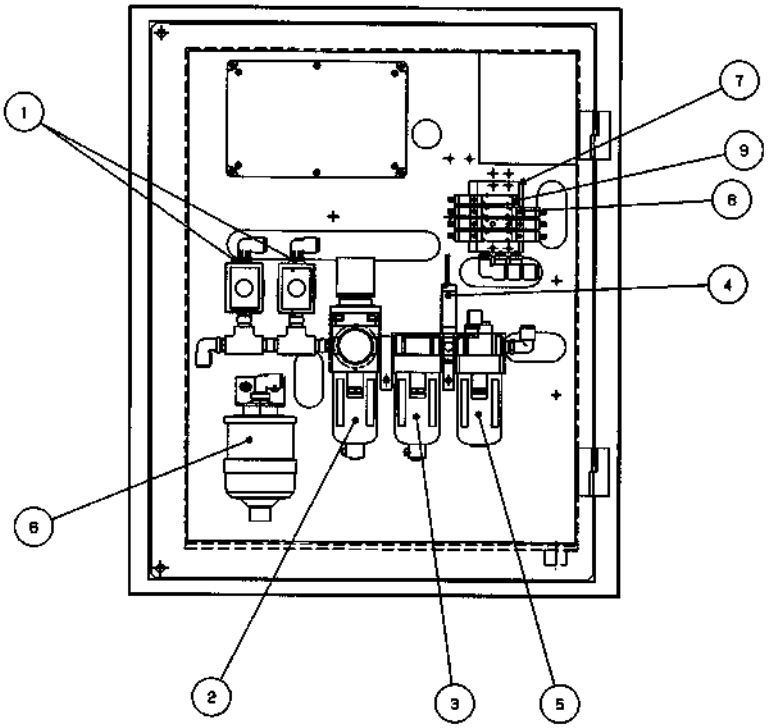
CAUTION Always fill the tank with coolant up to at least 80% (124 lit.) of the tank capacity. It is recommended to replenish the coolant during a break or after finishing work rather than in the middle of operation.

Fig. 18 Coolant system diagram

Euro

4-7 Air Unit (Optional Parts Included)

* Specifications are subject to change according to the improvement of the machine. For part replacement, consult Takamatsu about the type and quantity of the replacement part and place an order correctly.

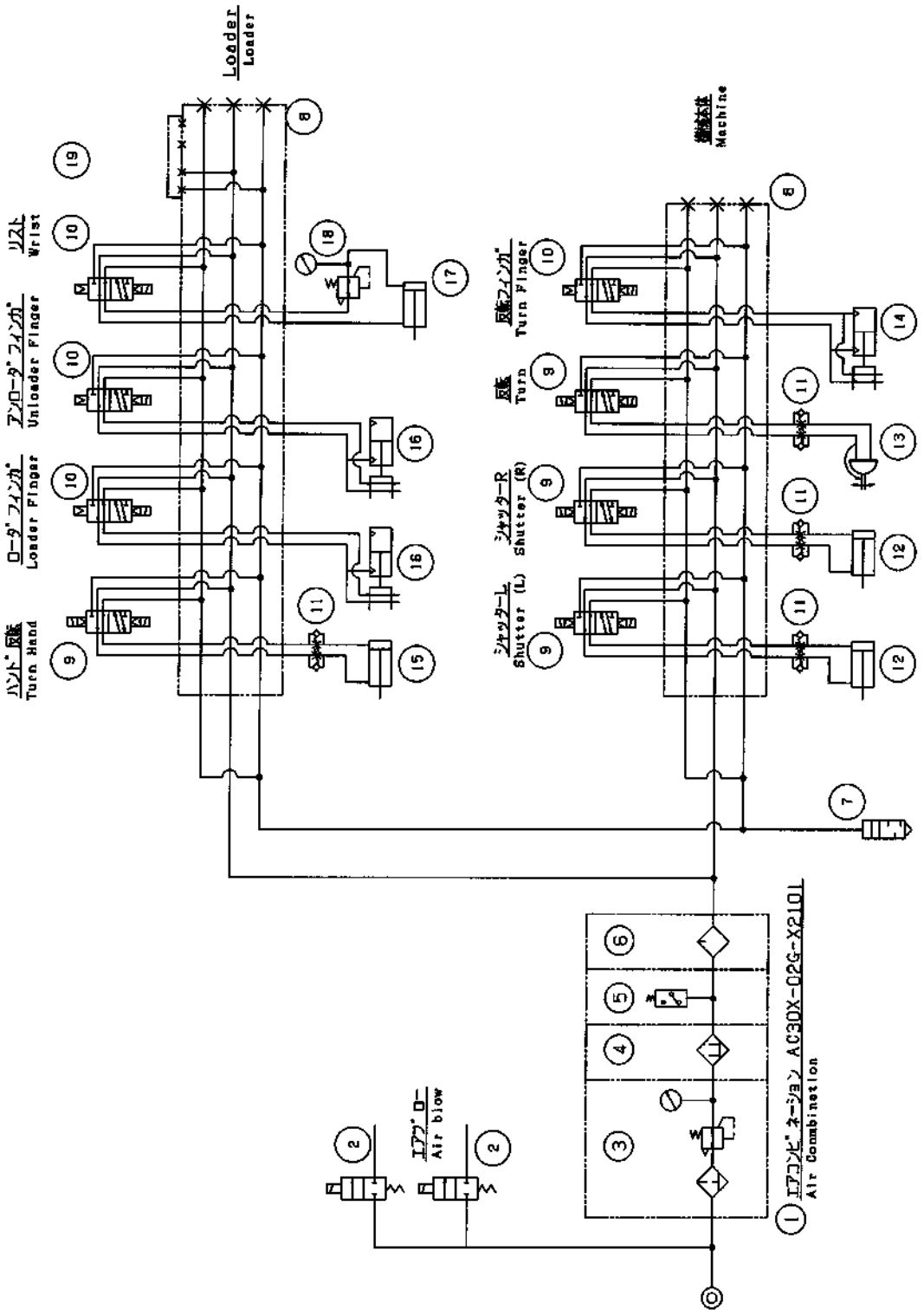


No.	品名 Part name	型式 Type	個数 Q'ty	メーカ Maker
1	ソレノイドバルブ Solenoid valve	VX2330-02-5GS	2	SMC
2	フィルターレギュレータ Filter Regulator	AW30-02G	1	SMC
3	ミストセパレータ Mist Separater	AFM30-02	1	SMC
4	圧力スイッチ Pressure Switch	IS1000M-30-X201	1	SMC
5	ルブリケータ Lublicater	AL30-02	1	SMC
6	エキゾーストクリーナ Exhaust cleaner	AMC320-03B	1	SMC
7	マニホールドブロック Manifold block	SS5Y3-42-04-01	1	SMC
8	ソレノイドバルブ Solenoid valve	SY3240-5HS	3	SMC
9	ソレノイドバルブ Solenoid valve	SY3140-5HS	1	SMC

* The type and location of the air unit may differ depending on the specifications.

Fig. 19 Air unit

Euro



* The type and location of the air unit may differ depending on the specifications.

Fig. 20 Air circuit diagram

No.	品名 Part name	型式 Type	個数 Q'ty	メーカ Maker
1	エアコンビネーション Air Conmbination	AC30X-02G-X2101	1	SMC
2	ソレノイドバルブ Solenoid valve	VX2330-02-5GS	2	SMC
3	フィルターレギュレータ Filter Regulator	AW30-02G	1	SMC
4	ミストセパレータ Mist Separater	AFM30-02	1	SMC
5	圧力スイッチ Pressure Switch	IS1000M-30-X201	1	SMC
6	ルブリケータ Lublicator	AL30-02	1	SMC
7	エキゾーストクリーナ Exhaust cleaner	AMC320-03B	1	SMC
8	マニホールドブロック Manifold block	SS5Y3-42-05-01	1	SMC
9	ソレノイドバルブ Solenoid valve	SY3240-5HS	3	SMC
10	ソレノイドバルブ Solenoid valve	SY3140-5HS	1	SMC
11	スピードコントローラ Speed controller	AS2201F-01-06S	8	SMC
12	エアシリンダ Air cylinder	RDQB25-150-DCH3541H	2	SMC
13	ロータリシリンダ Rotary cylinder	MSQB30AX-F9BL-X12	1	SMC
14	エアチャック Air chuck	MHKL2-20D1	1	SMC
15	エアシリンダ Air cylinder	RDQD40-100M-F9BWL	1	SMC
16	エアチャック Air chuck	MHSHJ3-32DF	2	SMC
17	エアシリンダ Air cylinder	CDQSB16-10D-F9BVLS	1	SMC
18	減圧弁 Regulator	ARM10-18-G	1	SMC
19	ブランキングプレートASSY Blanking plate ASSY	SY3000-26-9A	1	SMC

Euro

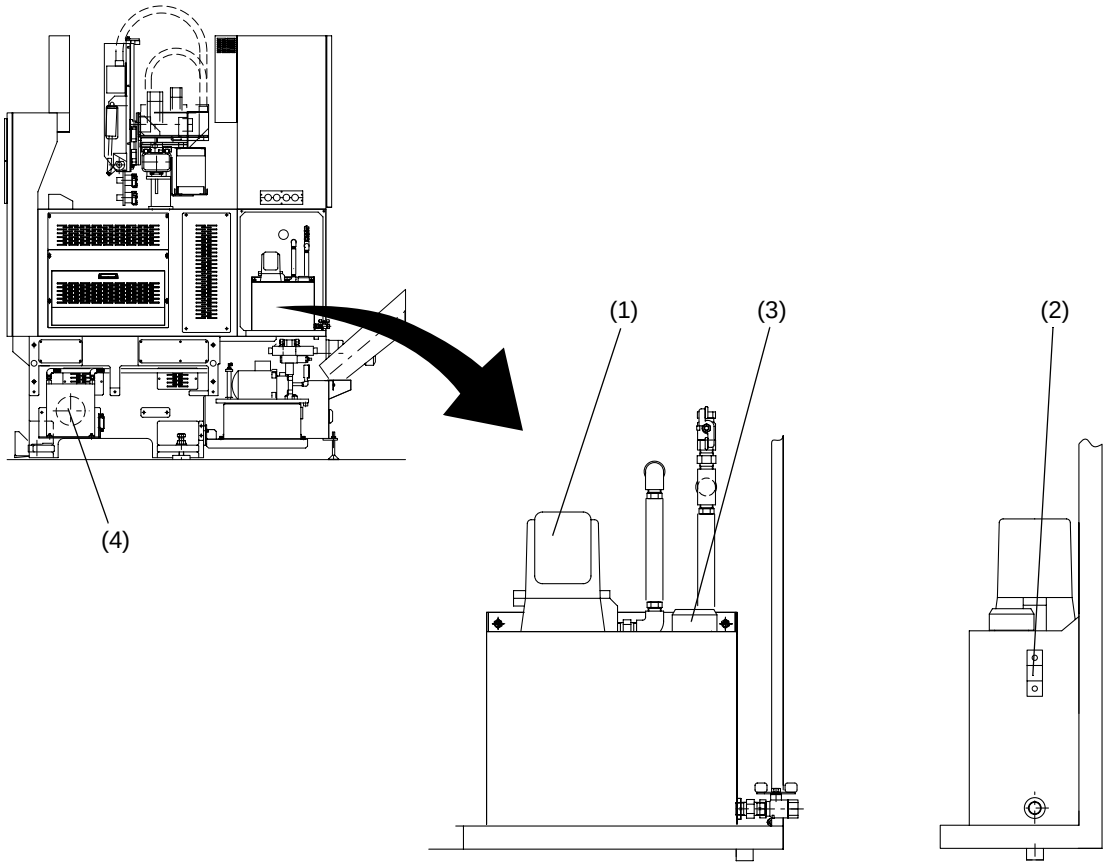
4-8 Headstock Base Cooling Unit (Optional)

The headstock base cooling unit cools the headstock base.

Tank capacity: 10.5 lit. (actual cooling fluid capacity: 30 lit.)

* Specifications are subject to change according to the improvement of the machine. For part replacement, consult Takamatsu about the type and quantity of the replacement part and place an order correctly.

4-8-1 Appearance of the Headstock Base Cooling Unit



No.	Part name	Type	Manufacturer
1	Cooling pump	VKP065A (100W)	Fuji Electric
2	Oil gauge	5X40	Kanazawa Kiko
3	Oil filler port/air breather	FA-35	Kanazawa Kiko
4	Oil cooler	3A92-002-0003	Kanazawa Kiko

Fig. 21

Euro

4-8-2 Headstock Base Cooling System Drawing

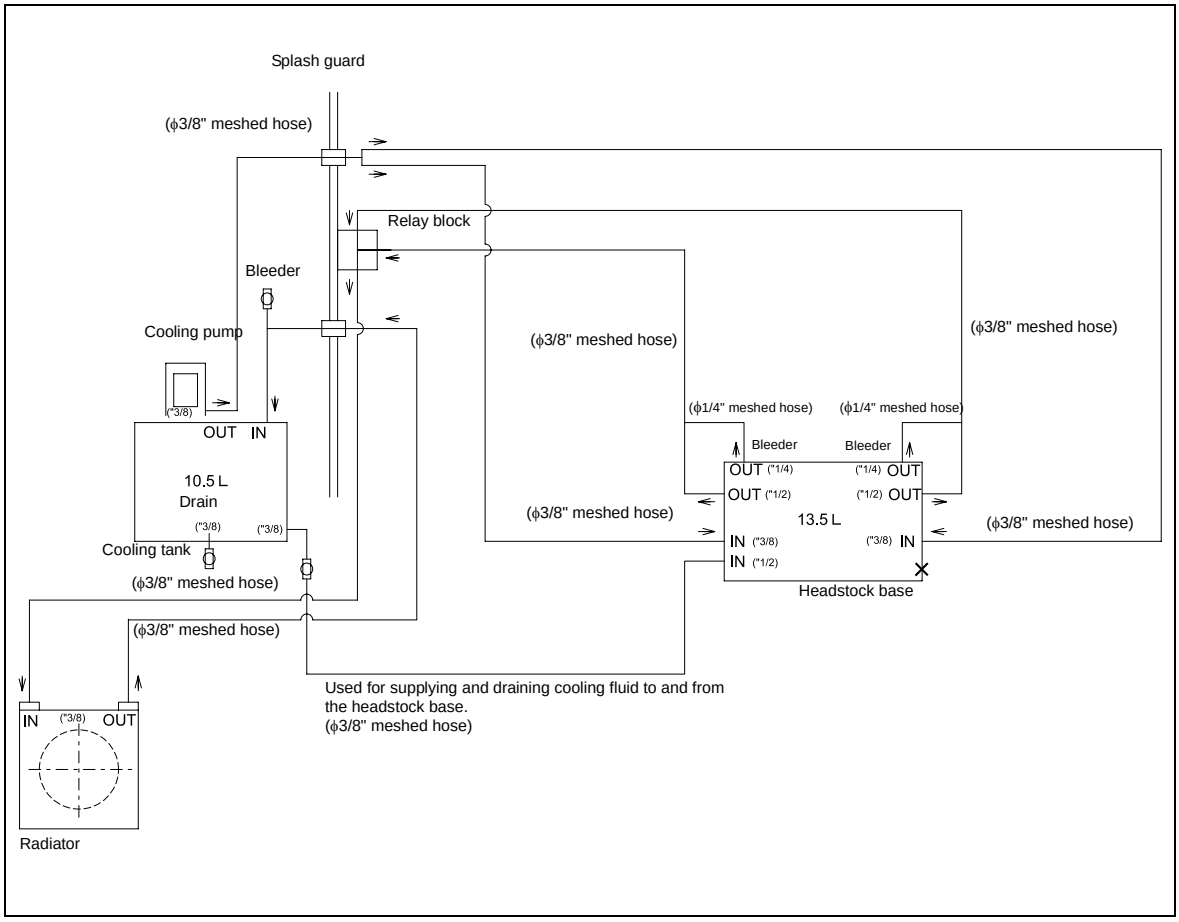


Fig. 22

Euro

Chapter 5 Electrical Drawings

5-1 Electrical Drawing List

図面一覧表 DRAWING LIST		ユーザー名 USER				
機種 MACHINE TYPE	XW-50(FANUC)	機番 ORDER No.		APPR.	CHECK	DRAWN
仕様 SPEC	CE仕様 CE	製番 FACTURE No.				

No.	TITLE	DRAWING No.	PAGE	NOTE
1	機器接続図 Outline of connection	K3529810	1	Machine Side
2	電気回路図1 Electric Circuit No.1	K3529820	2	200VAC(L1,L2,L3)
3	電気回路図2 Electric Circuit No.2	K3529830	3	200VAC(L1,L2,L3)
4	電気回路図3 Electric Circuit No.3	K3529840	4	200VAC(L1,L2,L3)
5	電気回路図4 Electric Circuit No.4	K3529850	5	100VAC(R2,S3)
6	電気回路図5 Electric Circuit No.5	K3529860	6	PSM,SVML
7	電気回路図6 Electric Circuit No.6	K3529870	7	SPML
8	電気回路図7 Electric Circuit No.7	K3529880	8	SVMR
9	電気回路図8 Electric Circuit No.8	K3529890	9	SPMR
10	電気回路図9 Electric Circuit No.9	K3529900	10	SVMTL,SVMTR
11	電気回路図10 Electric Circuit No.10	K3529910	11	NC,OPIFB,IOM1-8,MPG
12	電気回路図11 Electric Circuit No.11	K3529920	12	MDI,RS232C,EtherNet
13	電気回路図12 Electric Circuit No.12	K3529930	13	KPNL(Y97-Y102)
14	電気回路図13 Electric Circuit No.13	K3529940	14	KPNL(X97-X102)
15	電気回路図14 Electric Circuit No.14	K3529950	15	OPIFB(Y105,Y106)
16	電気回路図15 Electric Circuit No.15	K3529960	16	OPIFB(X105,X106)
17	電気回路図16 Electric Circuit No.16	K3529970	17	OPIFB(X107)
18	電気回路図17 Electric Circuit No.17	K3529980	18	24VDC(C1,C2,C3)
19	電気回路図18 Electric Circuit No.18	K3529990	19	24VDC(C1,C3) / ESTSR1,2
20	電気回路図19 Electric Circuit No.19	K3530000	20	24VDC(C1,C3) / DRCSR
21	電気回路図20 Electric Circuit No.20	K3530010	21	100VAC(R3,S3)
22	電気回路図21 Electric Circuit No.21	K3530020	22	100VAC(R3,S3)
23	電気回路図22 Electric Circuit No.22	K3530030	23	24VDC(C2B,C3B)
24	電気回路図23 Electric Circuit No.23	K3530040	24	24VDC(C2B,C3B)
25	電気回路図24 Electric Circuit No.24	K3530050	25	IOM1(Y0,Y1)
26	電気回路図25 Electric Circuit No.25	K3530060	26	IOM2(Y2,Y3)
27	電気回路図26 Electric Circuit No.26	K3530070	27	IOM3(Y4,Y5)
28	電気回路図27 Electric Circuit No.27	K3530080	28	IOM4(Y6,Y7)
29	電気回路図28 Electric Circuit No.28	K3530090	29	IOM5(Y8,Y9)
30	電気回路図29 Electric Circuit No.29	K3530100	30	IOM1(X4,X5)
31	電気回路図30 Electric Circuit No.30	K3530110	31	IOM1(X6)
32	電気回路図31 Electric Circuit No.31	K3530120	32	IOM2(X7,X8)
33	電気回路図32 Electric Circuit No.32	K3530130	33	IOM2(X9)
34	電気回路図33 Electric Circuit No.33	K3530140	34	IOM3(X10,X11)
35	電気回路図34 Electric Circuit No.34	K3530150	35	IOM3(X12)
36	電気回路図35 Electric Circuit No.35	K3530160	36	IOM4(X13,X14)

NOTE:

TAKAMAZ	REVISIONS	LIST NO.	PAGE /

Euro

図 面 一 覧 表 DRAWING LIST		ユーザー名 USER				
機 種 MACHINE TYPE	XW-50(FANUC)	機 番 ORDER No.		APPR.	CHECK	DRAWN
仕 様 SPEC	CE仕様 CE	製 番 FACTURE No.				

No.	TITLE	DRAWING No.	PAGE	NOTE
1	電気回路図36 Electric Circuit No.36	K3530170	37	IOM4(X15)
2	電気回路図37 Electric Circuit No.37	K3530180	38	IOM5(X20,X21)
3	電気回路図38 Electric Circuit No.38	K3530190	39	IOM5(X22)
4	ローダ部 機器接続図 Loader Outline of connection	K3530200	40	Loader Side
5	ローダ部 電気回路図1 Loader Electric Circuit No.1	K3530210	41	LOADER POWER
6	ローダ部 電気回路図2 Loader Electric Circuit No.2	K3530220	42	SVLY
7	ローダ部 電気回路図3 Loader Electric Circuit No.3	K3530230	43	SVLZ
8	ローダ部 電気回路図4 Loader Electric Circuit No.4	K3530240	44	SVLX
9	ローダ部 電気回路図5 Loader Electric Circuit No.5	K3530250	45	LDMCB
10	ローダ部 電気回路図6 Loader Electric Circuit No.6	K3530260	46	LDMCB,LDOPB
11	ローダ部 電気回路図7 Loader Electric Circuit No.7	K3530270	47	LDOPB,LDMPG
12	ローダ部 電気回路図8 Loader Electric Circuit No.8	K3530280	48	IOM6(Y10,Y11)
13	ローダ部 電気回路図9 Loader Electric Circuit No.9	K3530290	49	IOM7(Y12,Y13)
14	ローダ部 電気回路図10 Loader Electric Circuit No.10	K3530300	50	IOM8(Y14,Y15)
15	ローダ部 電気回路図11 Loader Electric Circuit No.11	K3530310	51	IOM6(X23,X24)
16	ローダ部 電気回路図12 Loader Electric Circuit No.12	K3530320	52	IOM6(X25)
17	ローダ部 電気回路図13 Loader Electric Circuit No.13	K3530330	53	IOM7(X26,X27)
18	ローダ部 電気回路図14 Loader Electric Circuit No.14	K3530340	54	IOM7(X28)
19	ローダ部 電気回路図15 Loader Electric Circuit No.15	K3530350	55	IOM8(X29,X30)
20	ローダ部 電気回路図16 Loader Electric Circuit No.16	K3530360	56	IOM8(X31)
21	ローダ部 電気回路図17 Loader Electric Circuit No.17	K3530370	57	LDMCB(Output:QX02)
22	ローダ部 電気回路図18 Loader Electric Circuit No.18	K3530380	58	LDMCB(Output:QX02,QX03)
23	ローダ部 電気回路図19 Loader Electric Circuit No.19	K3530390	59	LDMCB(Input:IX02)
24	ローダ部 電気回路図20 Loader Electric Circuit No.20	K3530400	60	LDMCB(Input:IX03)
25	制御盤内部品配置図 Parts Arrangement In Control Box	M3054760	61	
26	制御盤内端子台配列図 Terminal Arrangement In Control Box	M3054770	62	
27	制御盤外部品配置図 Parts Arrangement Outside Control Box	M3054780	63	
28	操作盤部品配置図 Parts Arrangement In Operation Panel	M3054790	64	
29				
30				
31				
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35				
36				

NOTE:

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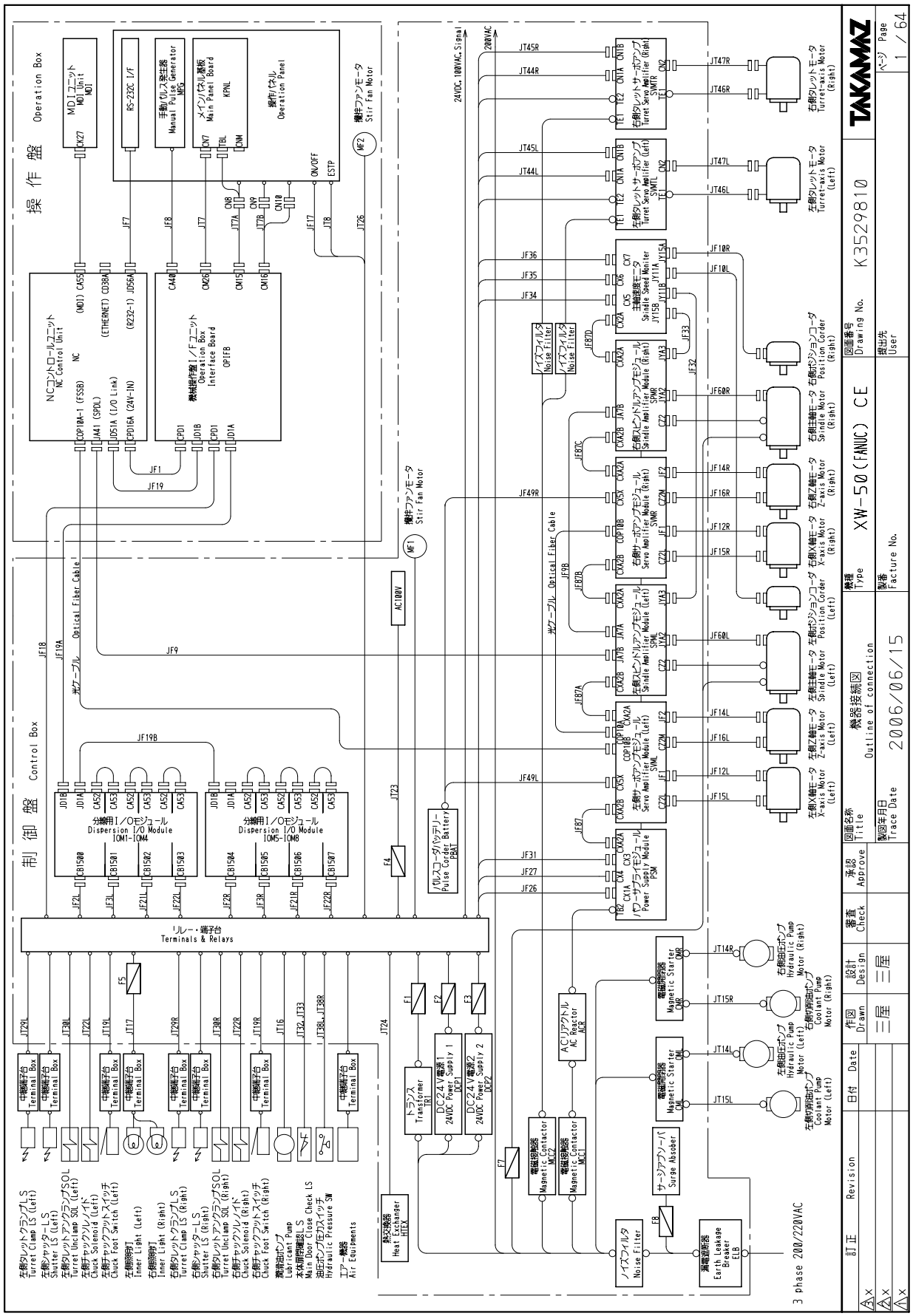
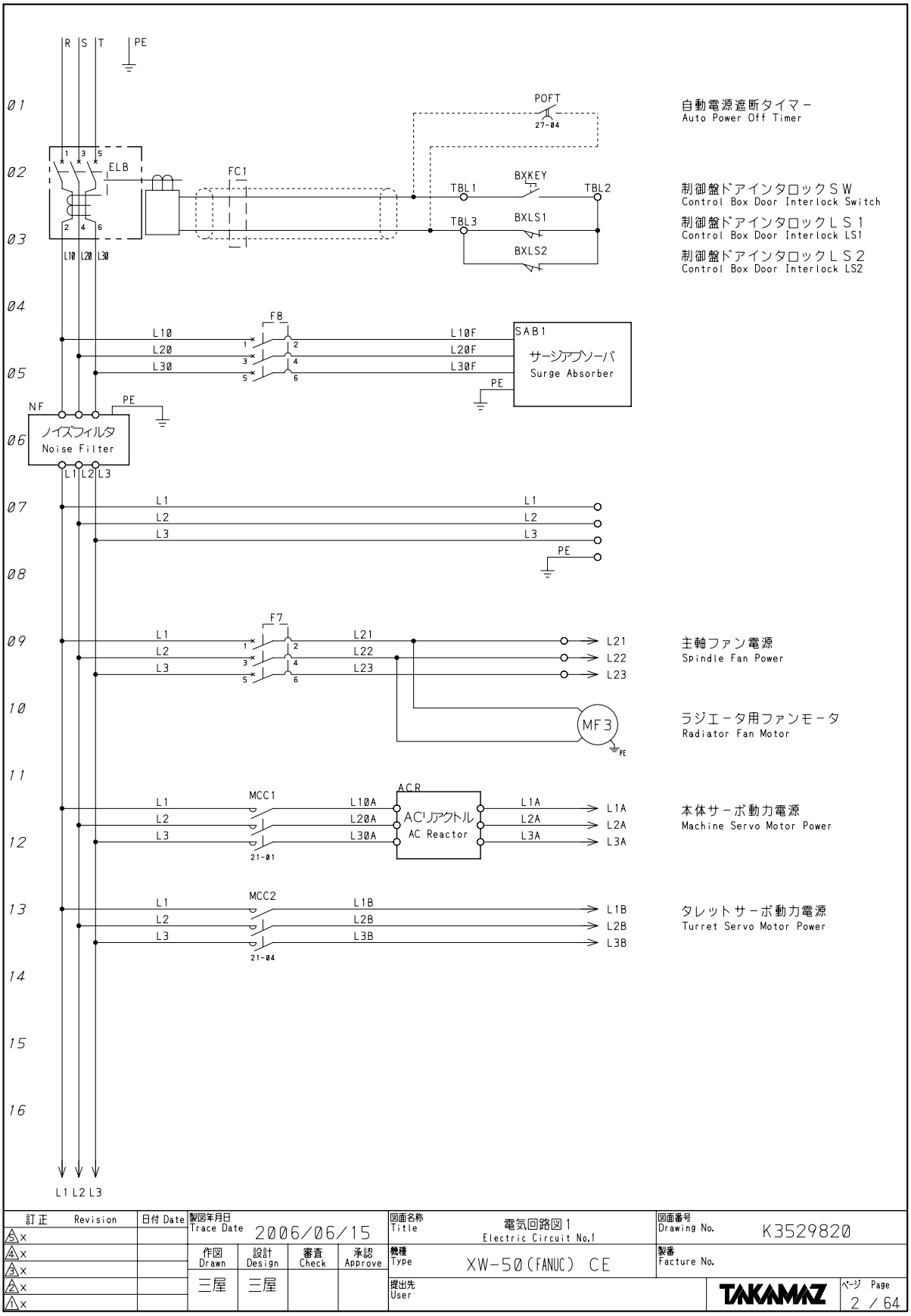
5-2 Connection Diagram



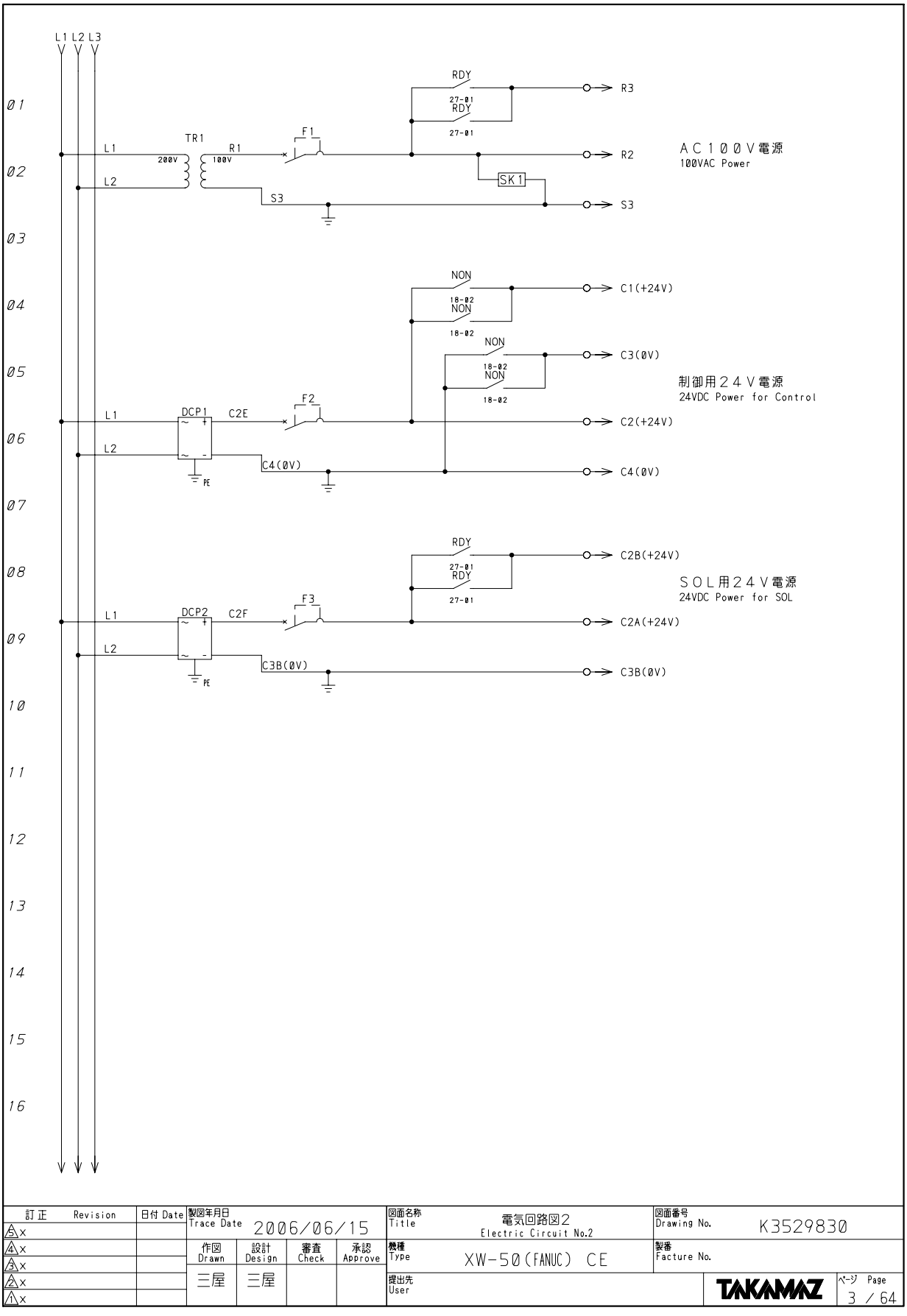
5-3 Electric Circuit Diagrams

Electric circuit diagram 1



Euro

Electric circuit diagram 2



訂正 Revision	日付 Date	製図年月日 Trace Date				図面名称 Title		図面番号 Drawing No.	
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△2 x		三屋	三屋			提出先 User		ページ Page	
△1 x							TAKAMAZ	3 / 64	

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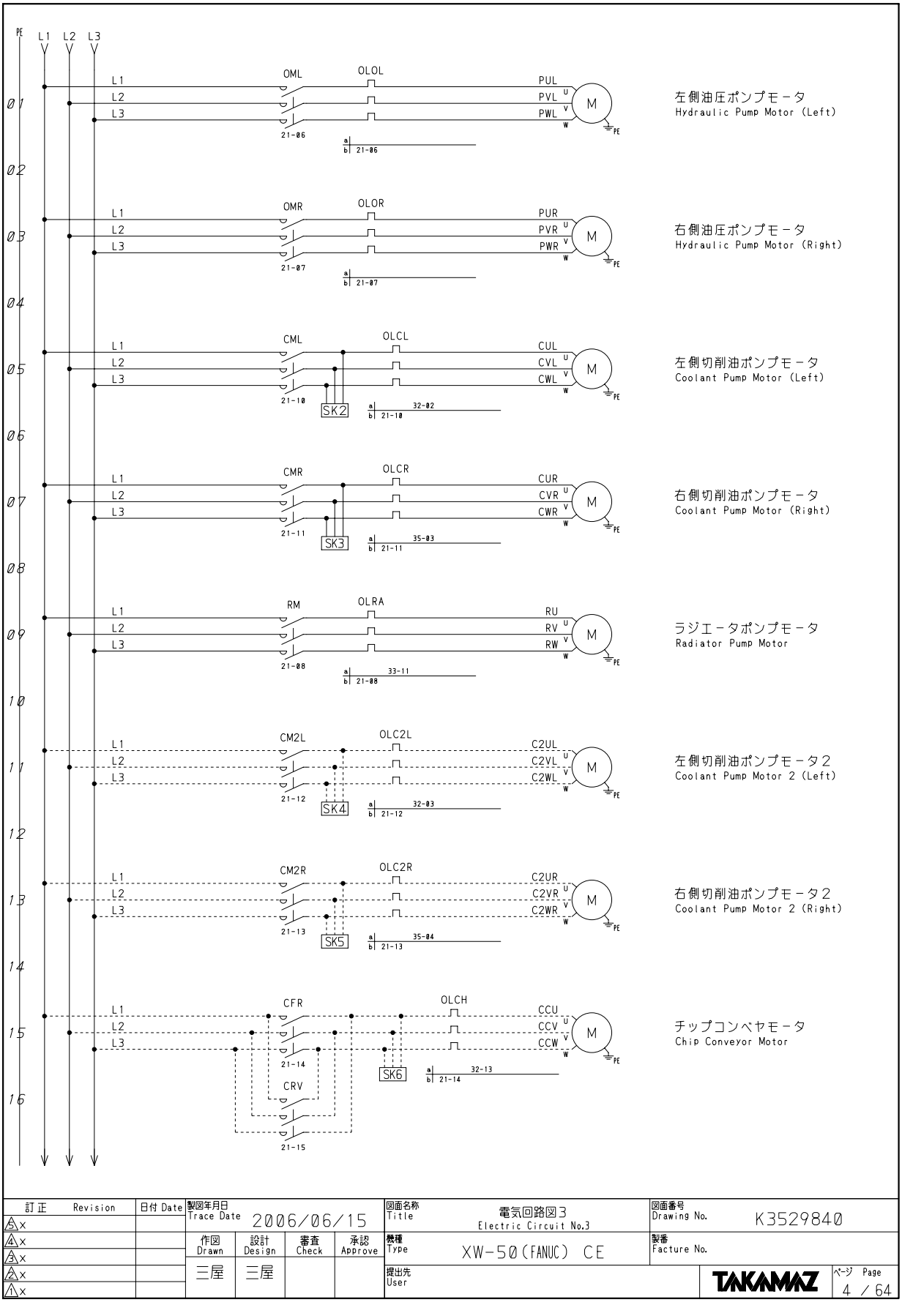
Electric circuit diagram 3



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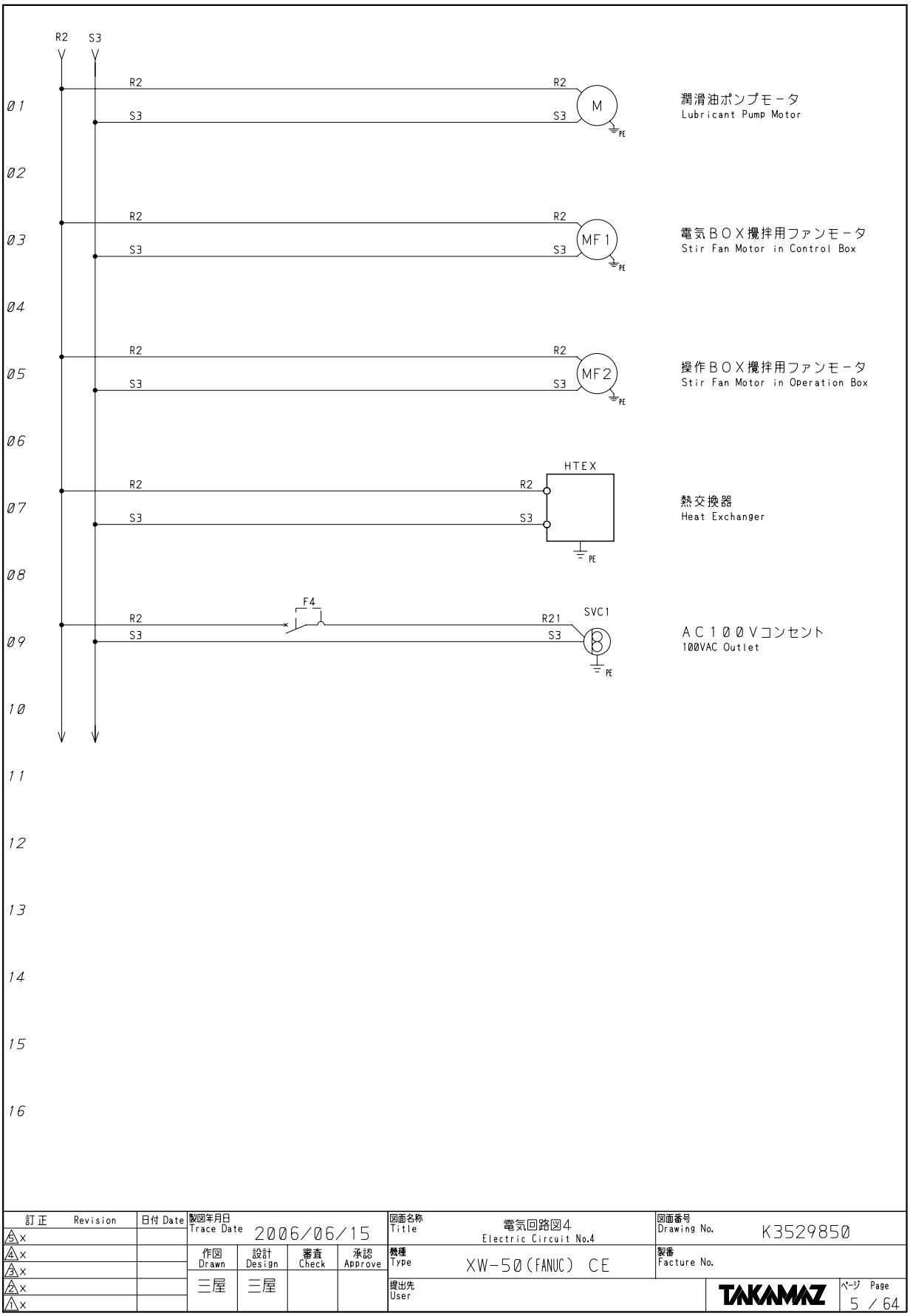
4 x		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type	XW-50(FANUC) CE	製番 Facture No.	
3 x		三屋	三屋			提出先 User		TAKAMAZ	ページ Page 4 / 64
2 x									
1 x									

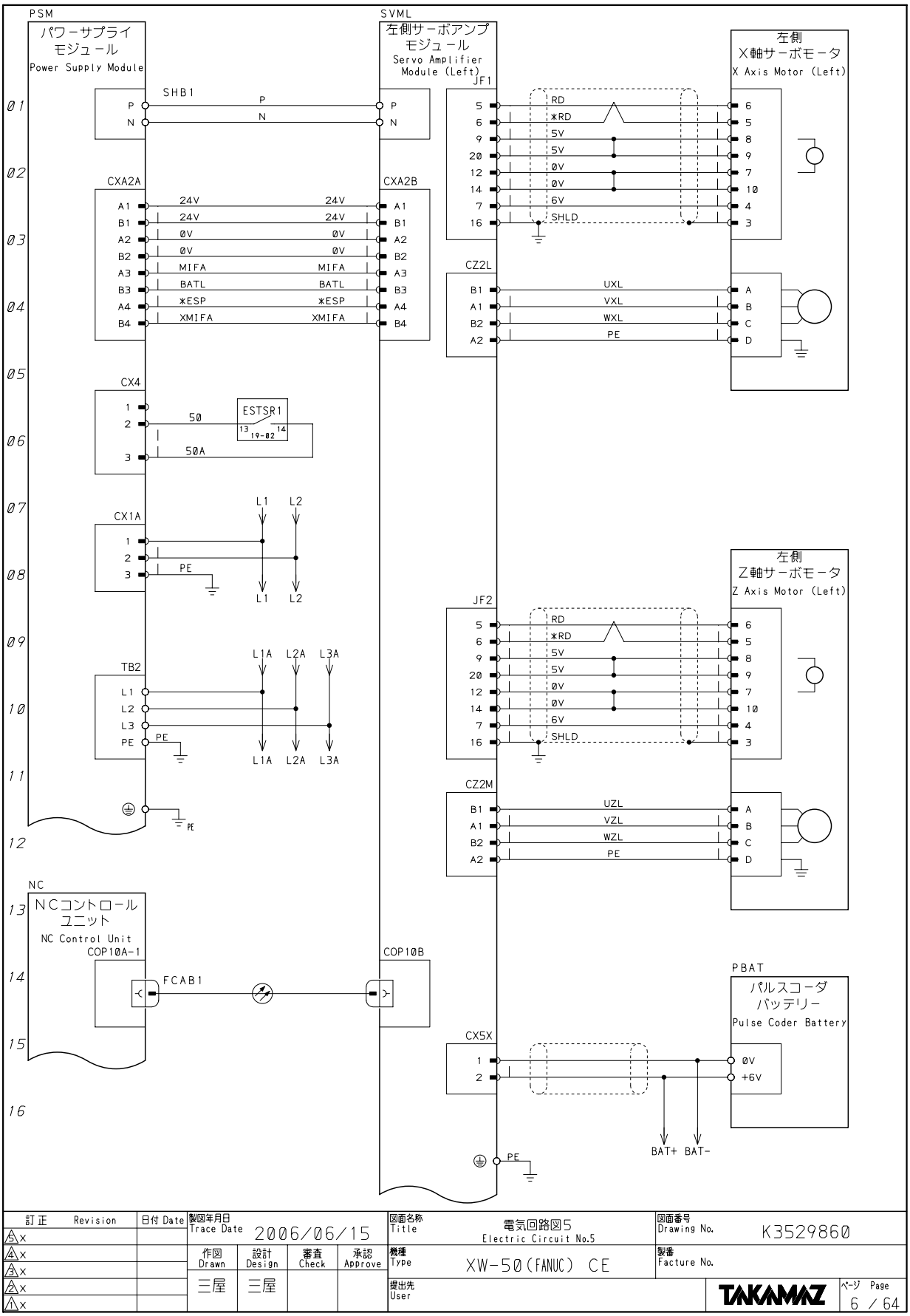
Euro

Electric circuit diagram 4



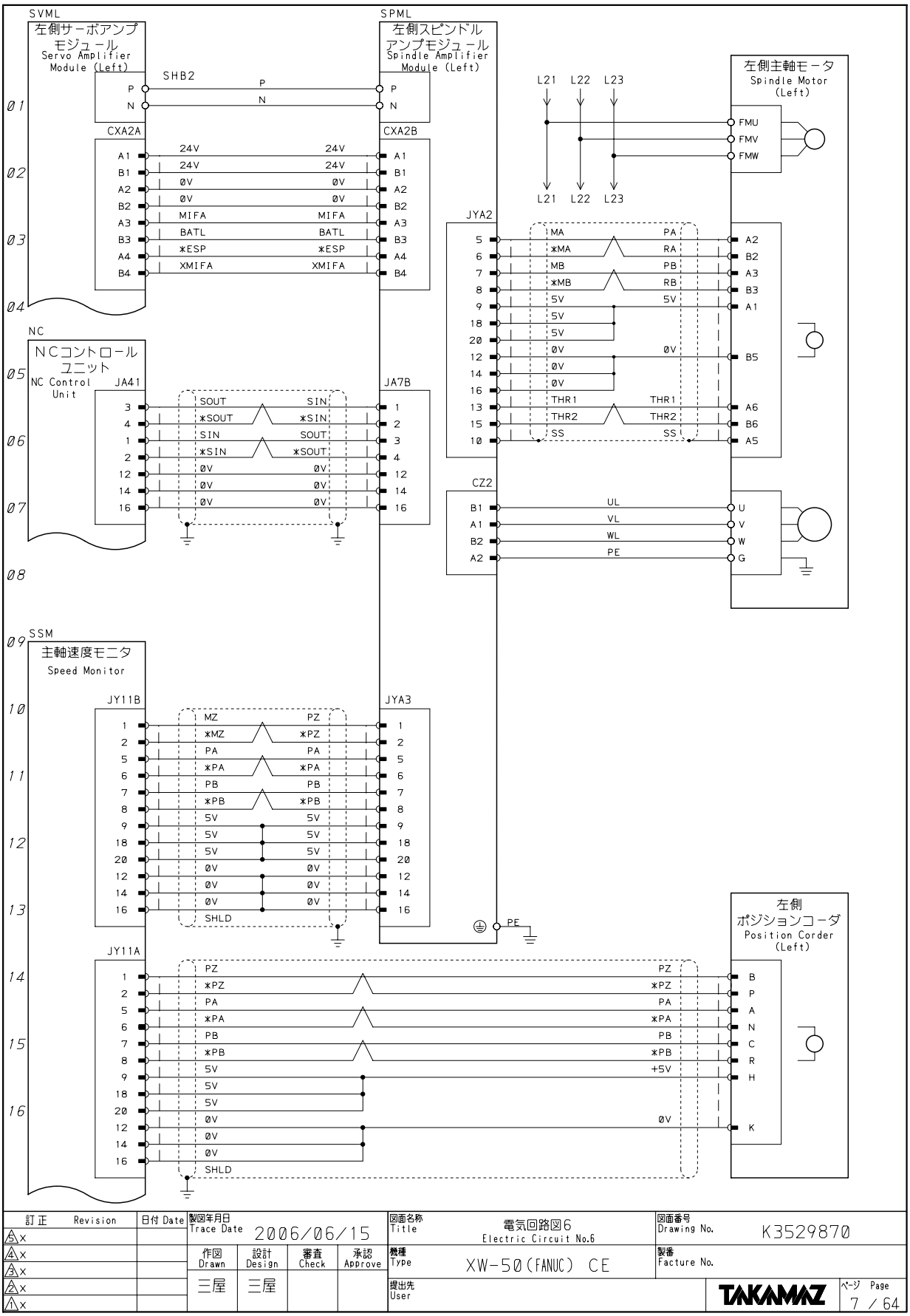
Euro

Electric circuit diagram 5



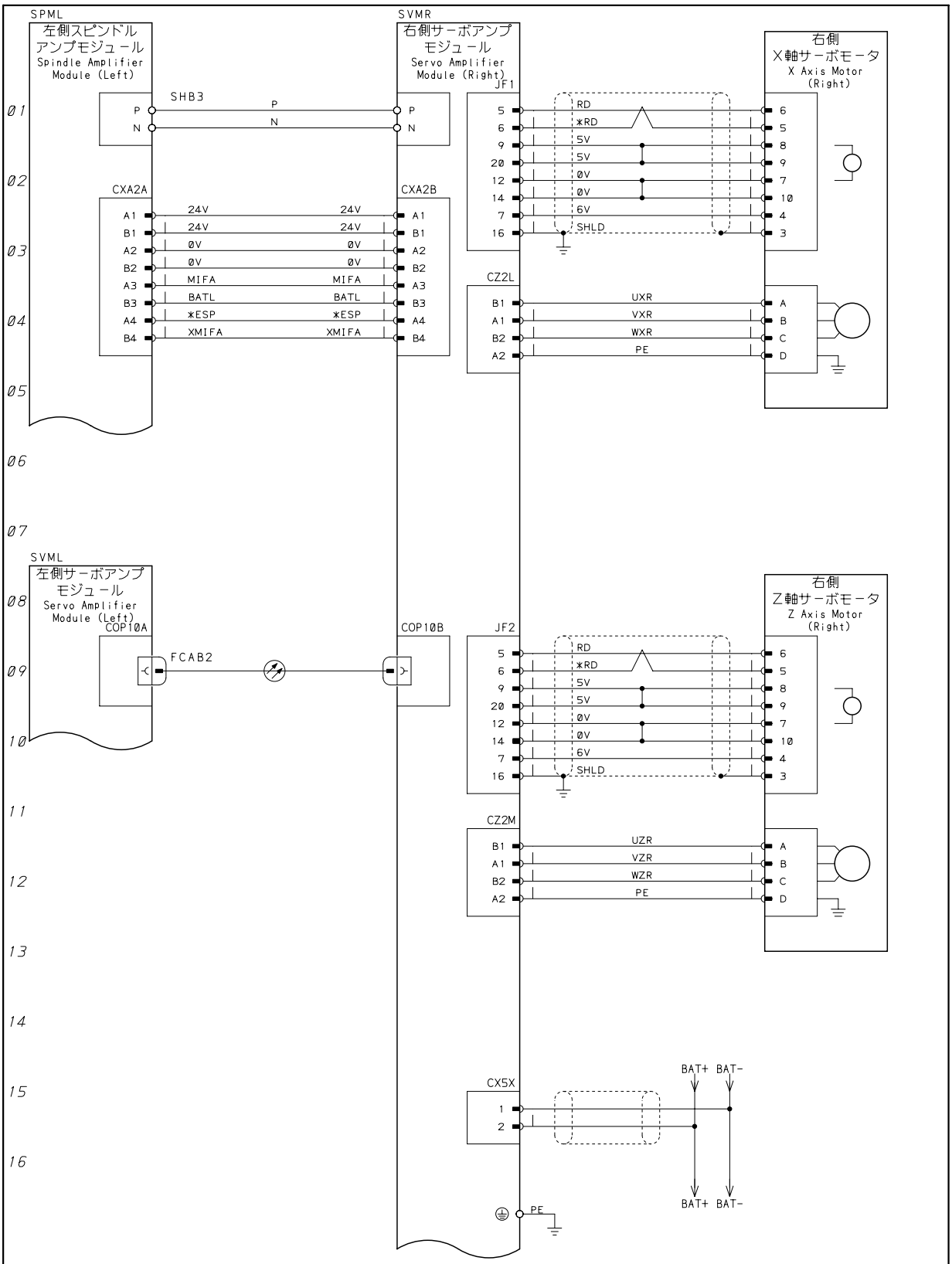
Euro

Electric circuit diagram 6



Euro

Electric circuit diagram 7



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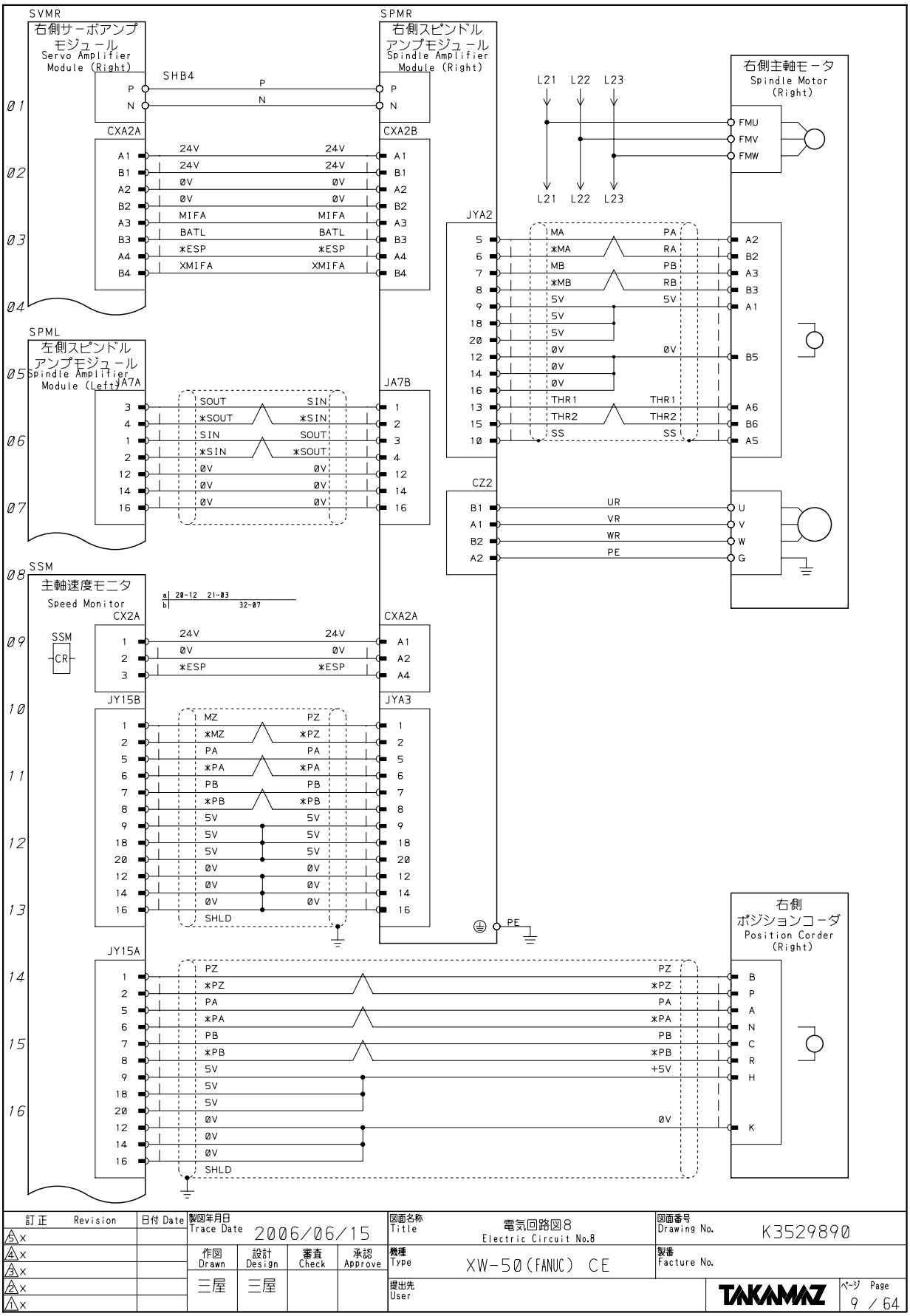
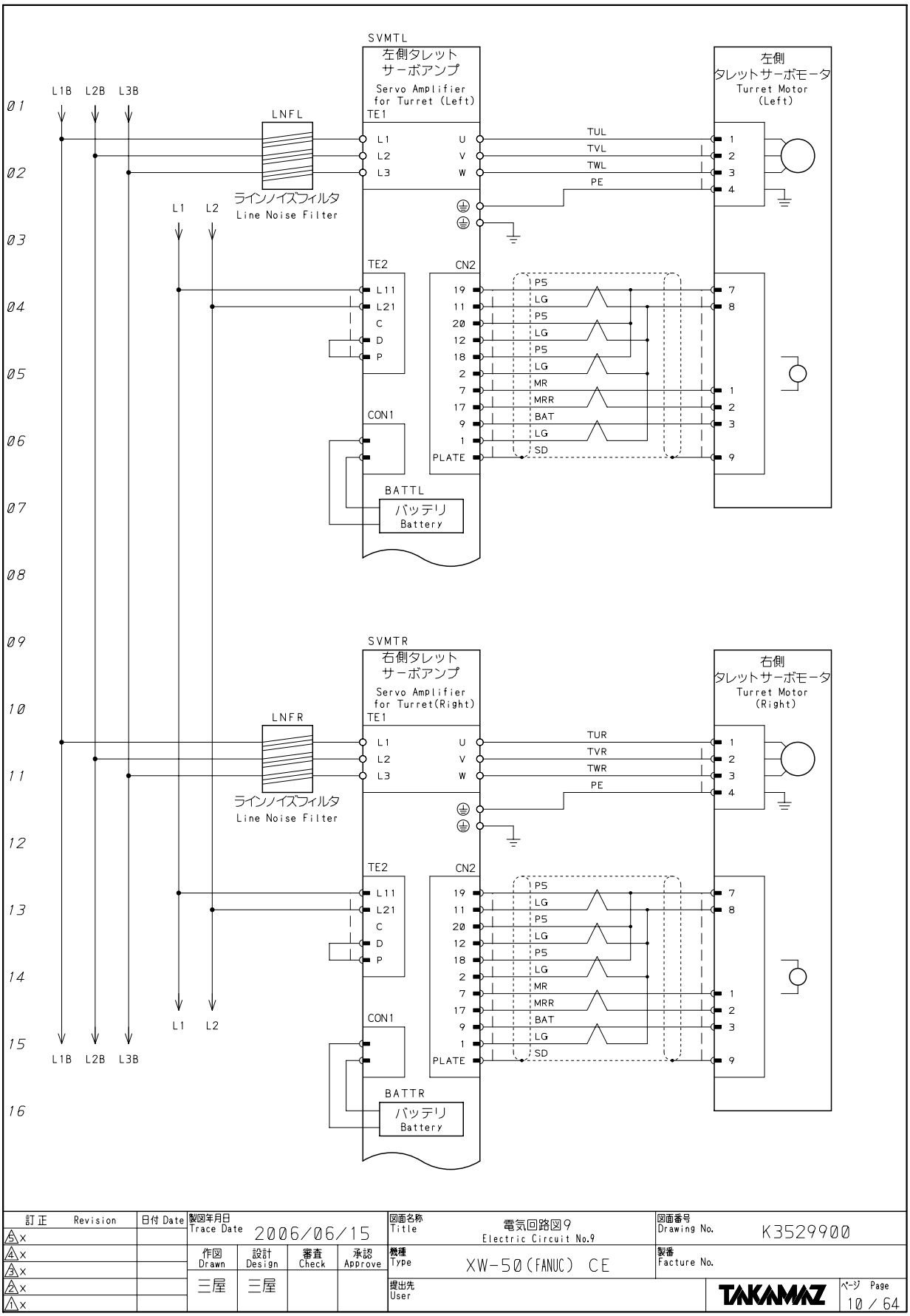
Electric circuit diagram 8



Euro

Electric circuit diagram 9



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△1 x							TAKAMAZ	10 / 64	

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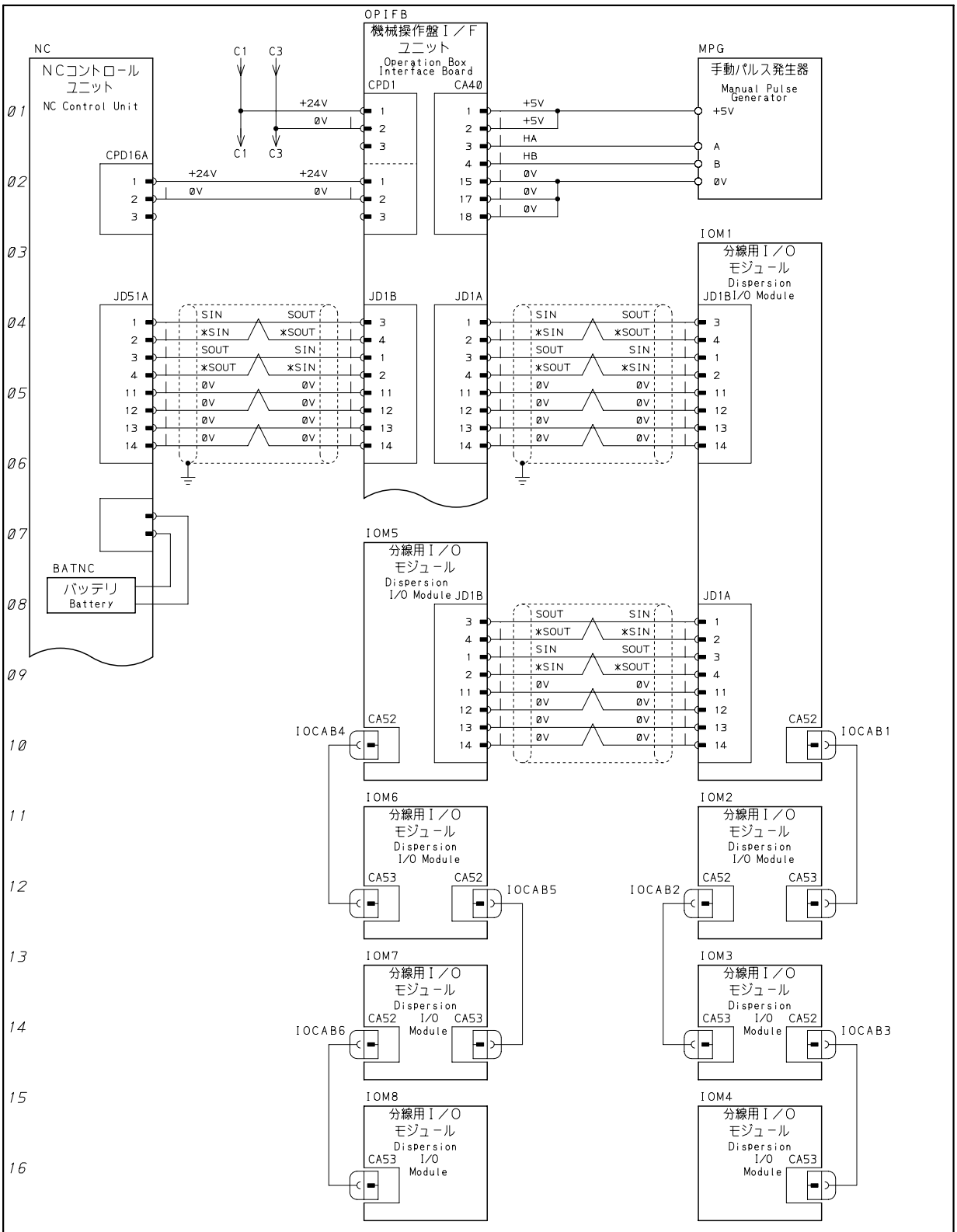
Electric circuit diagram 10



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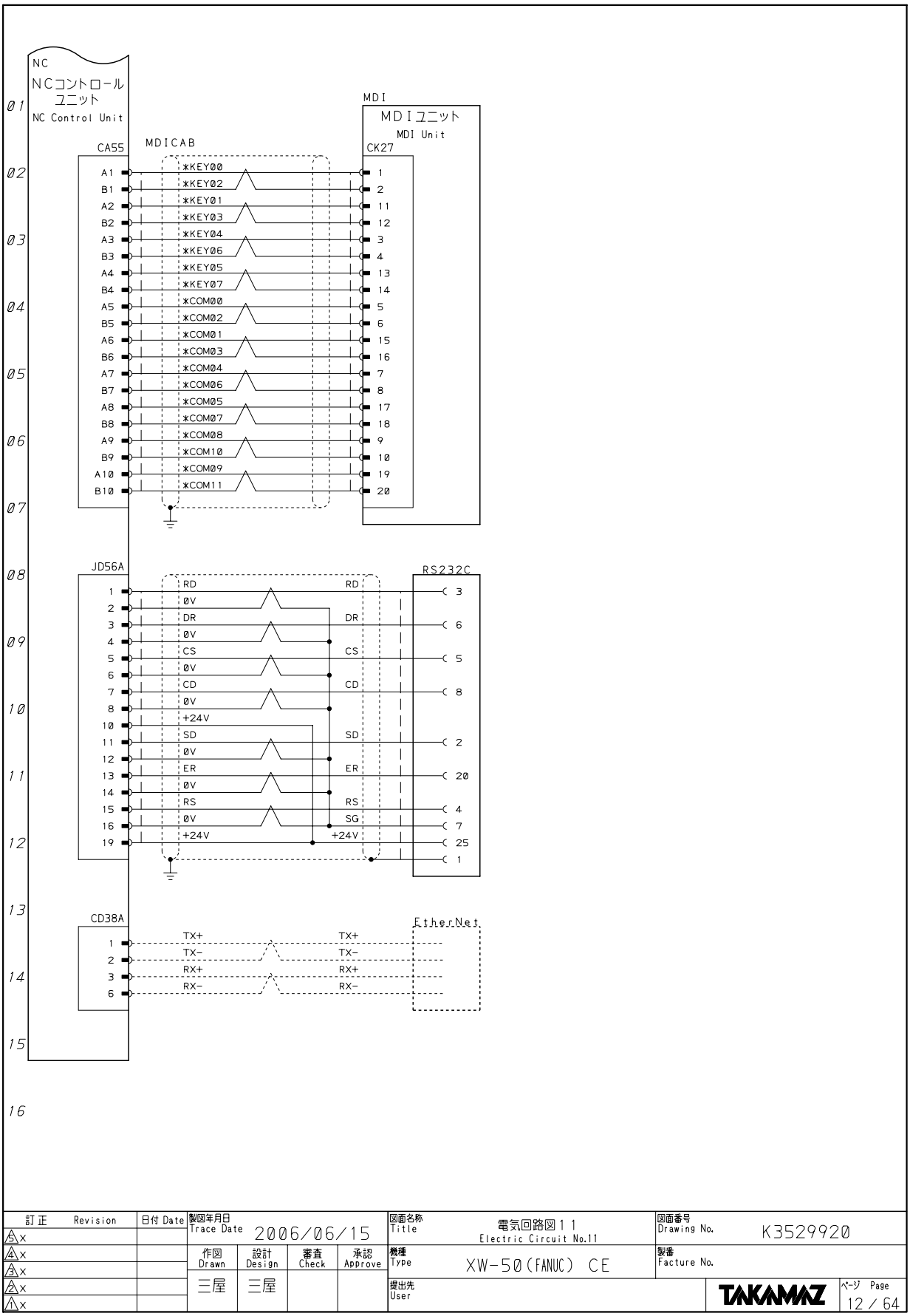
△3 x									
△2 x		三屋	三屋			提出先 User		TAKAMAZ	ページ Page 11 / 64
△1 x									

Euro

Electric circuit diagram 11



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△3 x		作図 Drawn	設計 Design	審査 Check	承認 Approve	XW-50(FANUC) CE			
△2 x		三屋	三屋			提出先 User	TAKAMAZ	ページ Page	12 / 64
△1 x									

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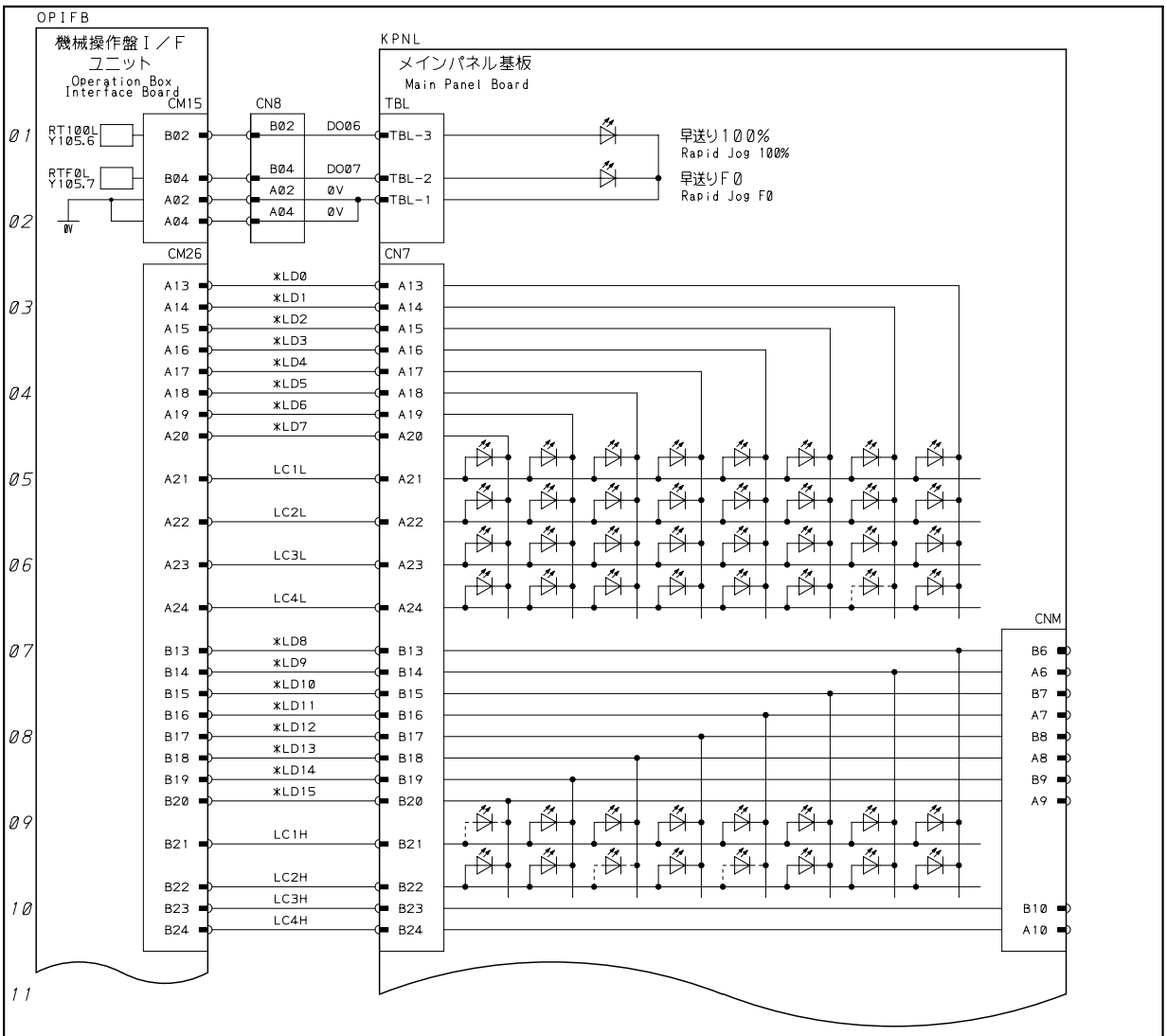
Electric circuit diagram 12



		*LD7	*LD6	*LD5	*LD4	*LD3	*LD2	*LD1	*LD0
12	LC1L	LTURCLL	RCHCLL	LCHCLL	DRCLL	WARNL	MCALL	FHLDL	CYSTL
	Y97	左タレットクランプ Turret (L) Clamp	右チャック閉 Chuck (R) Close	左チャック閉 Chuck (L) Open	本体扉 閉 Door Close	警告 Warning	機械異常 MC Alarm	NC一時休止中 NC Feed Hold	NC起動中 NC Cycle Start
13	LC2L	M01L	ZRNL	JOGL	HNDLL	MDIL	AUTOL	EDITL	RTURCLL
	Y98	M01 Optional Stop	原点復帰 Zero Return	ジョグ Jog	ハンドル Handle	MDI Manual Data Input	自動 Auto	編集 Edit	右タレットクランプ Turret (R) Clamp
14	LC3L	RZPXL	LZPZL	LZPXL			BDTL	DRNL	SBKL
	Y99	右側原点X Origin X (Right)	左側原点Z Origin Z (Left)	左側原点X Origin X (Left)			／コード Slash Code	ドライラン Dry Run	シングルブロック Single Block
15	LC4L	L4L7L	CLTATL	AIR2L	CLT2L	AIR1L	CLT1L		RZPZL
	Y100		切削油自動 Coolant Auto	エアー2 Air No.2	切削油2 Coolant No.2	エアー1 Air No.1	切削油1 Coolant No.1		右側原点Z Origin Z (Right)

		*LD15	*LD14	*LD13	*LD12	*LD11	*LD10	*LD9	*LD8
16	LC1H				CCRVL	CCFRL	CCATL	TBAKL	TFORL
	Y101				チップコンベヤ逆転 Chip Conveyor REV	チップコンベヤ正転 Chip Conveyor FOR	チップコンベヤ自動 Chip Conveyor AUTO		
	LC2H	HND1L	HND10L		HNDLZL		HNDLXL	S1RVL	S1FRL
	Y102	ハンドル×1 Handle x1	ハンドル×10 Handle x10		ハンドルZ Handle Z		ハンドルX Handle X	主軸逆転 Spindle CCW Turn	主軸正転 Spindle CW Turn

訂正 Revision	日付 Date	製図年月日 Trace Date	2006/06/15			図面名称 Title	電気回路図１２ Electric Circuit No.12	図面番号 Drawing No.	K3529930
		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type	XW-50(FANUC) CE	製番 Facture No.	
		三屋	三屋			提出先 User		TAKAMAZ	ページ Page 13 / 64

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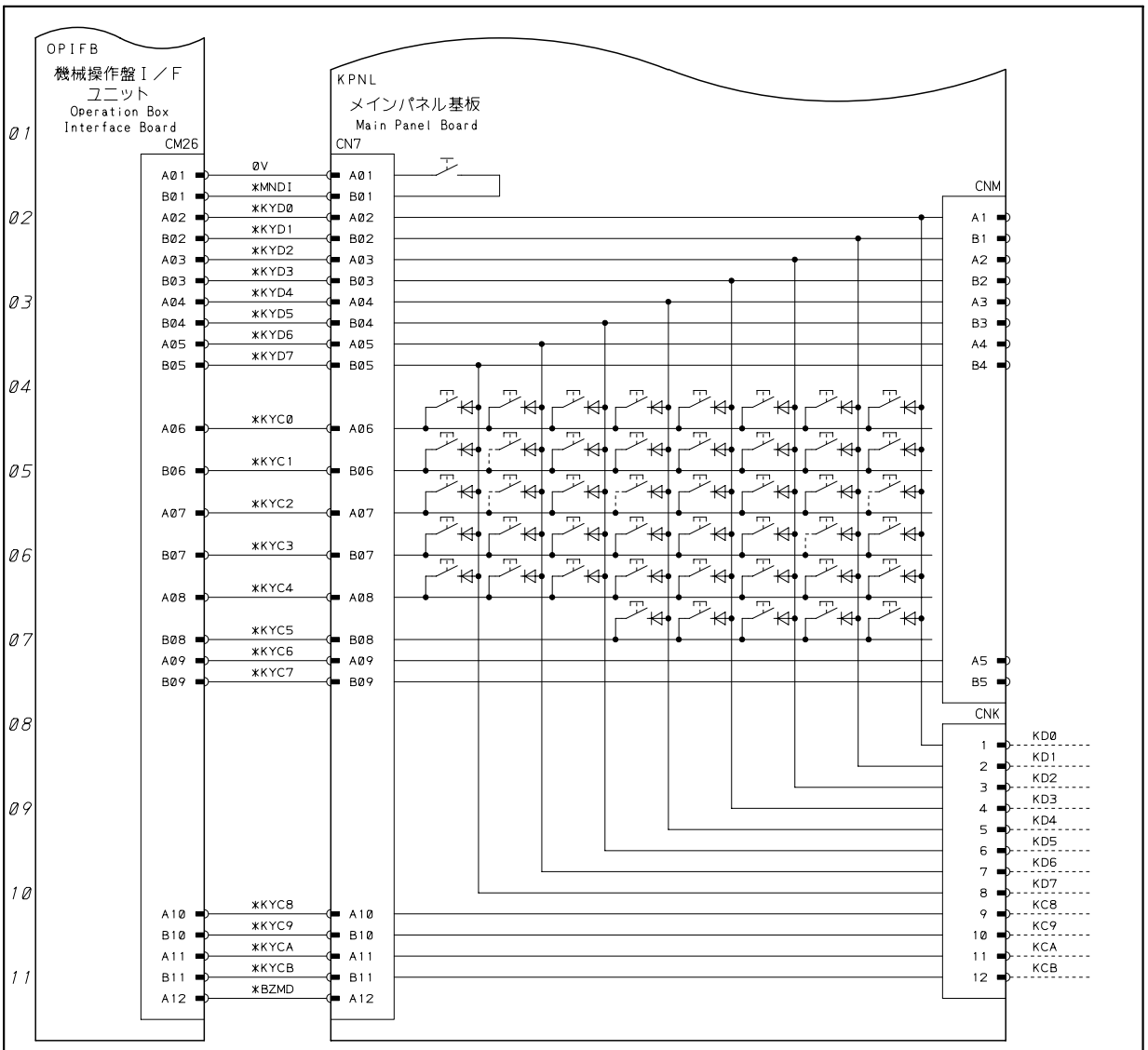
Electric circuit diagram 13



	*KYD7	*KYD6	*KYD5	*KYD4	*KYD3	*KYD2	*KYD1	*KYD0
*KYC0	ROVK	LIGHTK	ZRNK	JOGK	HNDLK	MDIK	AUTOK	EDITK
X97	F0／100% Rapid Jog Selection	照明灯入 Inner Light	原点復帰 Zero Return	ジョグ Jog	ハンドル Handle	MDI Manual Data Input	自動 Auto	編集 Edit
*KYC1	+XK	KY16K	KY15K		BDTK	DRNK	SBKK	M01K
X98	←X ←X				／コード Slash Code	ドライラン Dry Run	シングルブロック Single Block	M01 Optional Stop
*KYC2	[SHOP]		-XK		+ZK	RTK	-ZK	KY20K
X99	シャッタ開 Shutter Open		→X →X		↓Z ↓Z	早送り Rapid Jog	↑Z ↑Z	
*KYC3	KY37K	AIR2K	AIR1K	CLTATK	CLT2K	CLT1K		[SHCL]
X100		エアー2 Air No.2	エアー1 Air No.1	切削油自動 Coolant Auto	切削油2 Coolant No.2	切削油1 Coolant No.1		シャッタ閉 Shutter Close
*KYC4	INCHK			CCRVK	CCFRK	CCATK	TBAKK	TFORK
X101	主軸寸動 Spindle Inching			チップコンベヤ逆転 Chip Conveyor REV	チップコンベヤ正転 Chip Conveyor FOR	チップコンベヤ自動 Chip Conveyor AUTO		
*KYC5				MP1K	HSELK	S1RVK	S1STK	S1FRK
X102				ハンドル倍率切替 Handle Speed Select	ハンドル軸選択 Handle Axis Select	主軸逆転 Spindle CCW Turn	主軸停止 Spindle Stop	主軸正転 Spindle CW Turn

訂正 Revision	日付 Date	製図年月日 Trace Date	2006/06/15	図面名称 Title	電気回路図13 Electric Circuit No.13	図面番号 Drawing No.	K3529940
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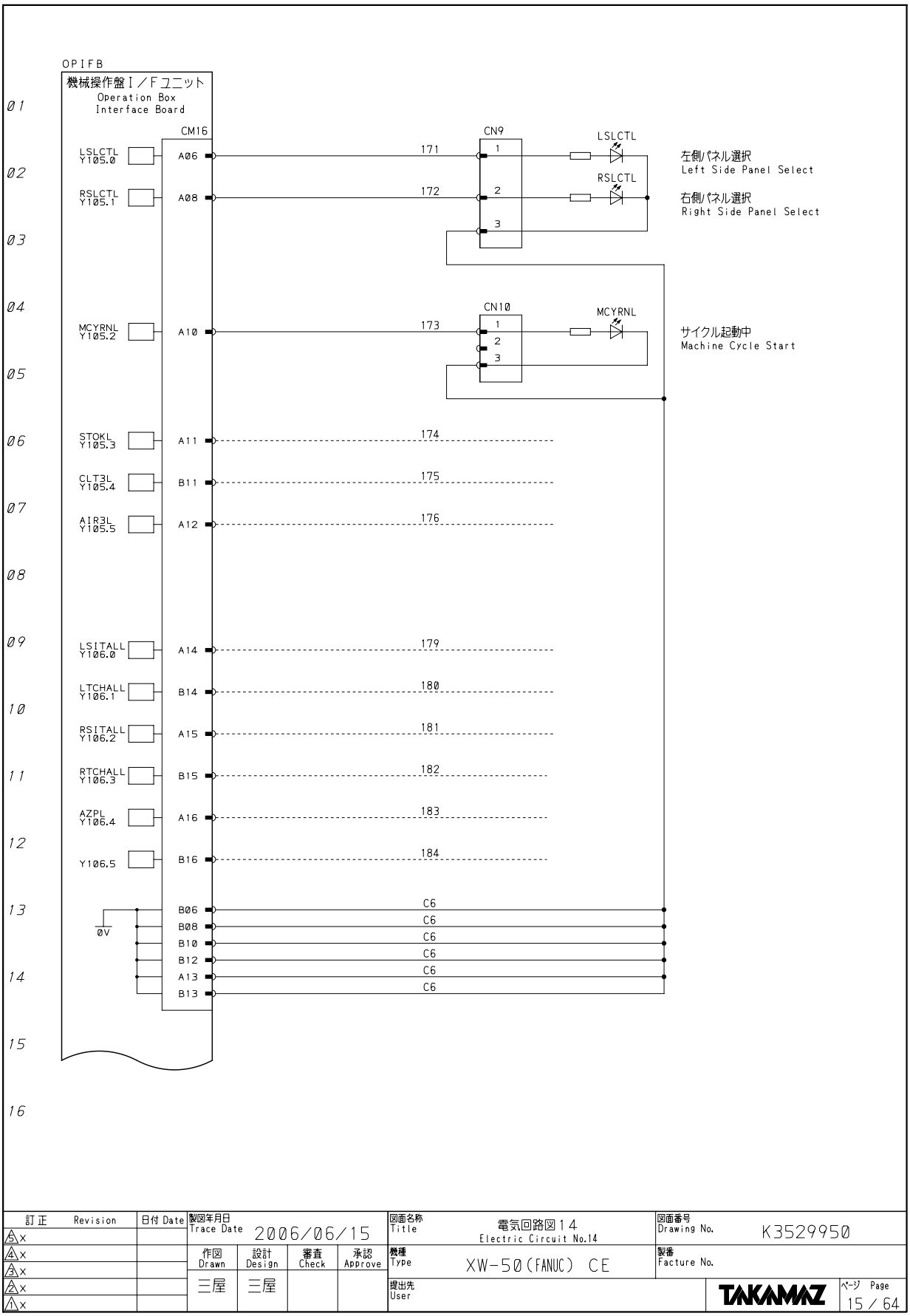
△3 x		三屋	三屋			提出先 User		TAKAMAZ	ページ Page 14 / 64
△2 x									
△1 x									

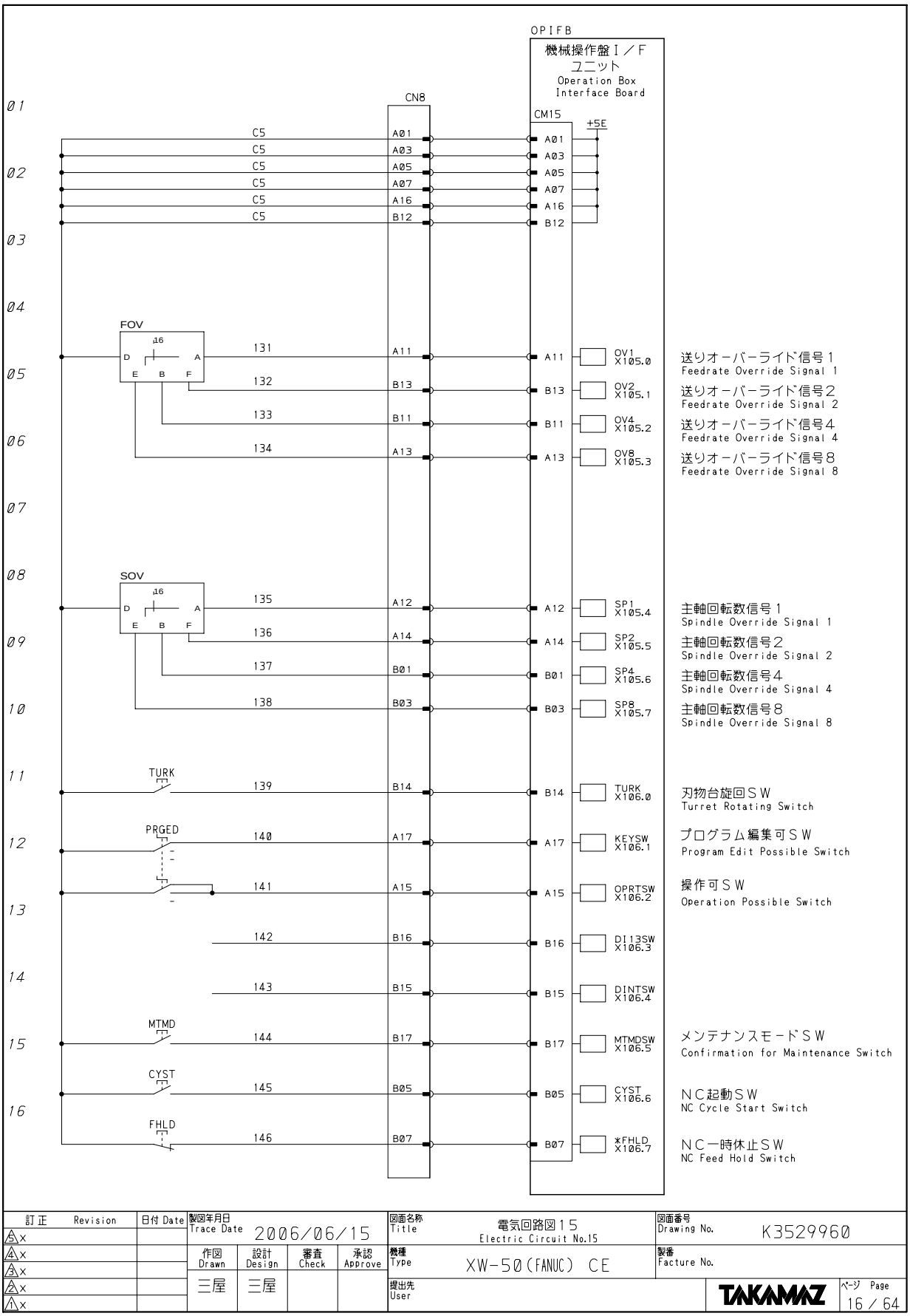
Euro

Electric circuit diagram 14



Euro

Electric circuit diagram 15



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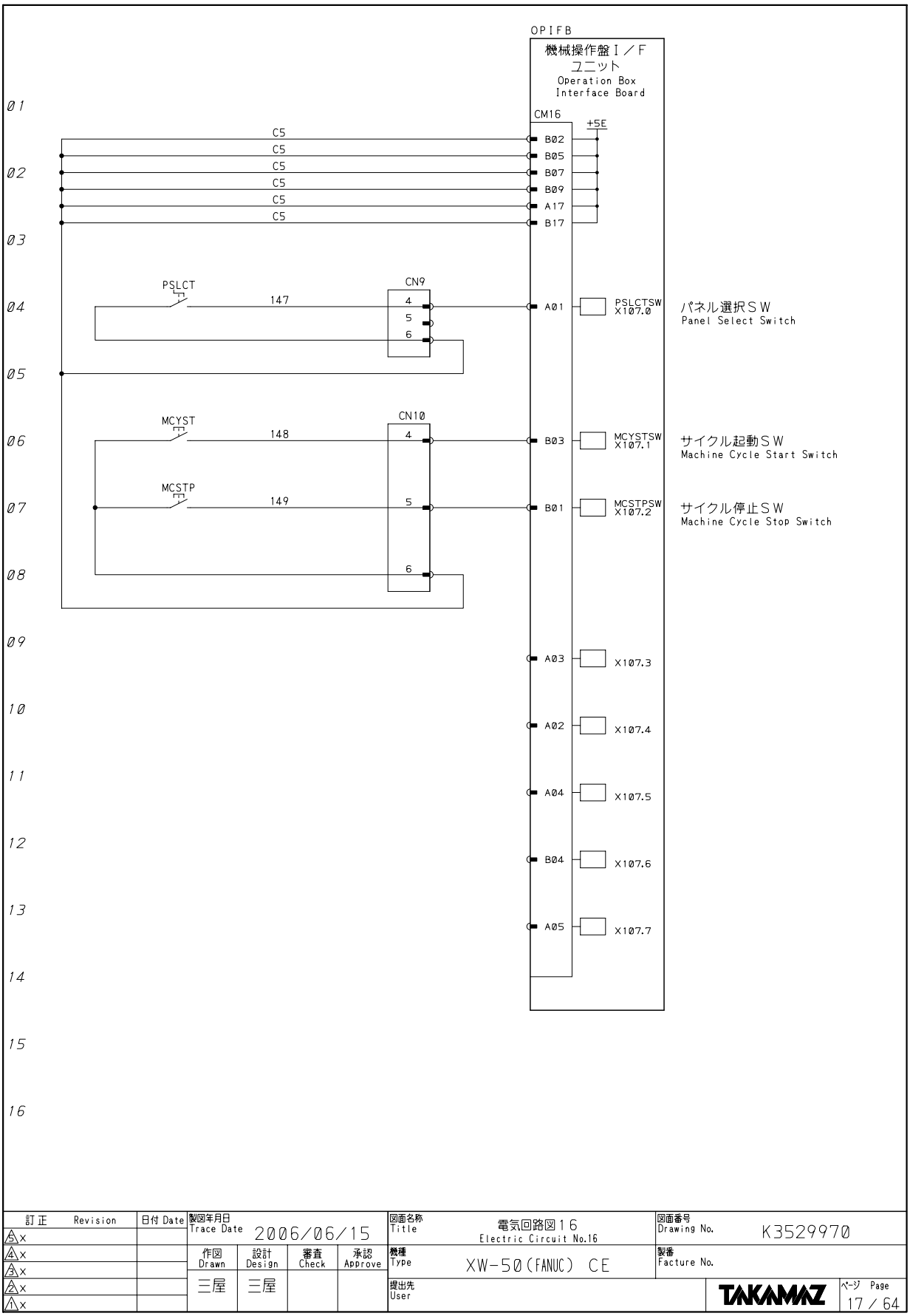
Electric circuit diagram 16



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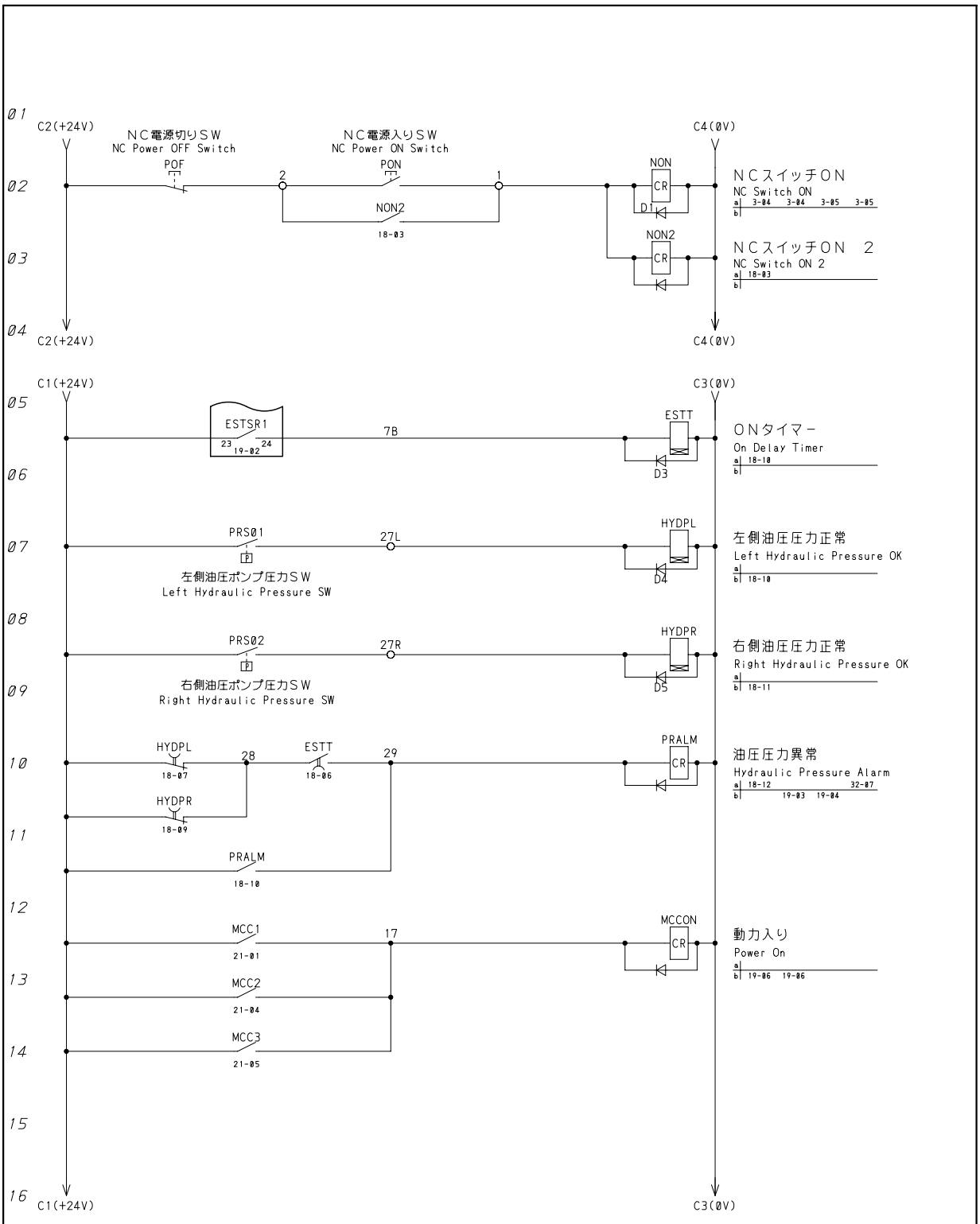
Electric circuit diagram 17



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△x						提出先 User	TAKAMAZ	ページ Page	18 / 64
△x									

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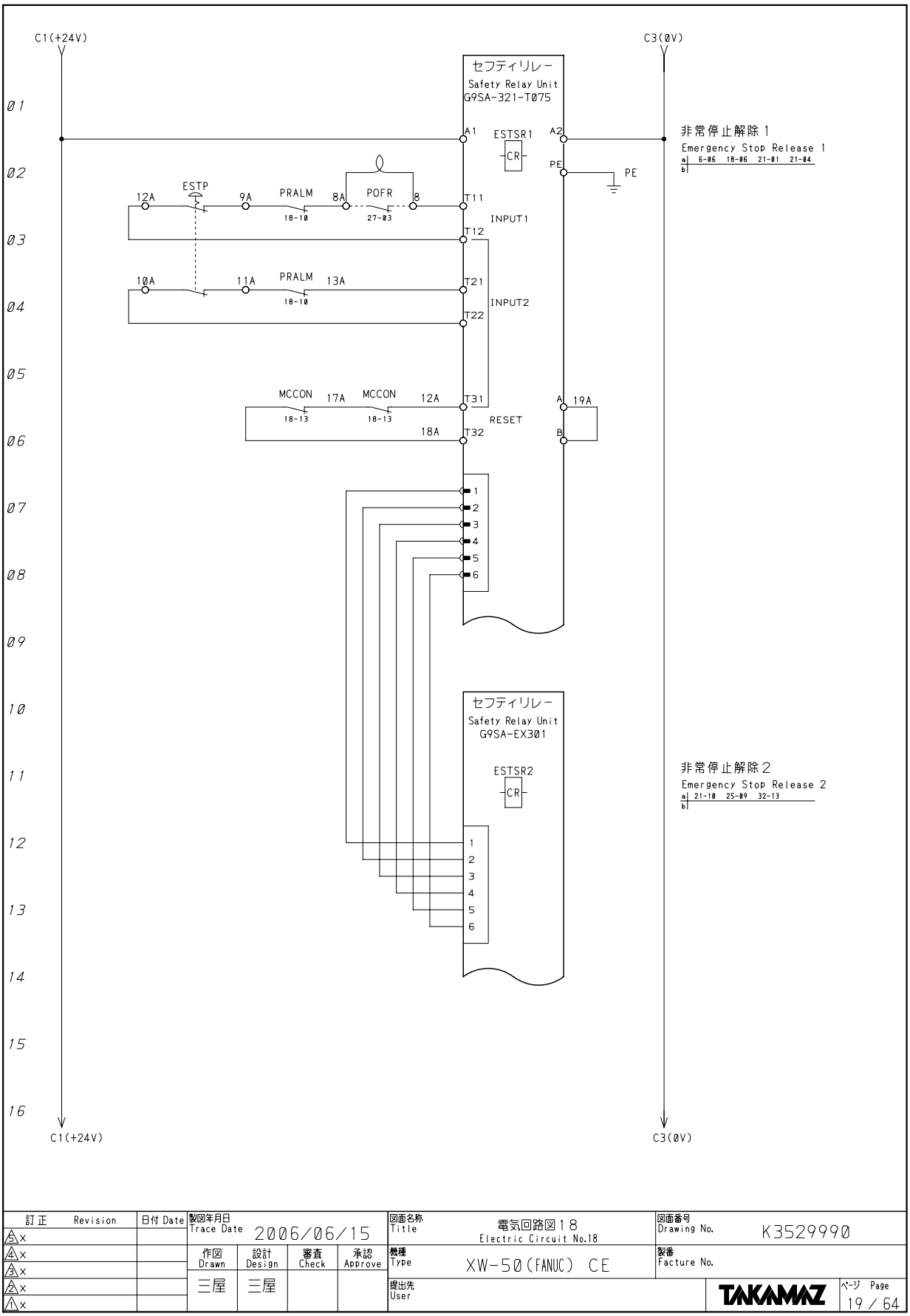
Electric circuit diagram 18



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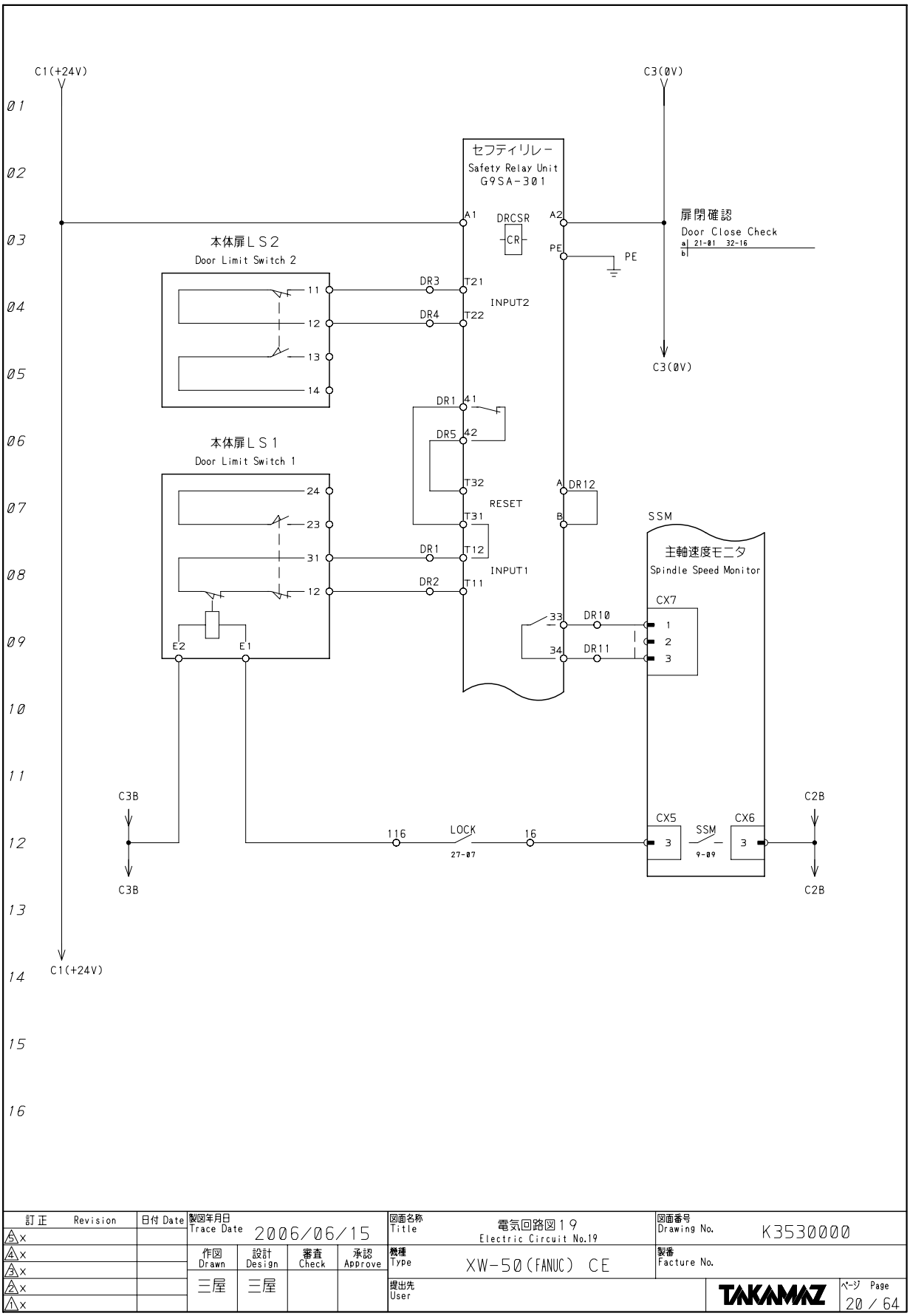
Euro

Electric circuit diagram 19



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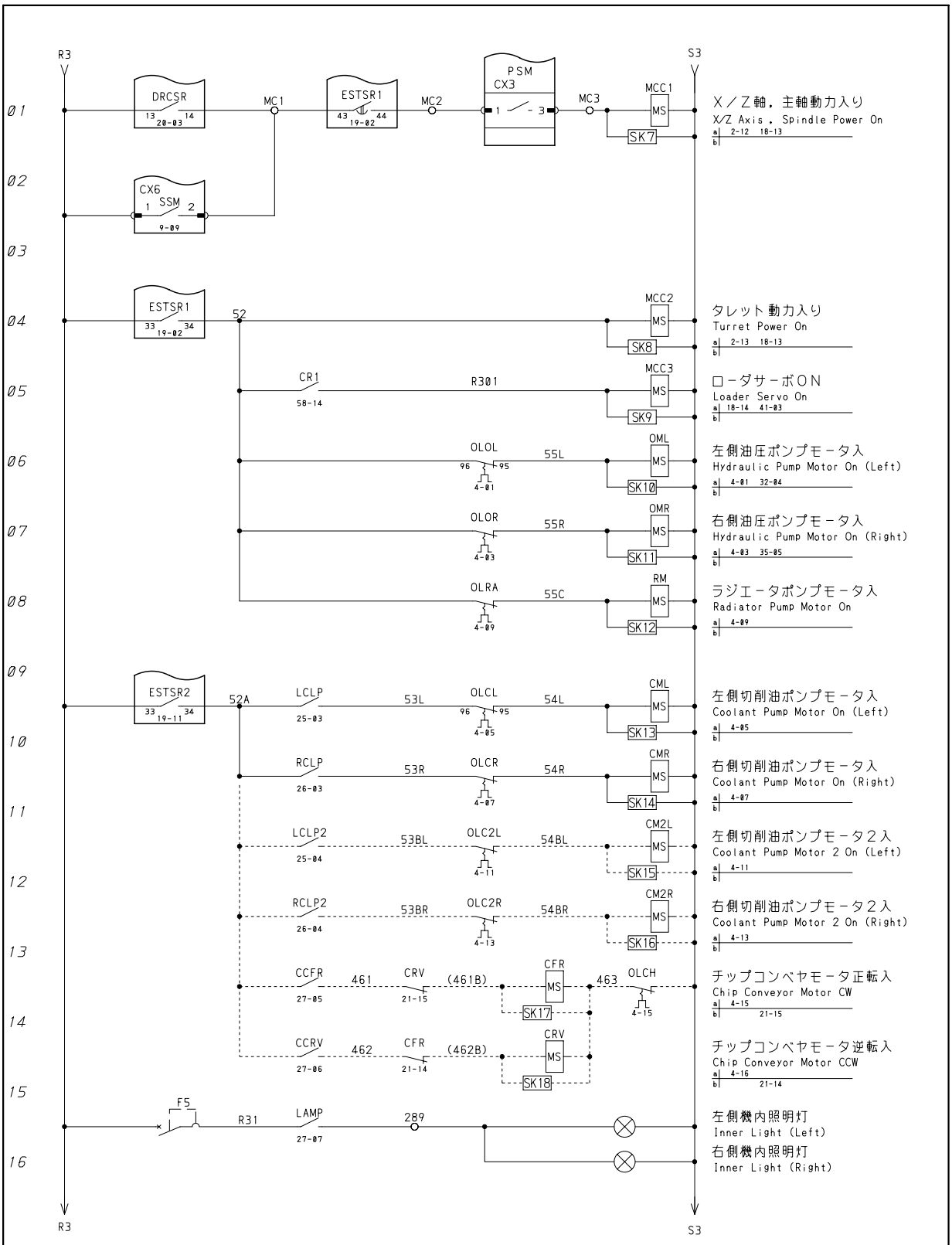
Euro

Electric circuit diagram 20



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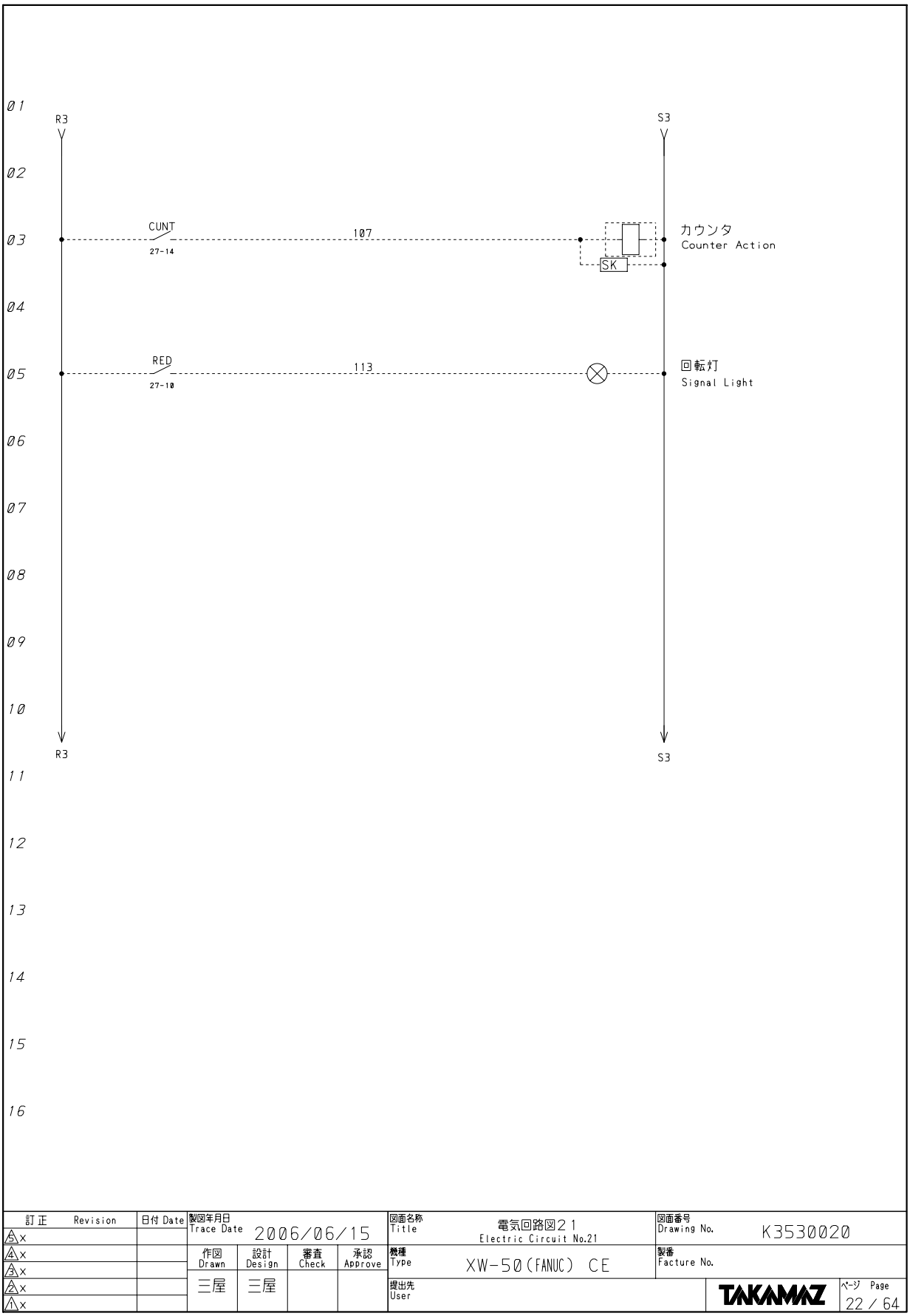
Electric circuit diagram 21



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3 x									
2 x		三屋	三屋			提出先 User			
1 x									

2006/06/15

電気回路図21
Electric Circuit No.21

K3530020

XW-50(FANUC) CE

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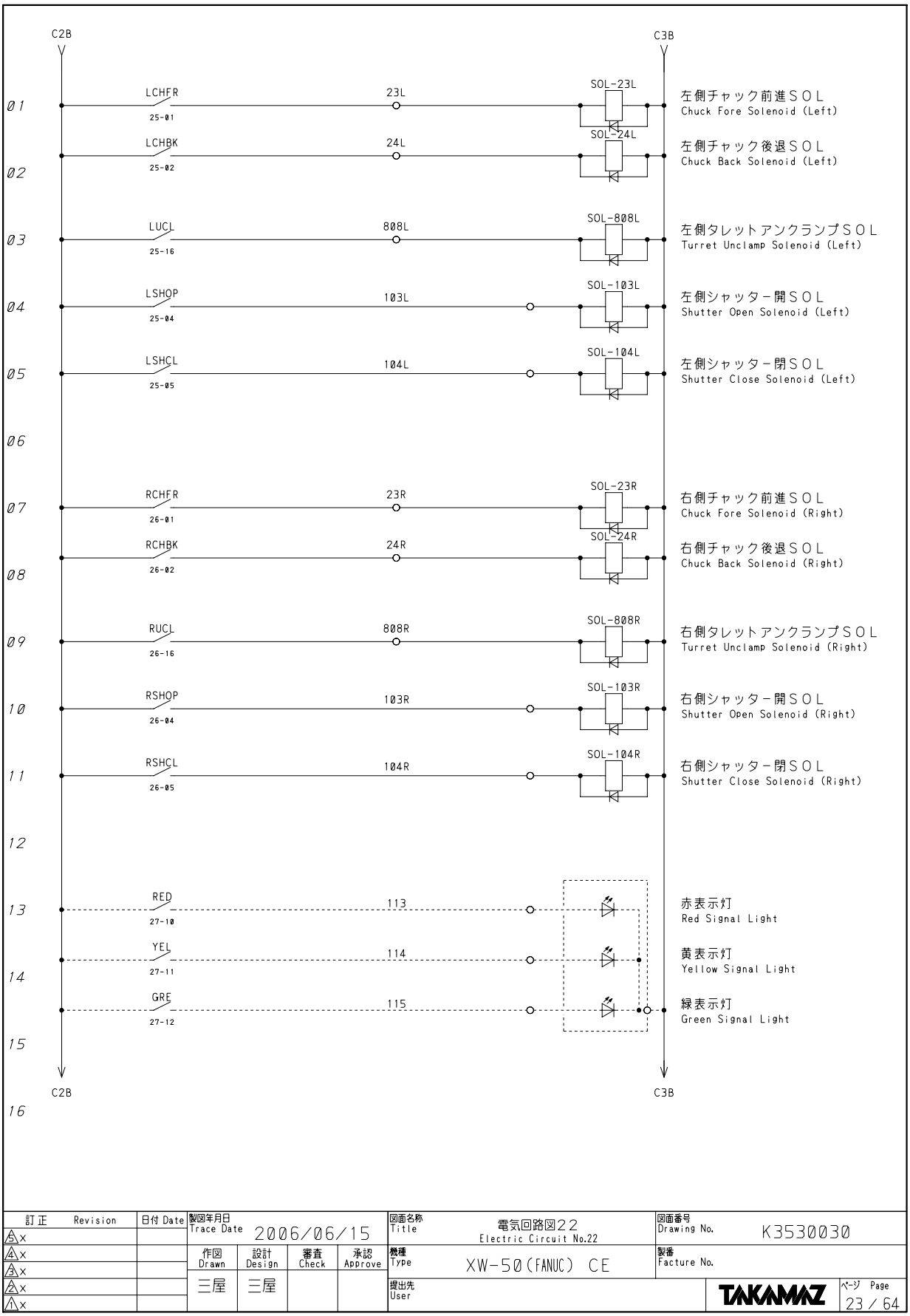
Electric circuit diagram 22



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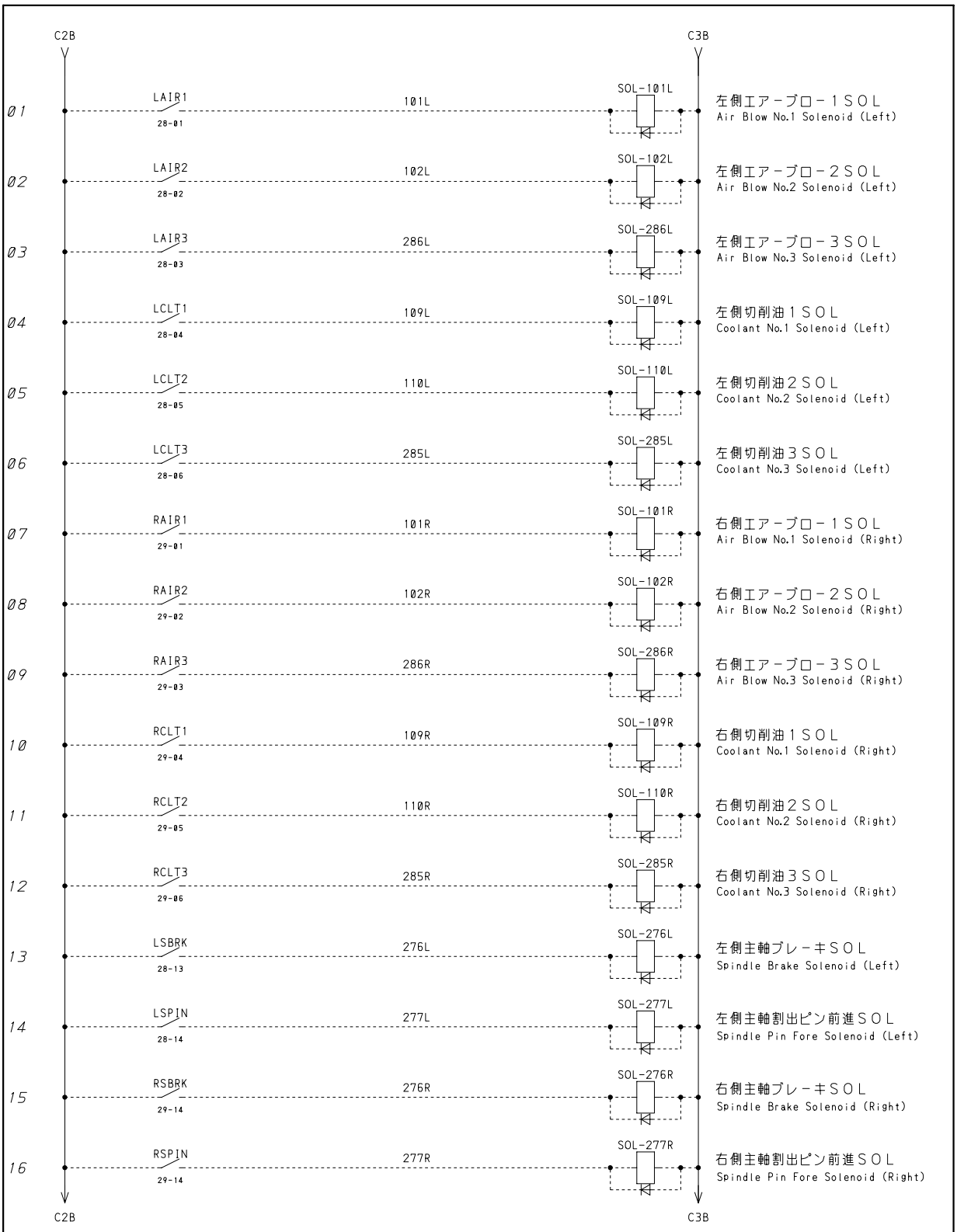
Electric circuit diagram 23



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△3 x						XW-50(FANUC) CE			
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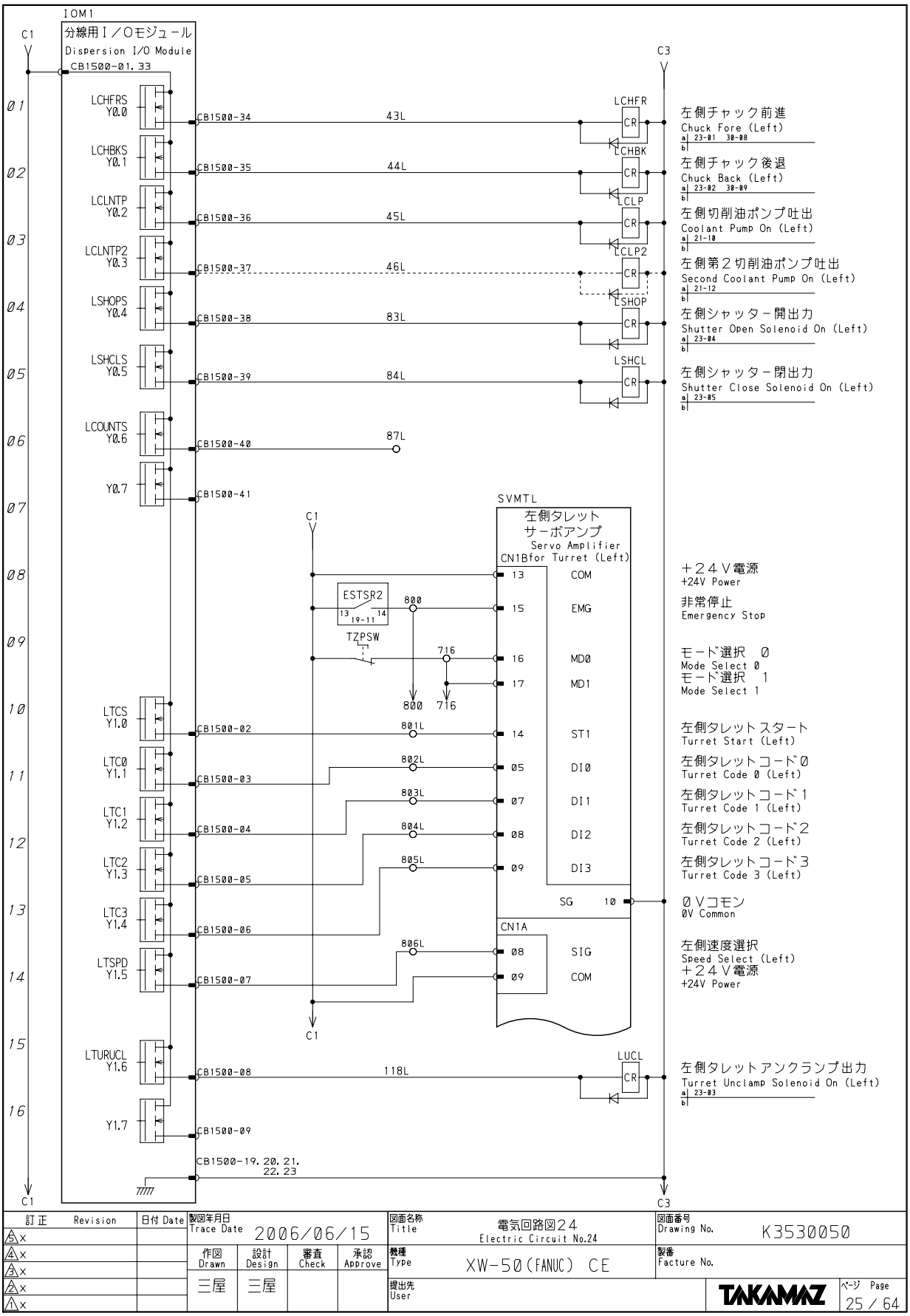
Electric circuit diagram 24



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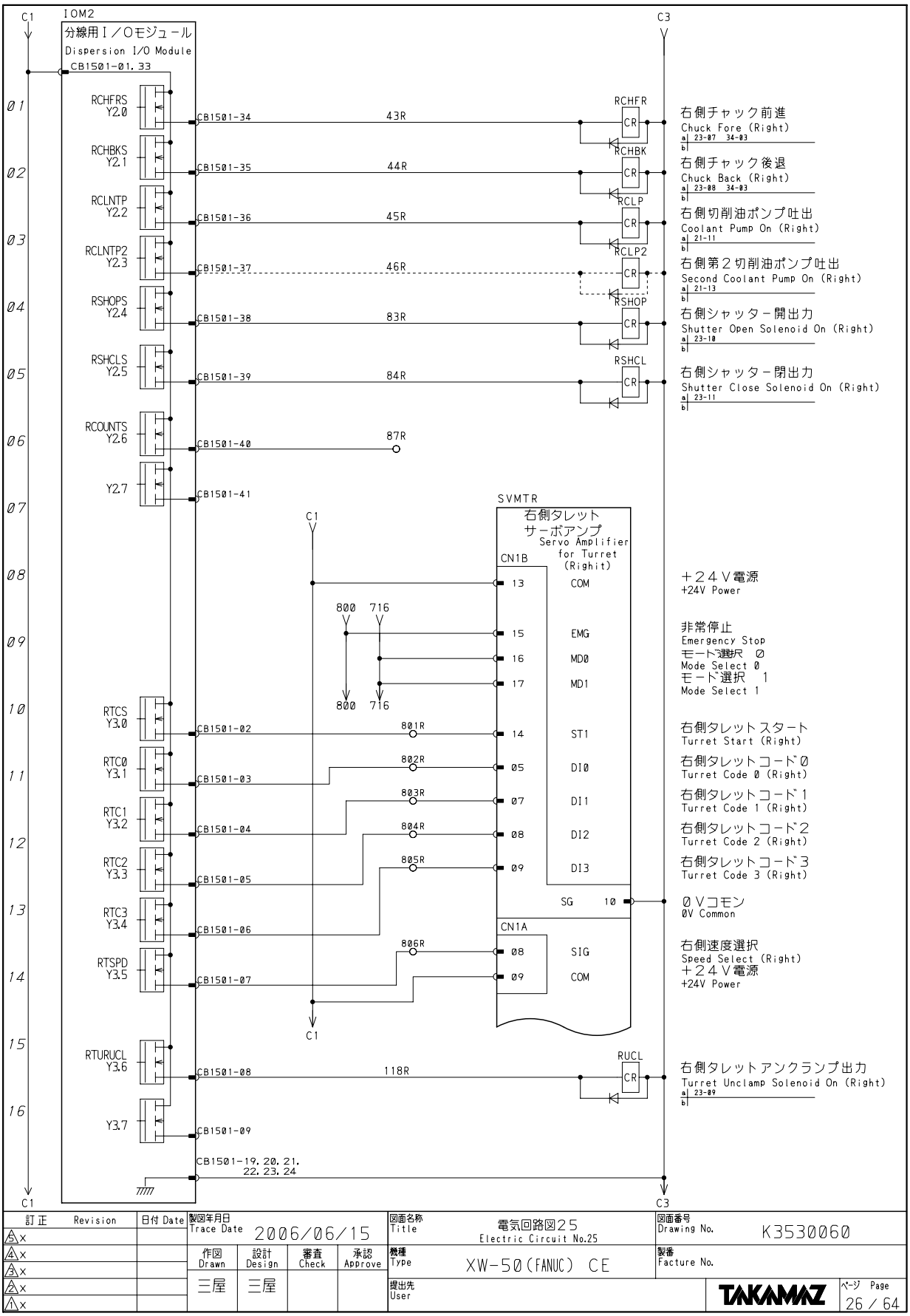
Electric circuit diagram 25



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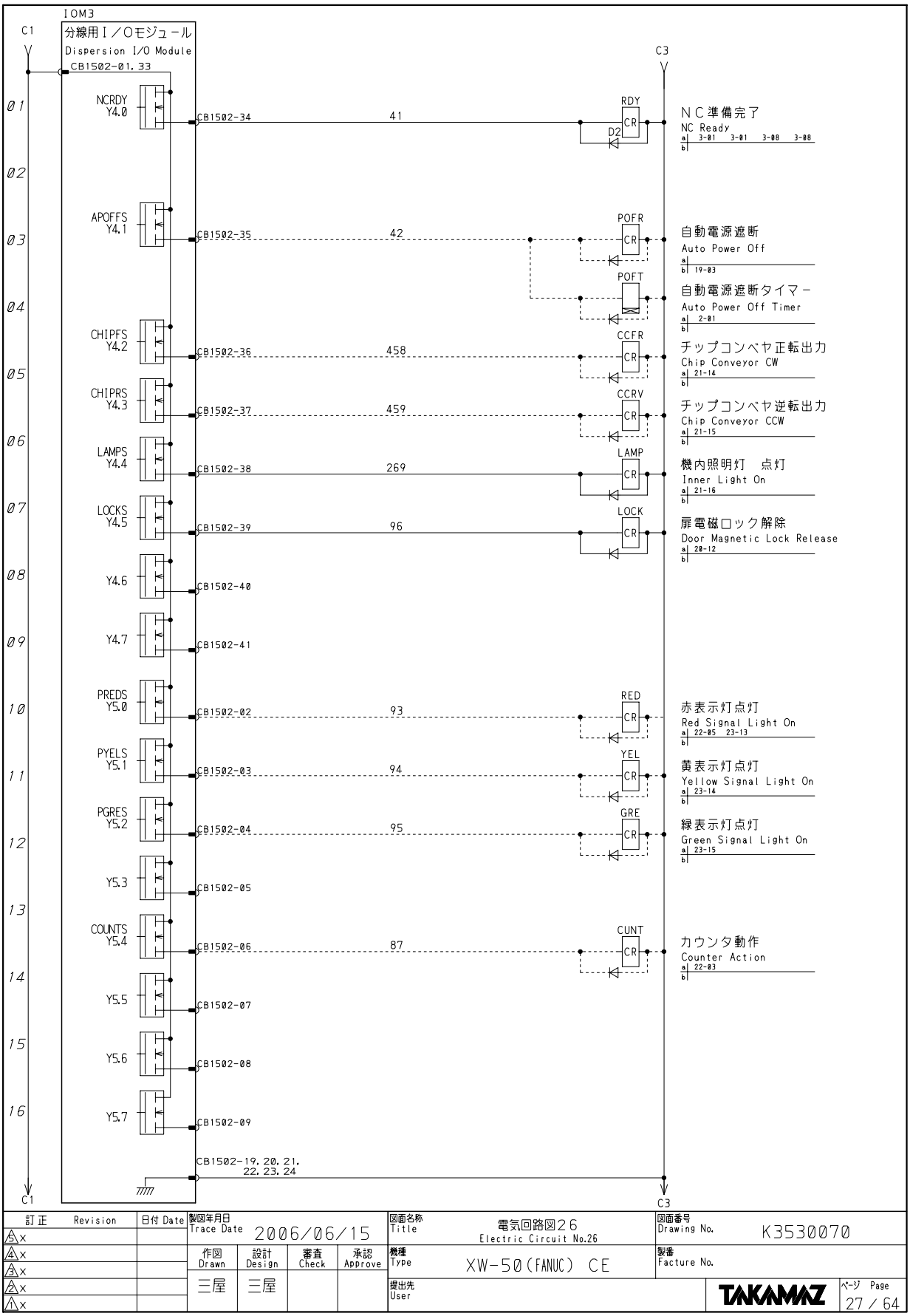
Electric circuit diagram 26



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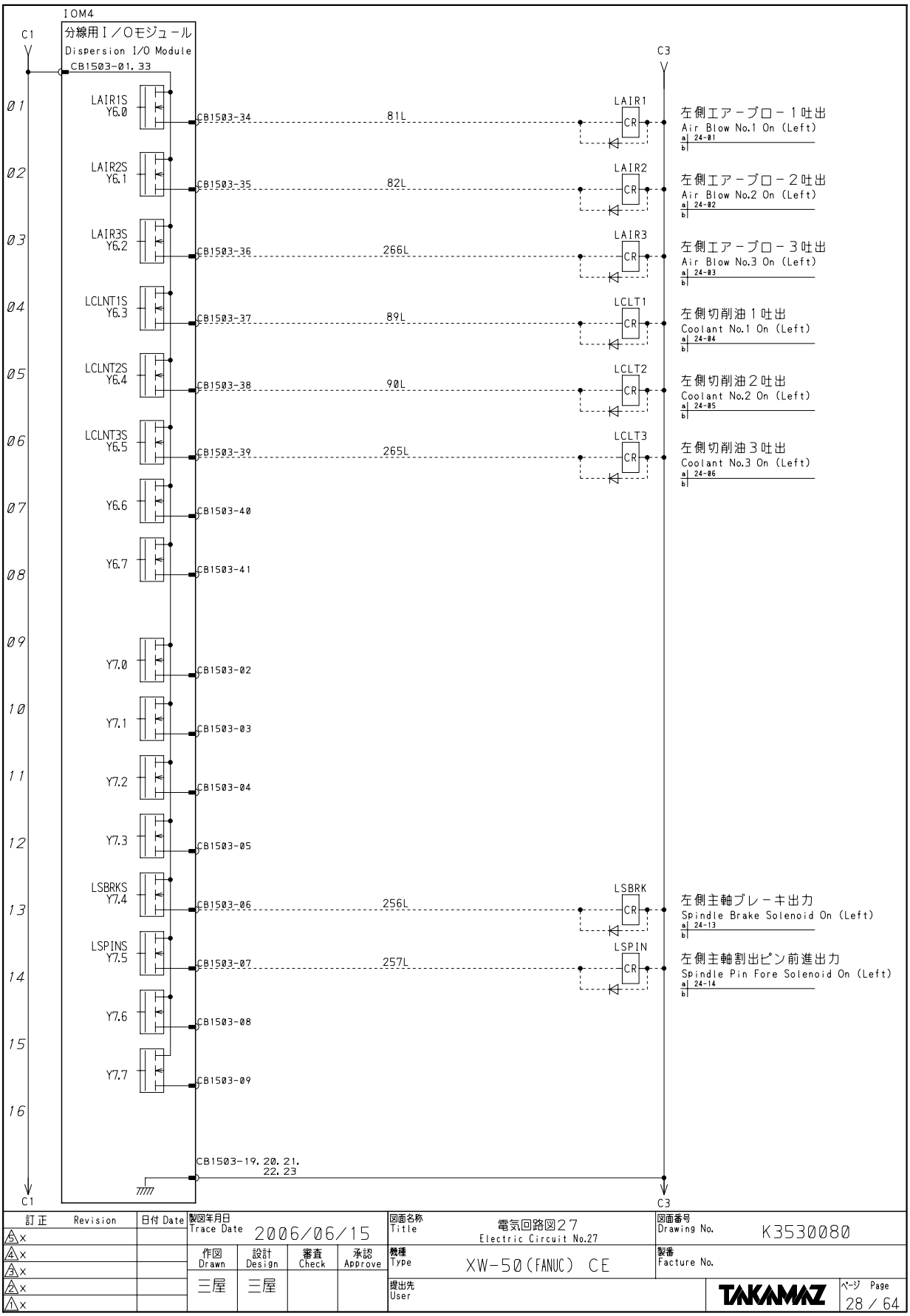
Electric circuit diagram 27



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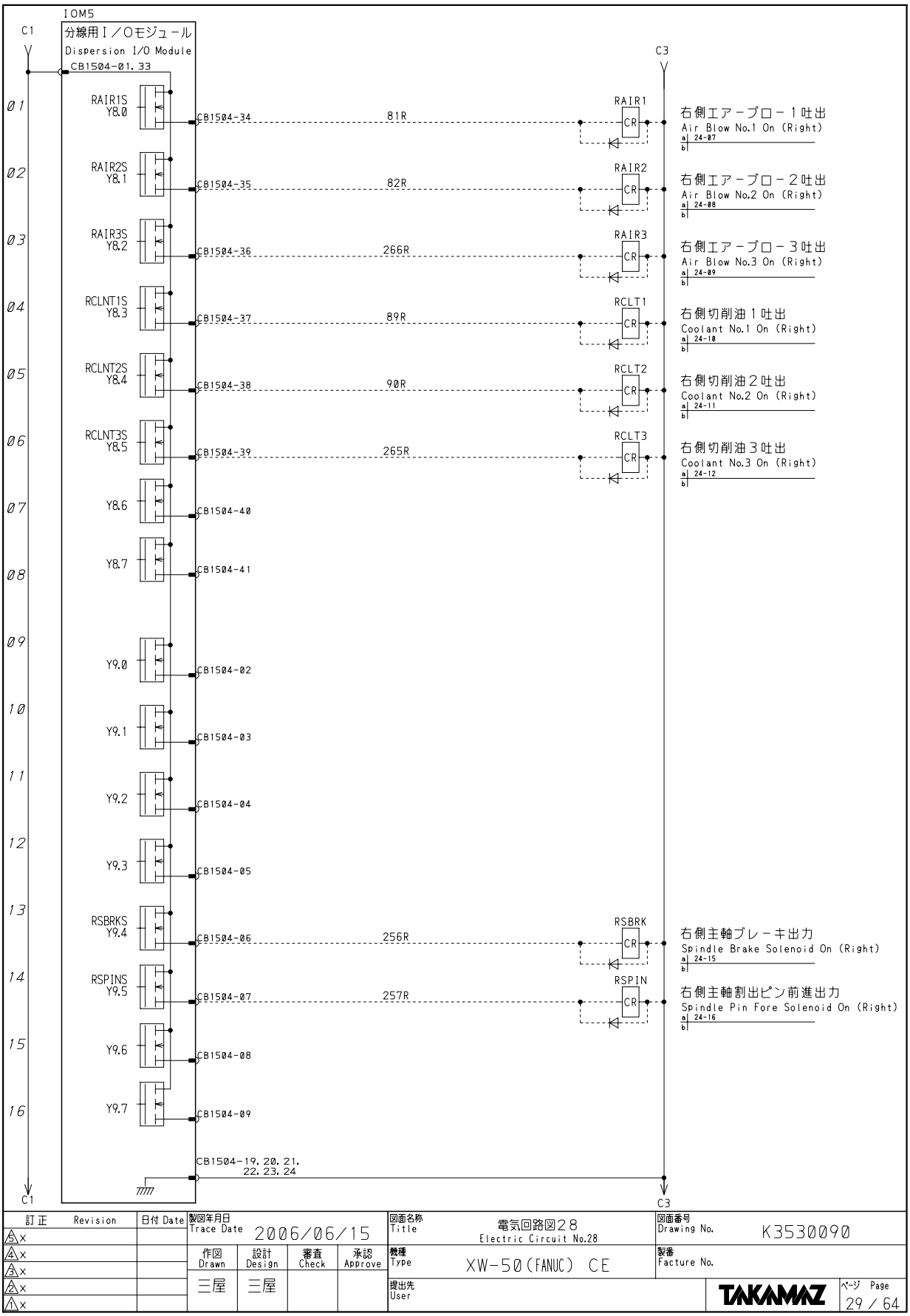
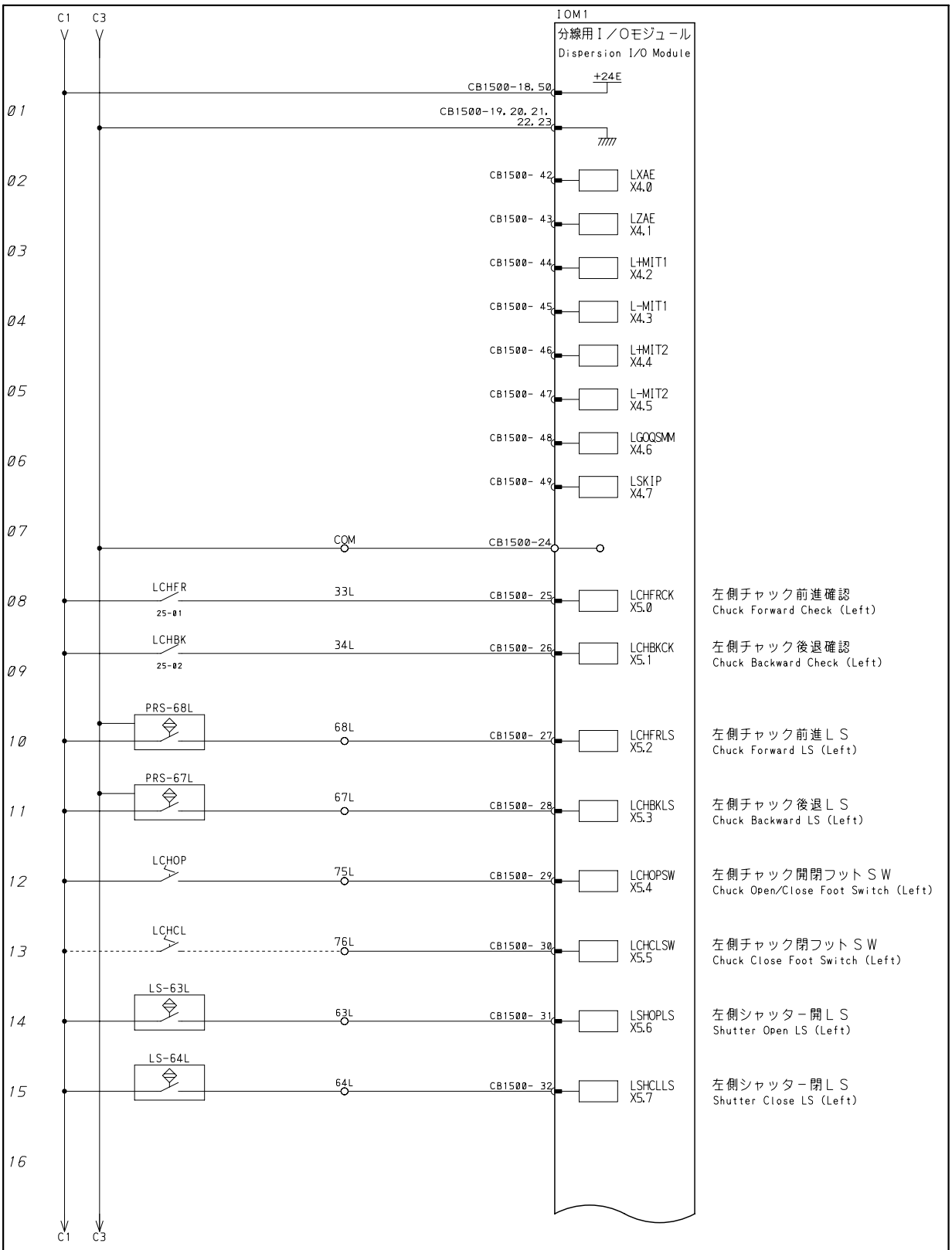
Electric circuit diagram 28



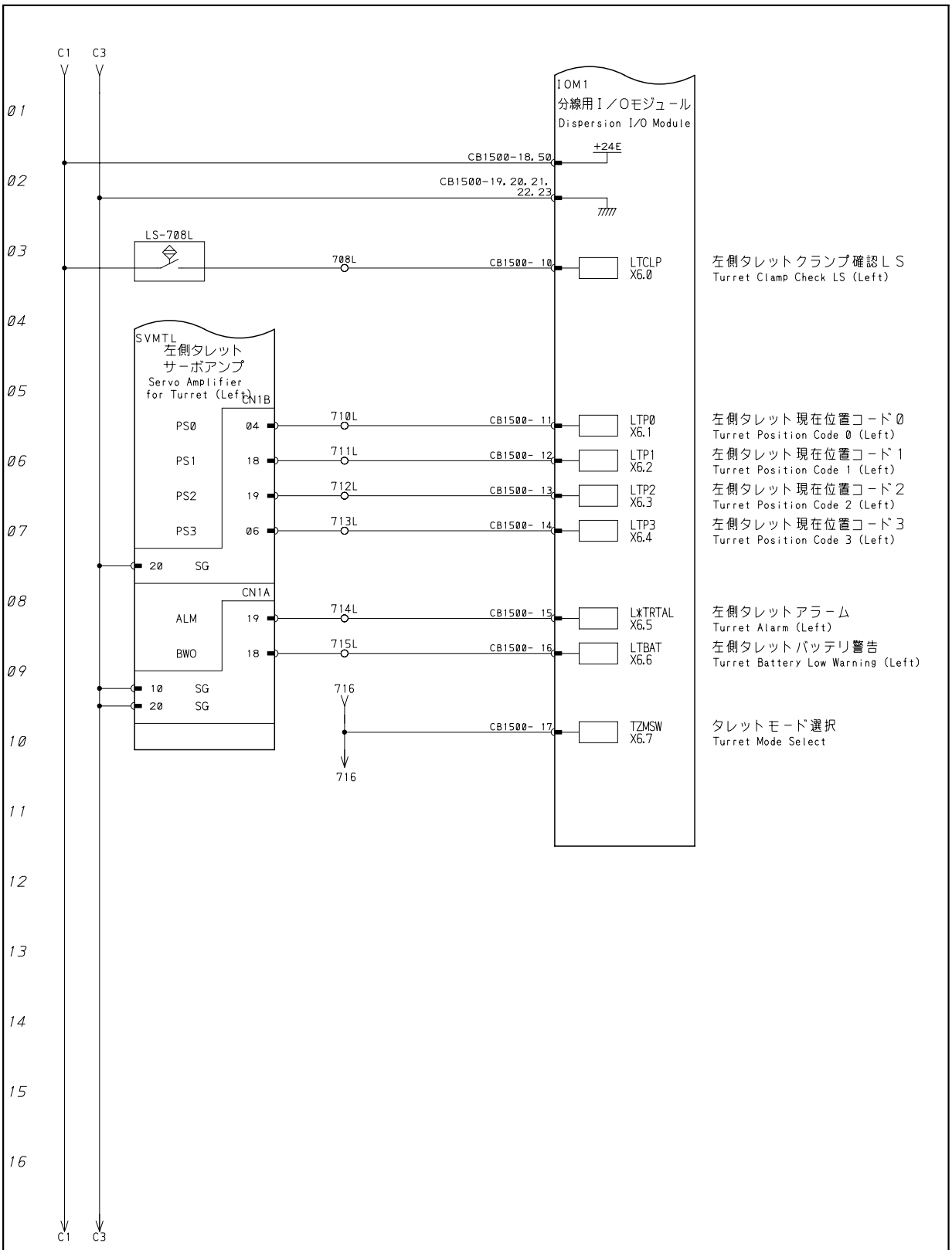
Euro

Electric circuit diagram 29



Euro

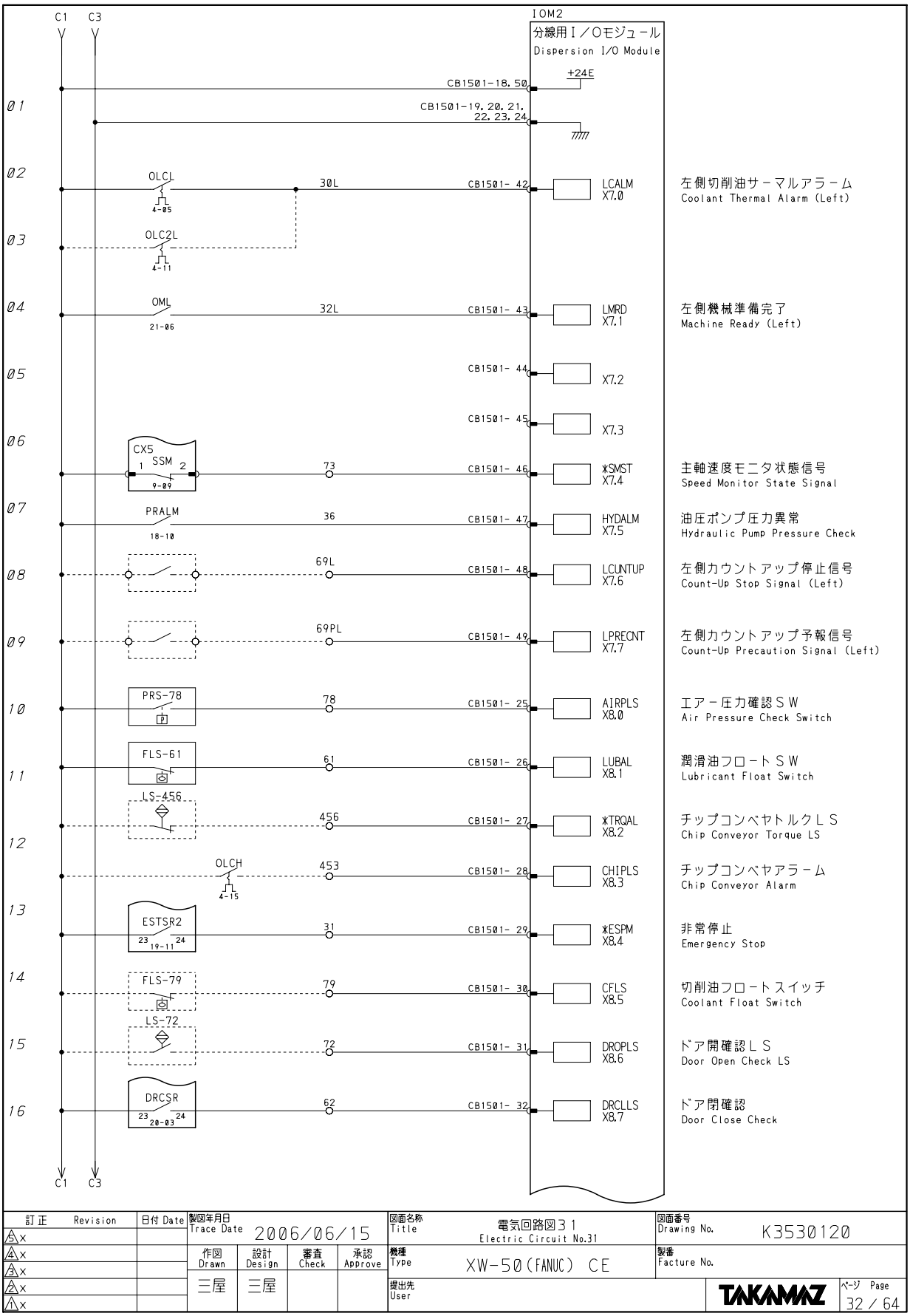
Electric circuit diagram 30



訂正 Revision	日付 Date	製図年月日 Trace Date				図面名称 Title		図面番号 Drawing No.	
△5 x		2006/06/15				電気回路図３０ Electric Circuit No.30		K3530110	
△4 x		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type		製番 Facture No.	
△3 x						XW-50(FANUC) CE			
△2 x		三屋	三屋			提出先 User	TAKAMAZ	ページ Page	31 / 64
△1 x									

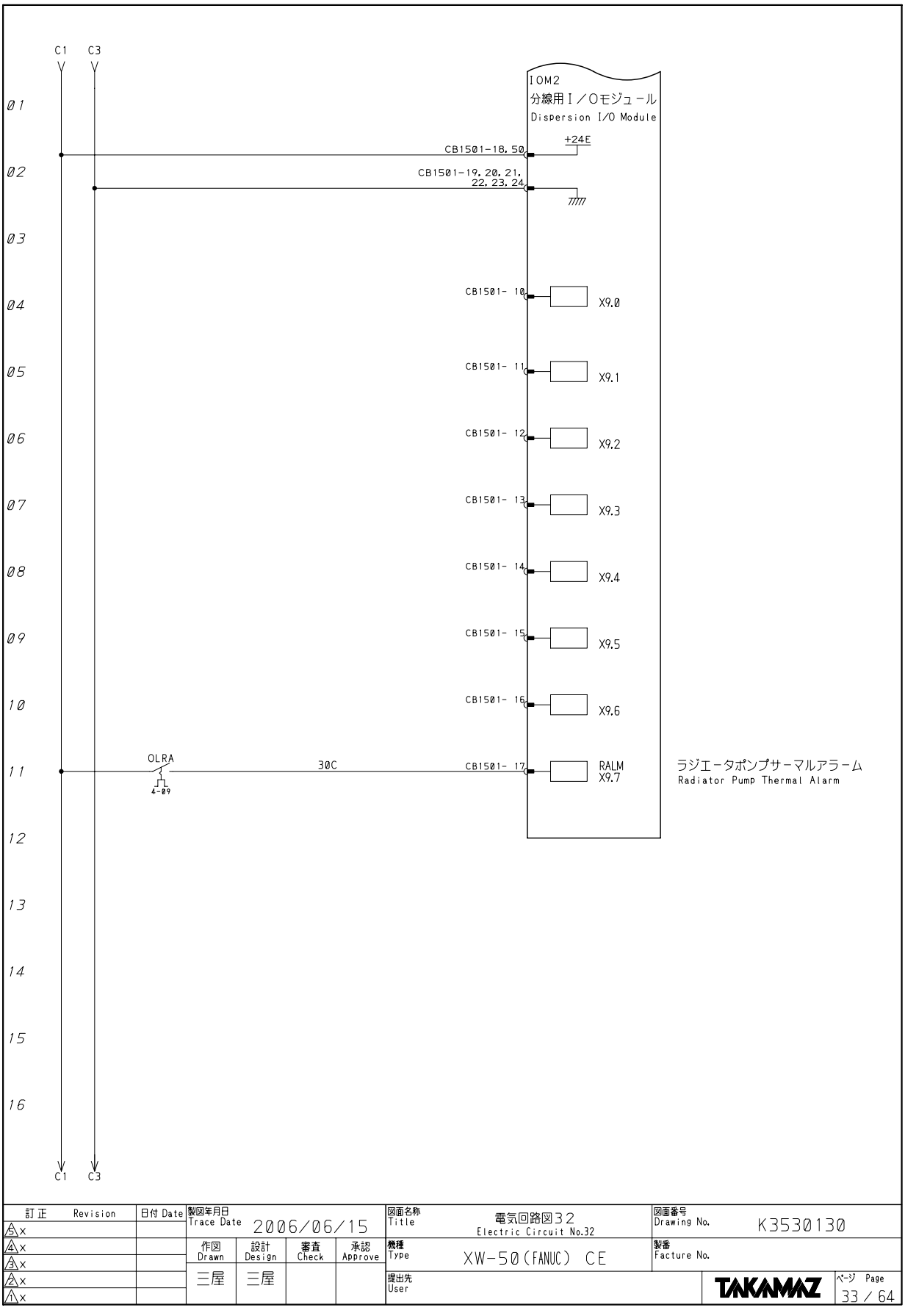
Euro

Electric circuit diagram 31



Euro

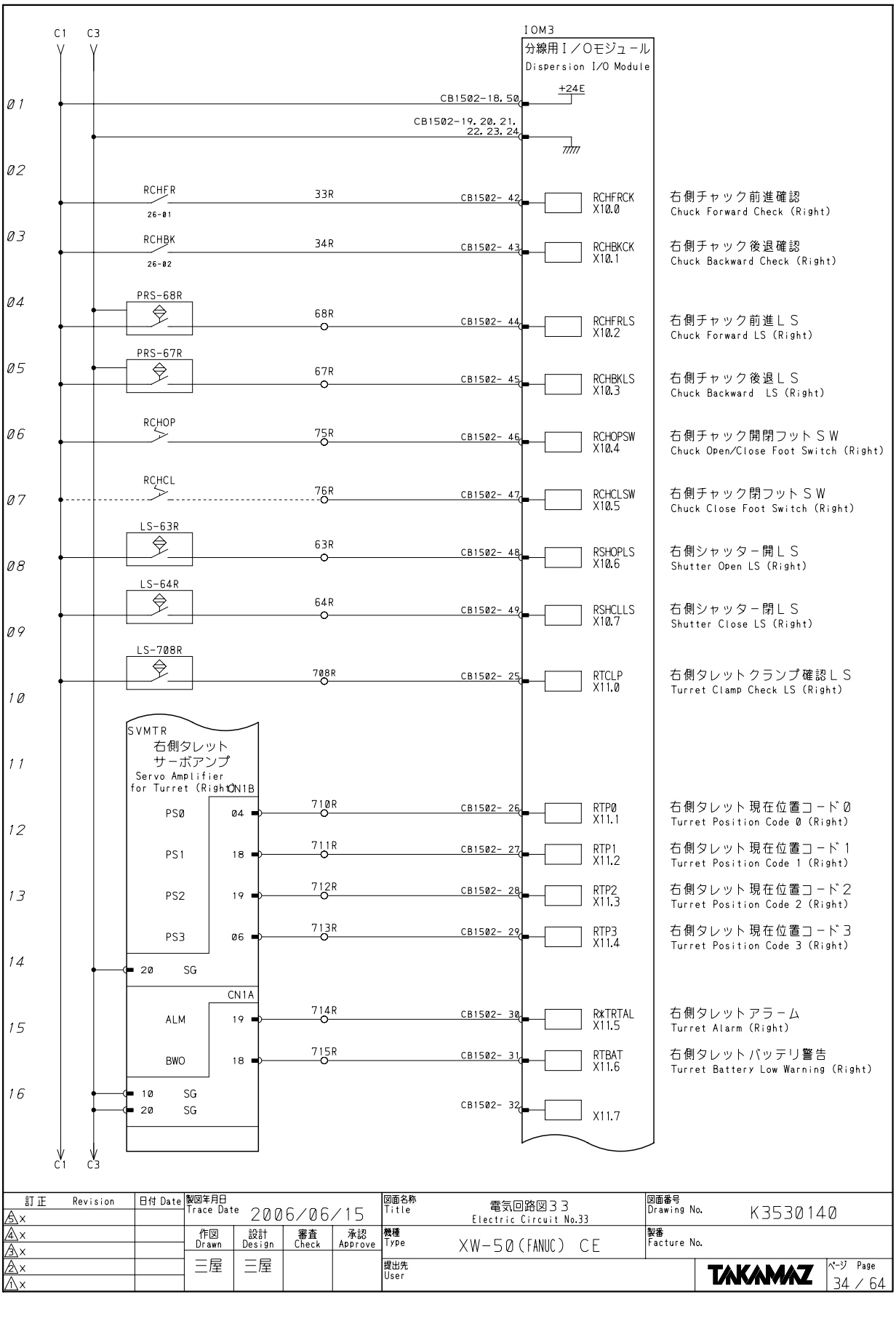
Electric circuit diagram 32



訂正 Revision	日付 Date	製図年月日 Trace Date				図面名称 Title		図面番号 Drawing No.	
5 x		2006/06/15				電気回路図32 Electric Circuit No.32		K3530130	
4 x		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type	XW-50(FANUC) CE	製番 Facture No.	
3 x									
2 x		三屋	三屋			提出先 User		TAKAMAZ	ページ Page 33 / 64
1 x									

Euro

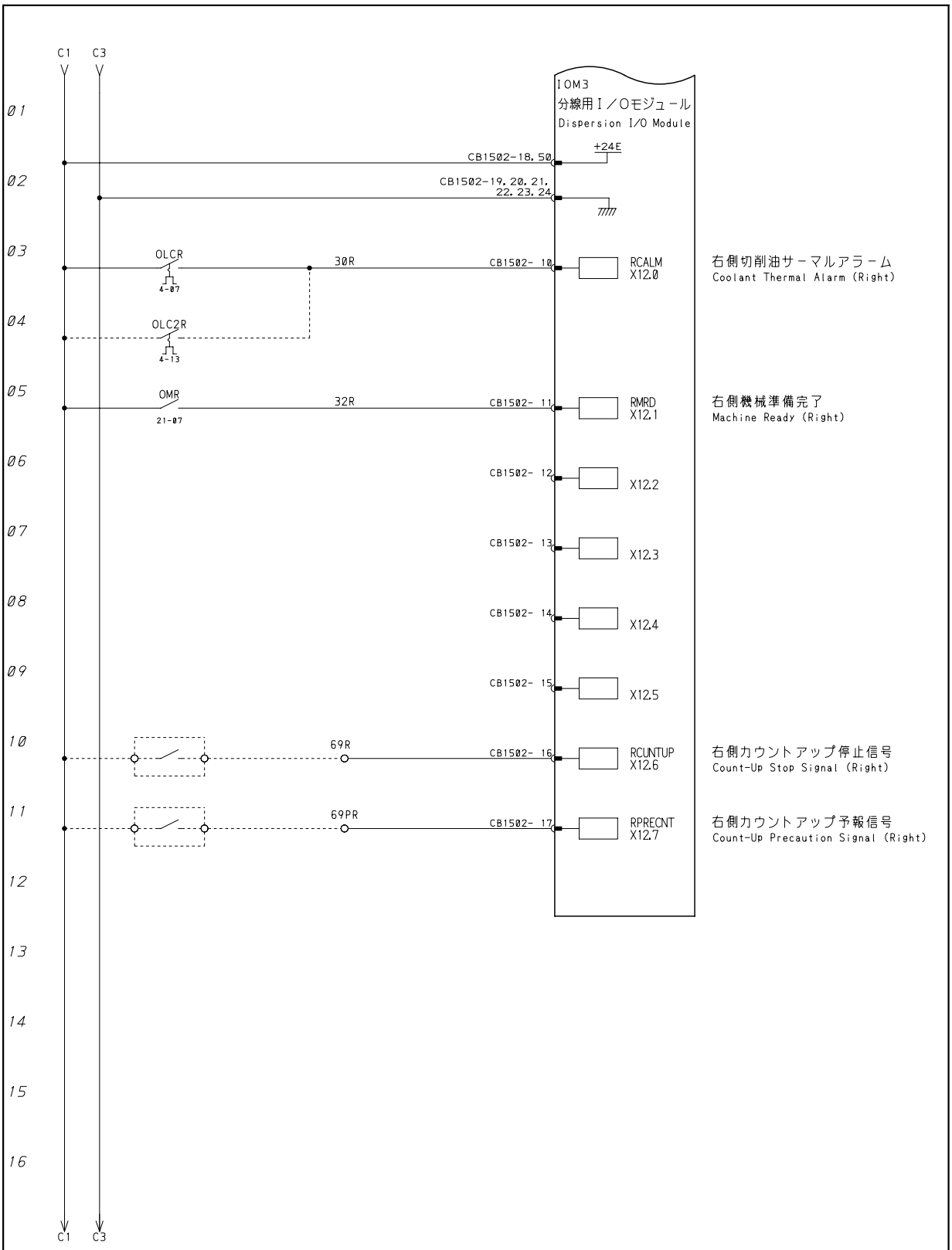
Electric circuit diagram 33



訂正 Revision	日付 Date	製図年月日 Trace Date				図面名称 Title		図面番号 Drawing No.	
△5 x		2006/06/15				電気回路図３３ Electric Circuit No.33		K3530140	
△4 x		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type		製番 Facture No.	
△3 x		三屋	三屋			XW-50(FANUC) CE			
△2 x						提出先 User	TAKAMAZ	ページ Page	34 / 64
△1 x									

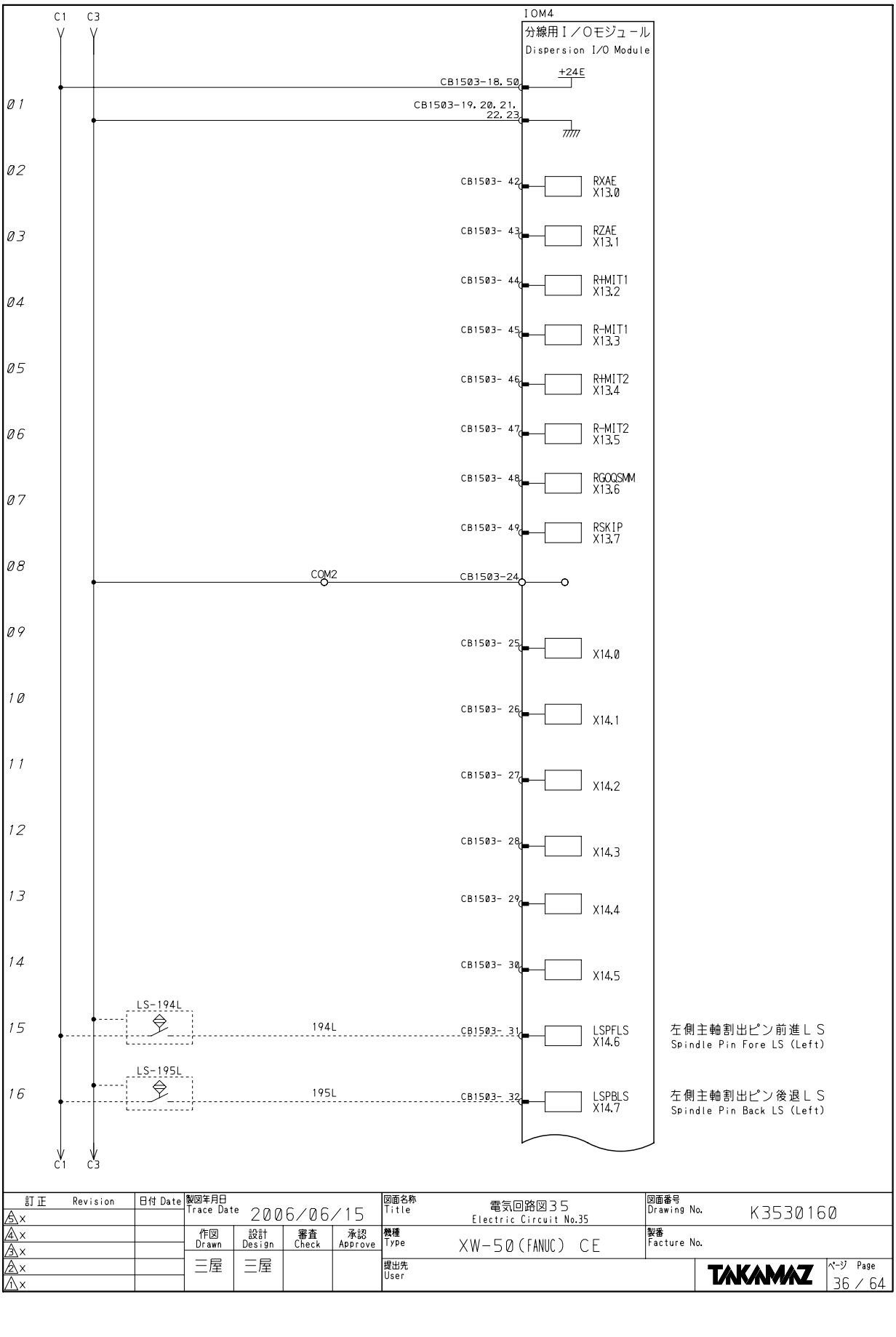
Euro

Electric circuit diagram 34



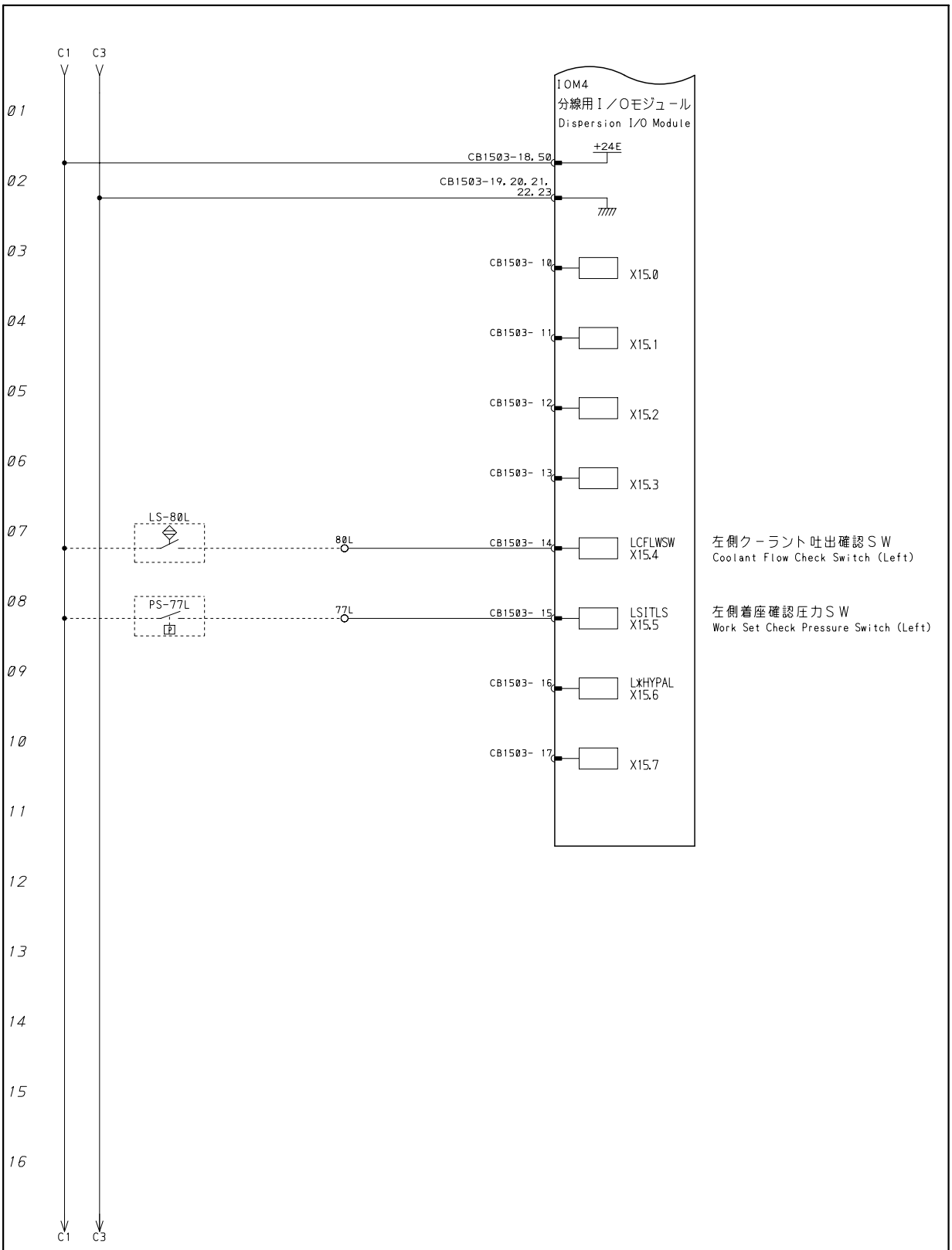
Euro

Electric circuit diagram 35



Euro

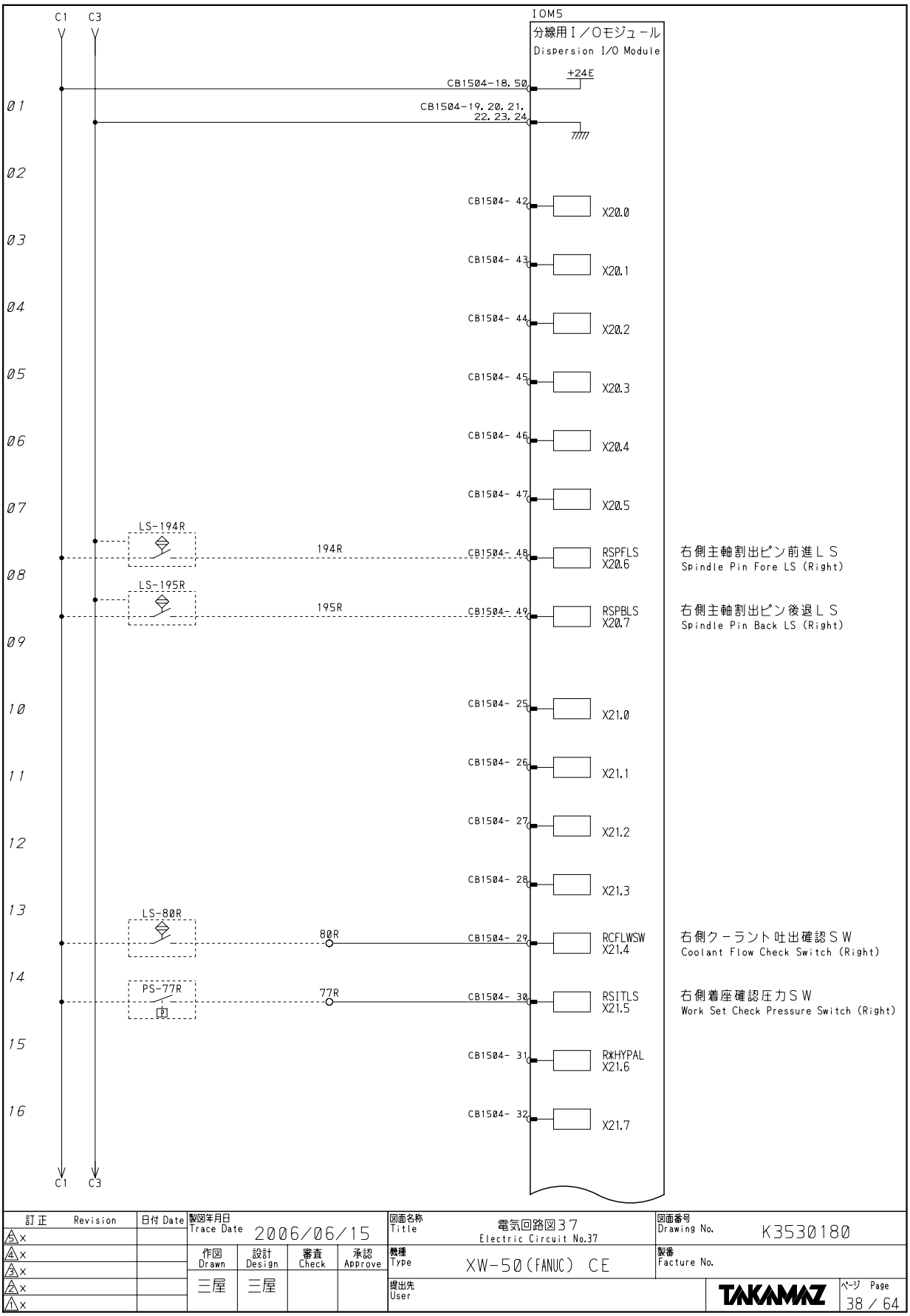
Electric circuit diagram 36



訂正 Revision	日付 Date	製図年月日 Trace Date				図面名称 Title		図面番号 Drawing No.	
△5 x		2006/06/15				電気回路図36 Electric Circuit No.36		K3530170	
△4 x		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type		製番 Facture No.	
△3 x		三屋	三屋			XW-50(FANUC) CE			
△2 x						提出先 User	TAKAMAZ	ページ Page	37 / 64
△1 x									

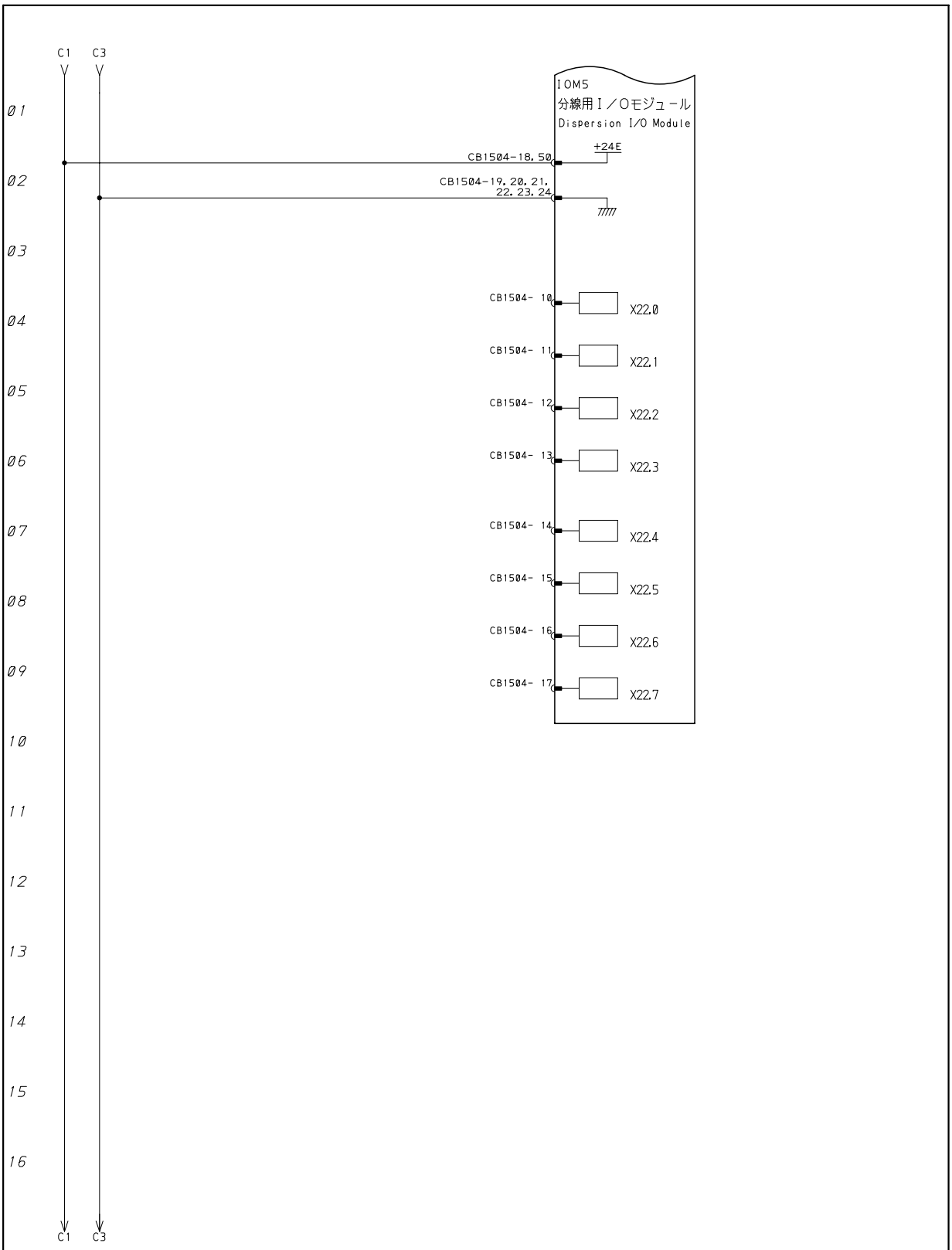
Euro

Electric circuit diagram 37



Euro

Electric circuit diagram 38



訂正 Revision	日付 Date	製図年月日 Trace Date				図面名称 Title		図面番号 Drawing No.	
△5 x									
△4 x		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type		製番 Facture No.	
△3 x									
△2 x		三屋	三屋			提出先 User			
△1 x									

2006/06/15

電気回路図38
Electric Circuit No.38

K3530190

XW-50(FANUC) CE

TAKAMAZ

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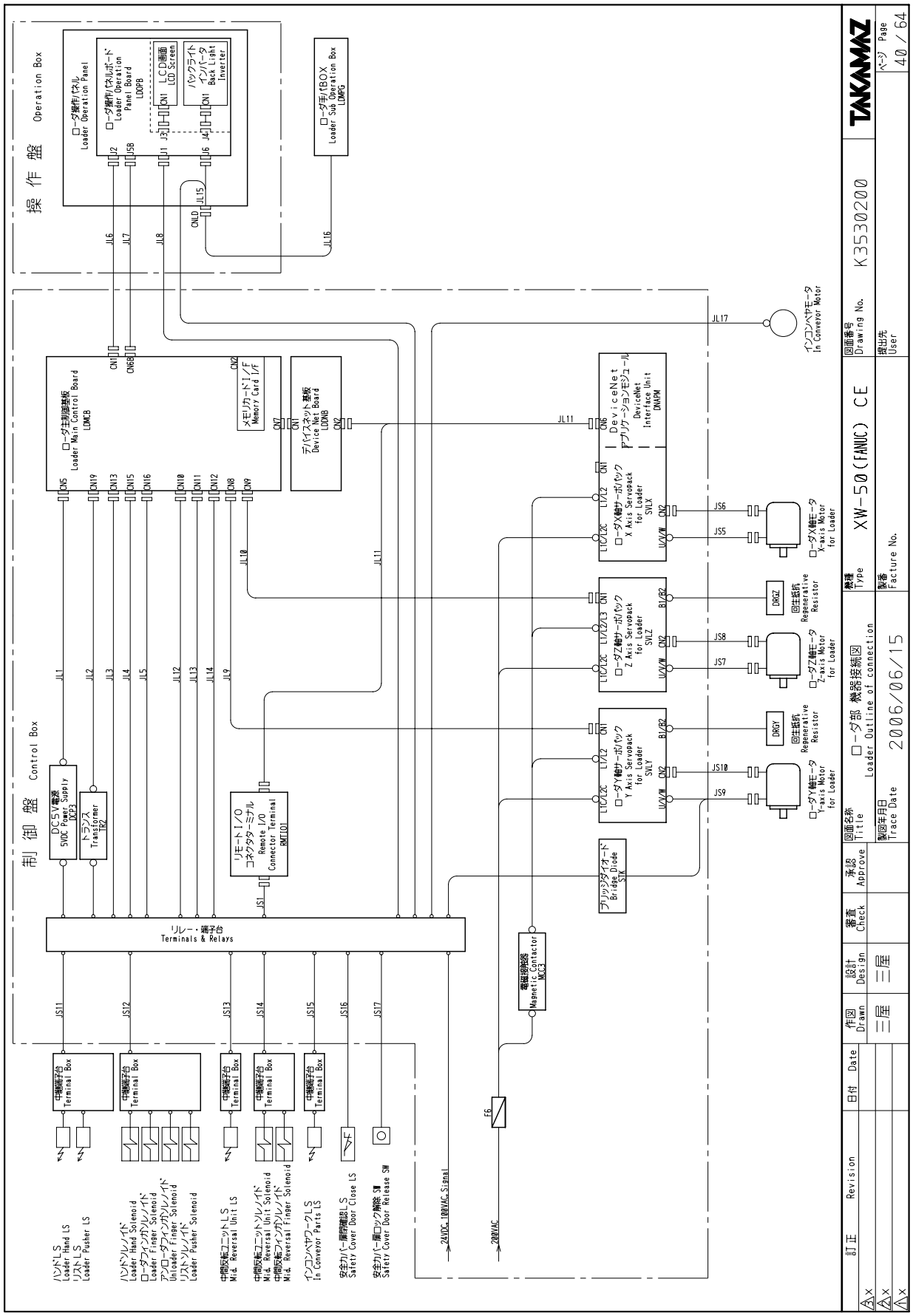
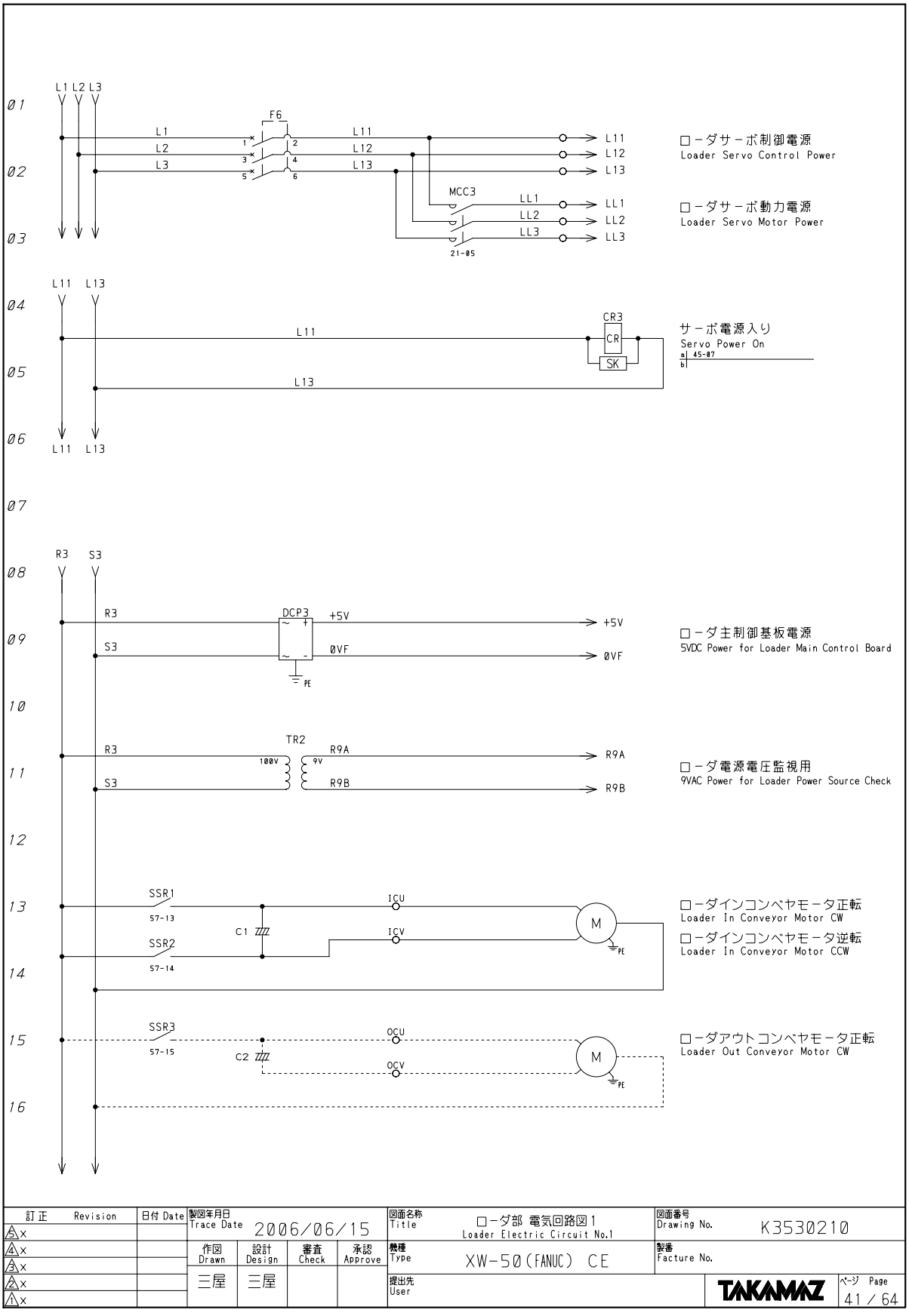
5-4 Loader Parts Connection Diagram



5-5 Loader Electric Circuit Diagrams

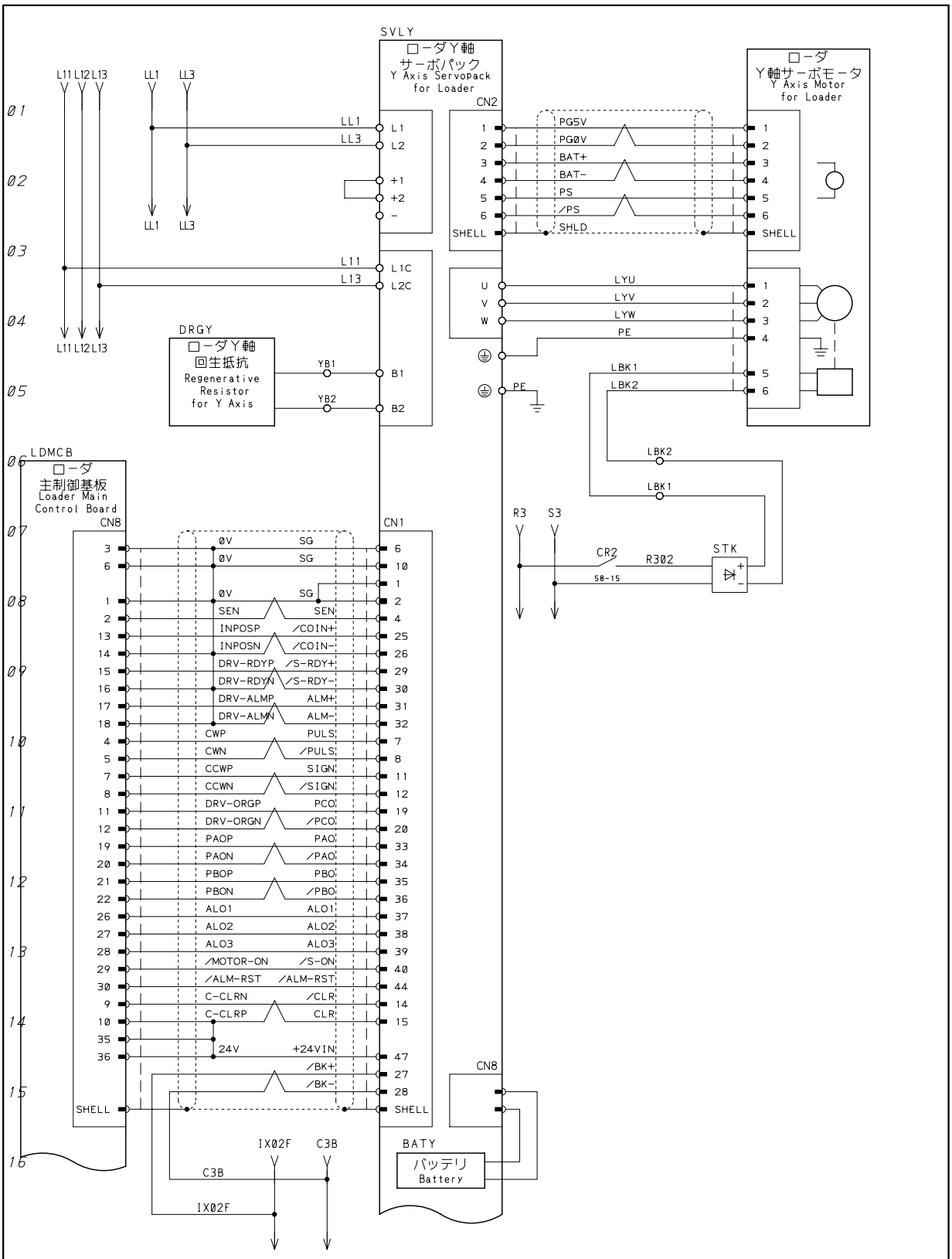
Loader electric circuit diagram 1



訂正 Revision	日付 Date	製図年月日 Trace Date				図面名称 Title		図面番号 Drawing No.	
5 x		2006/06/15				ローダ部 電気回路図1 Loader Electric Circuit No.1		K3530210	
4 x		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type		製番 Facture No.	
3 x		三屋	三屋			XW-50(FANUC) CE			
2 x						提出先 User	TAKAMAZ	ページ Page	41 / 64
1 x									

Euro

Loader electric circuit diagram 2



訂正 Revision	日付 Date	製図年月日 Trace Date	図面名称 Title	図面番号 Drawing No.
△6 x		2006/06/15	ローダ部 電気回路図2 Loader Electric Circuit No.2	K3530220
△4 x		作図 Drawn: 三屋 / 設計 Design: 三屋 / 審査 Check / 承認 Approve	機種 Type: XW-50(FANUC) CE	製番 Facture No.
△3 x				
△2 x			提出先 User	TAKAMAZ
△1 x				ページ Page 42 / 64

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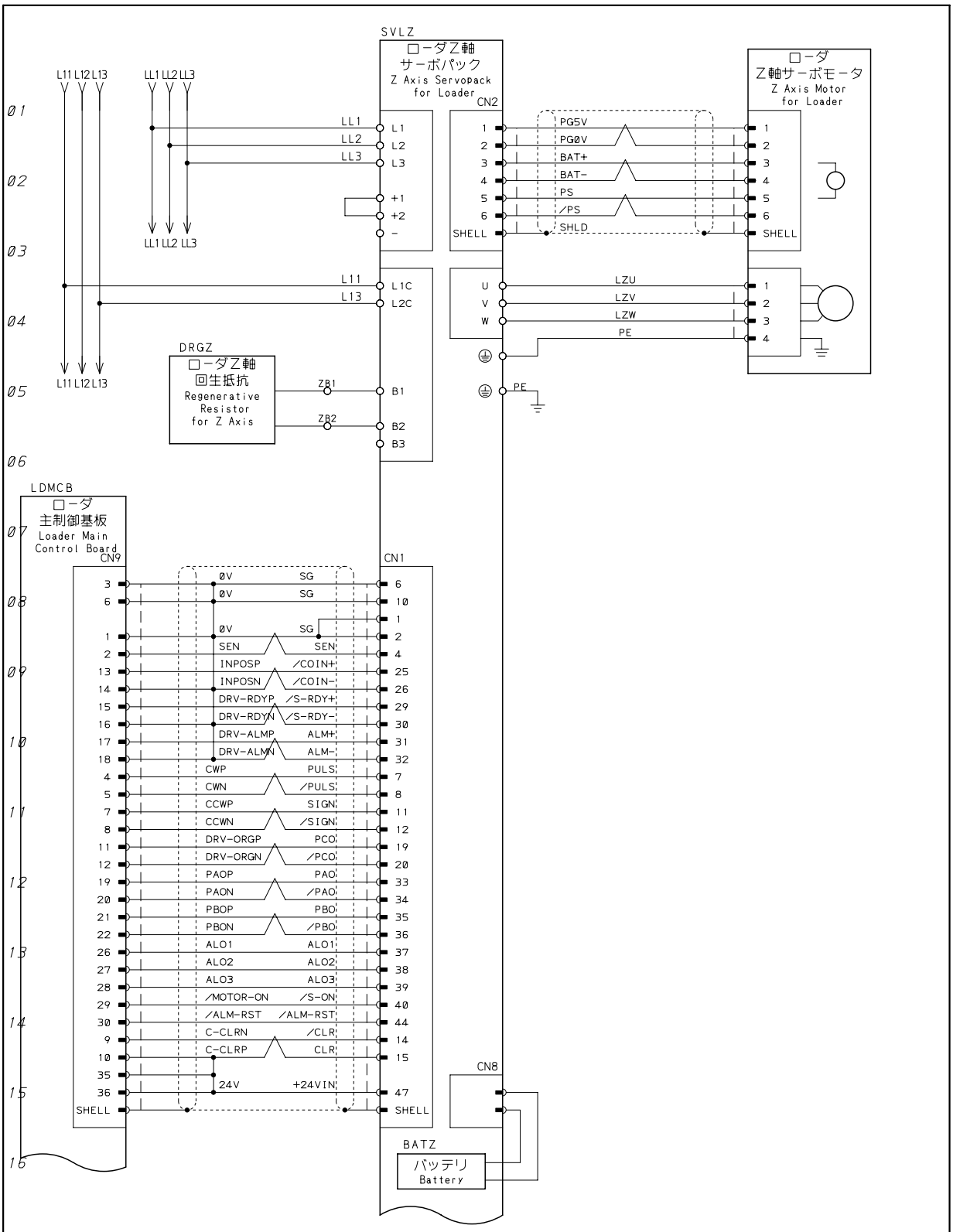
Loader electric circuit diagram 3



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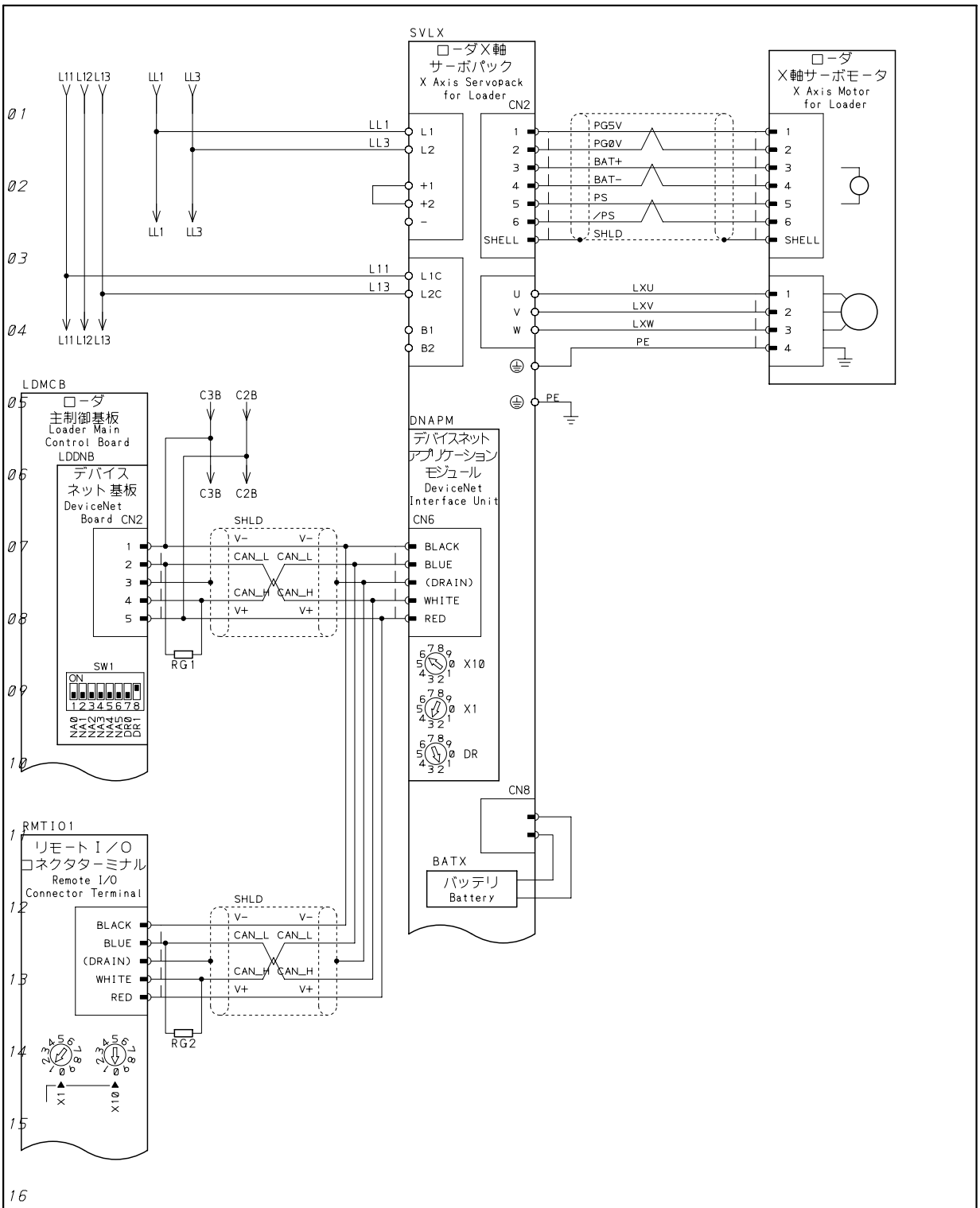
△x		2006/06/15	ローダ部 電気回路図3 Loader Electric Circuit No.3	K3530230
△x		作図 Drawn: 三屋 / 設計 Design: 三屋 / 審査 Check / 承認 Approve	機種 Type: XW-50(FANUC) CE	製番 Facture No.
△x			提出先 User	TAKAMAZ ページ Page 43 / 64
△x				
△x				

Euro

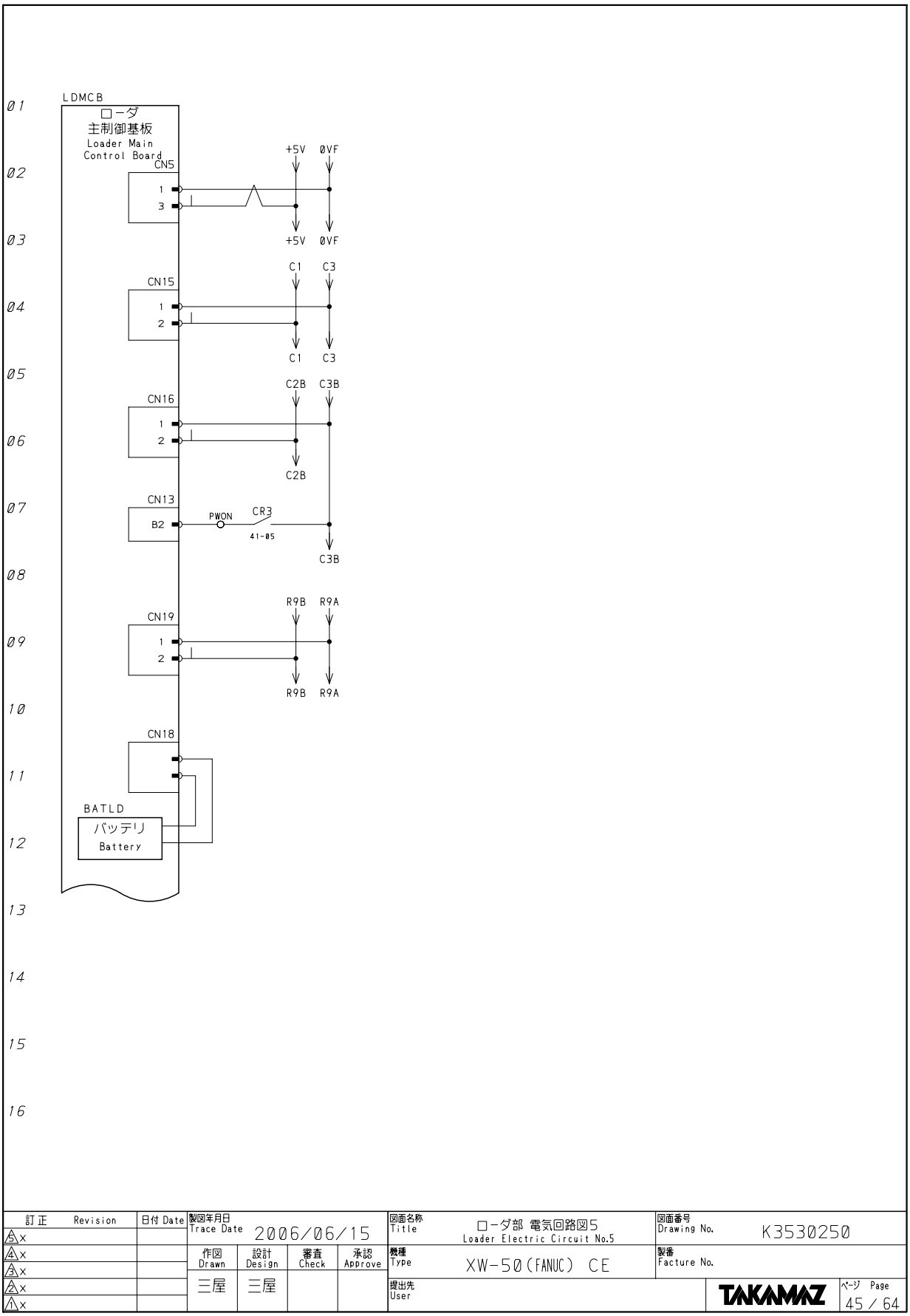
Loader electric circuit diagram 4



訂正 Revision	日付 Date	製図年月日 Trace Date				図面名称 Title		図面番号 Drawing No.	
△5 x		2006/06/15				ローダ部 電気回路図4 Loader Electric Circuit No.4		K3530240	
△4 x		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type		製番 Facture No.	
△3 x		三屋	三屋			XW-50(FANUC) CE			
△2 x						提出先 User	TAKAMAZ	ページ Page	44 / 64
△1 x									

Euro

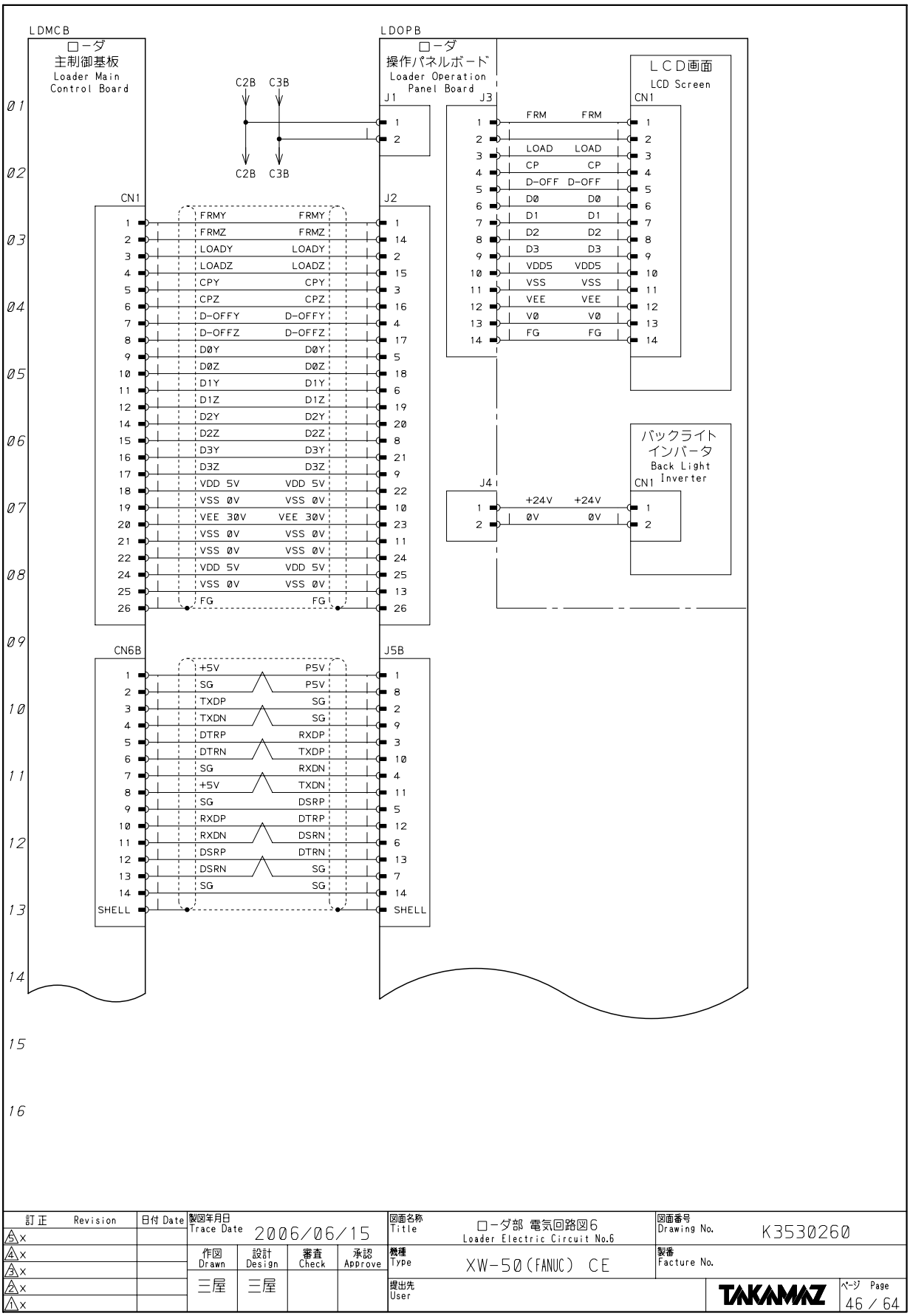
Loader electric circuit diagram 5



訂正 Revision	日付 Date	製図年月日 Trace Date				図面名称 Title		図面番号 Drawing No.	
6 x		2006/06/15				ローダ部 電気回路図5 Loader Electric Circuit No.5		K3530250	
4 x		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type	XW-50(FANUC) CE	製番 Facture No.	
3 x									
2 x		三屋	三屋			提出先 User		TAKAMAZ	ページ Page 45 / 64
1 x									

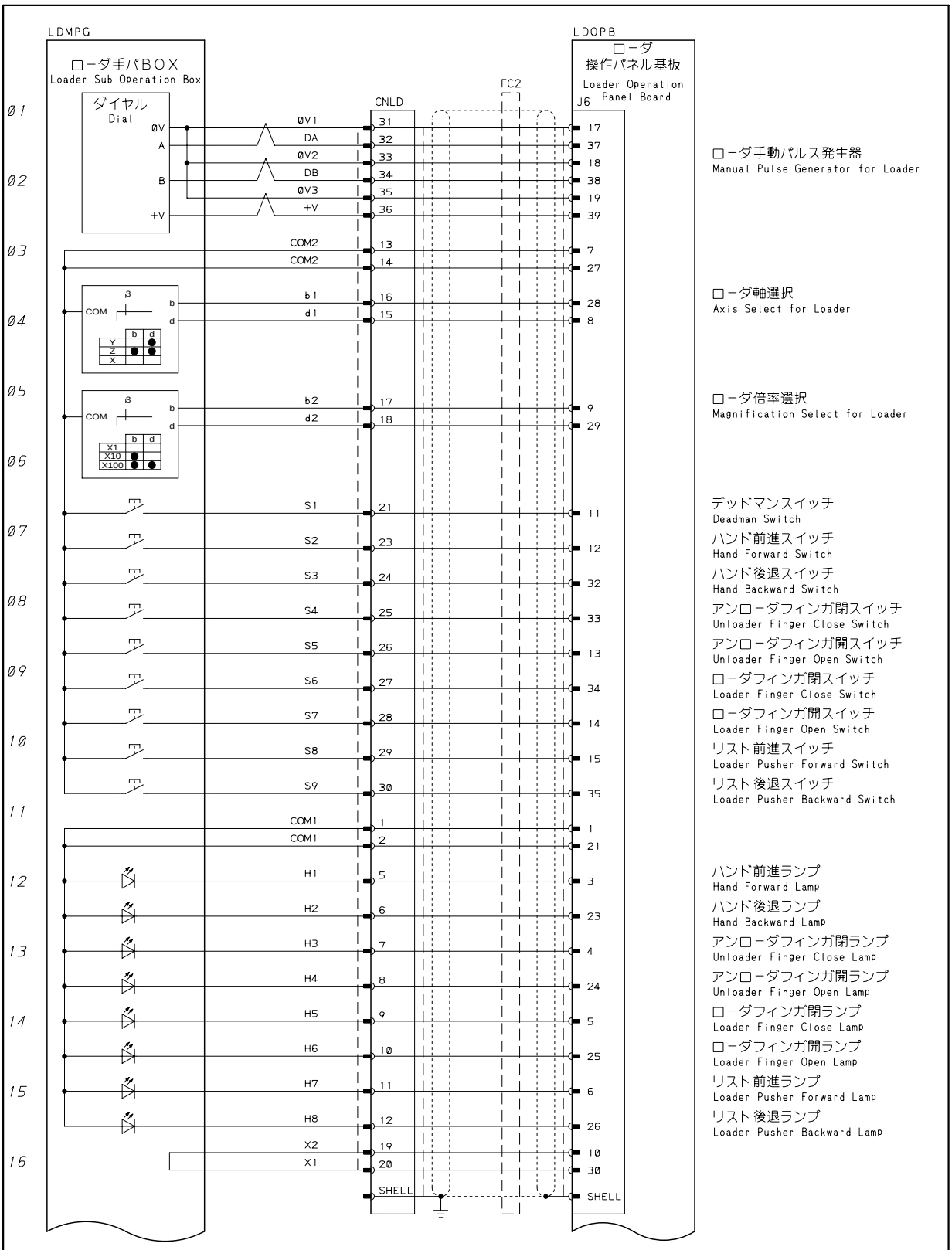
Euro

Loader electric circuit diagram 6



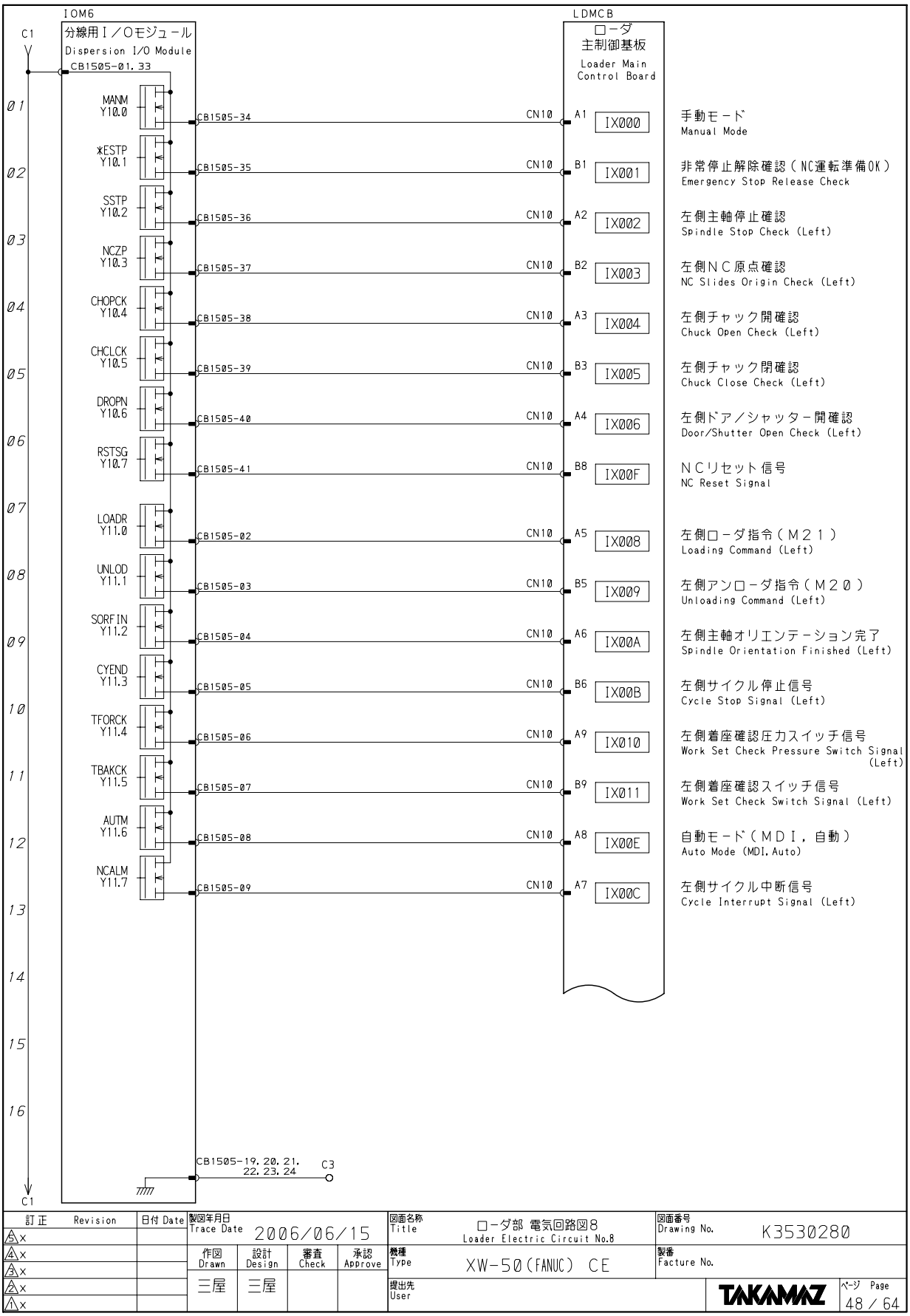
Euro

Loader electric circuit diagram 7



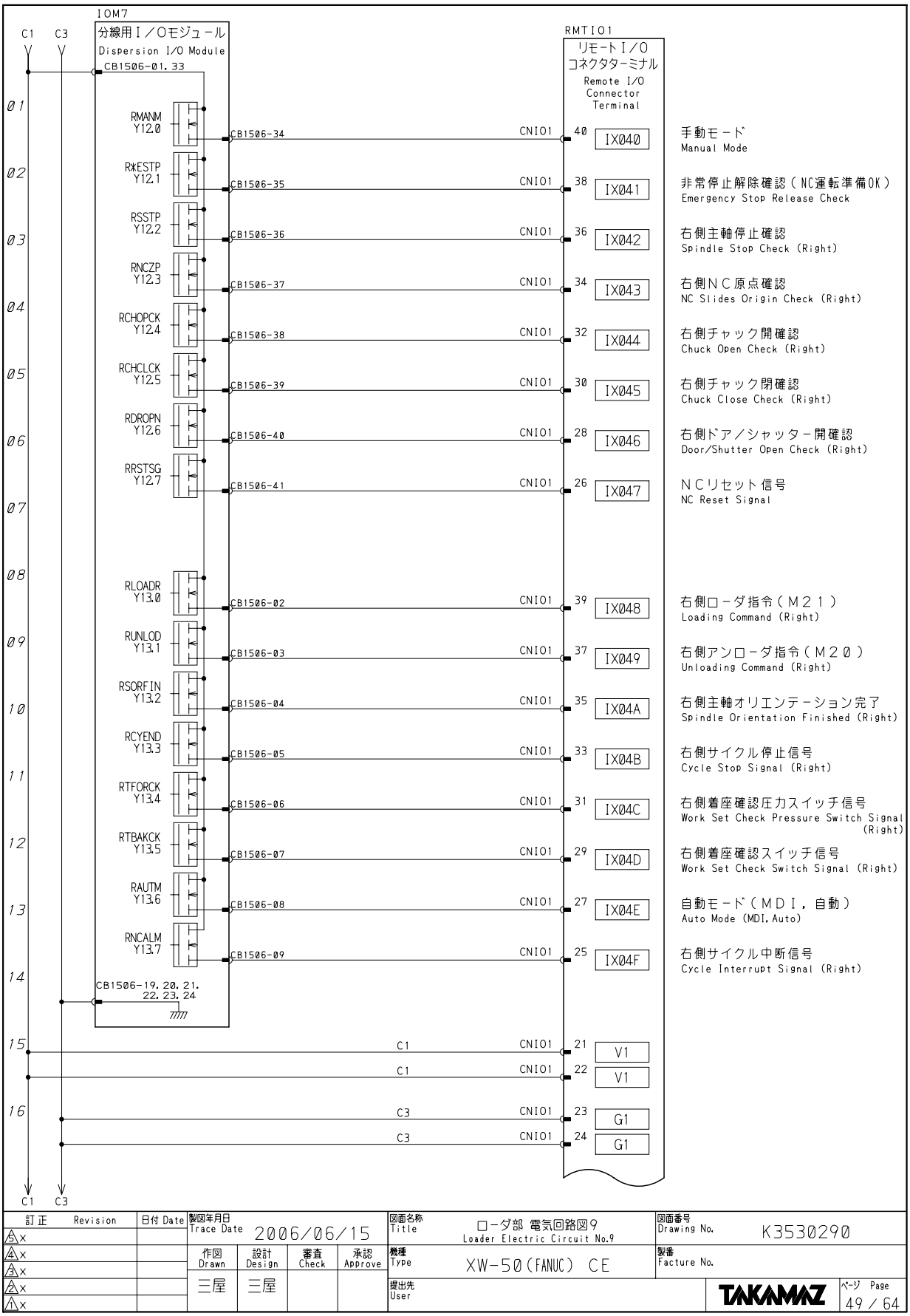
Euro

Loader electric circuit diagram 8



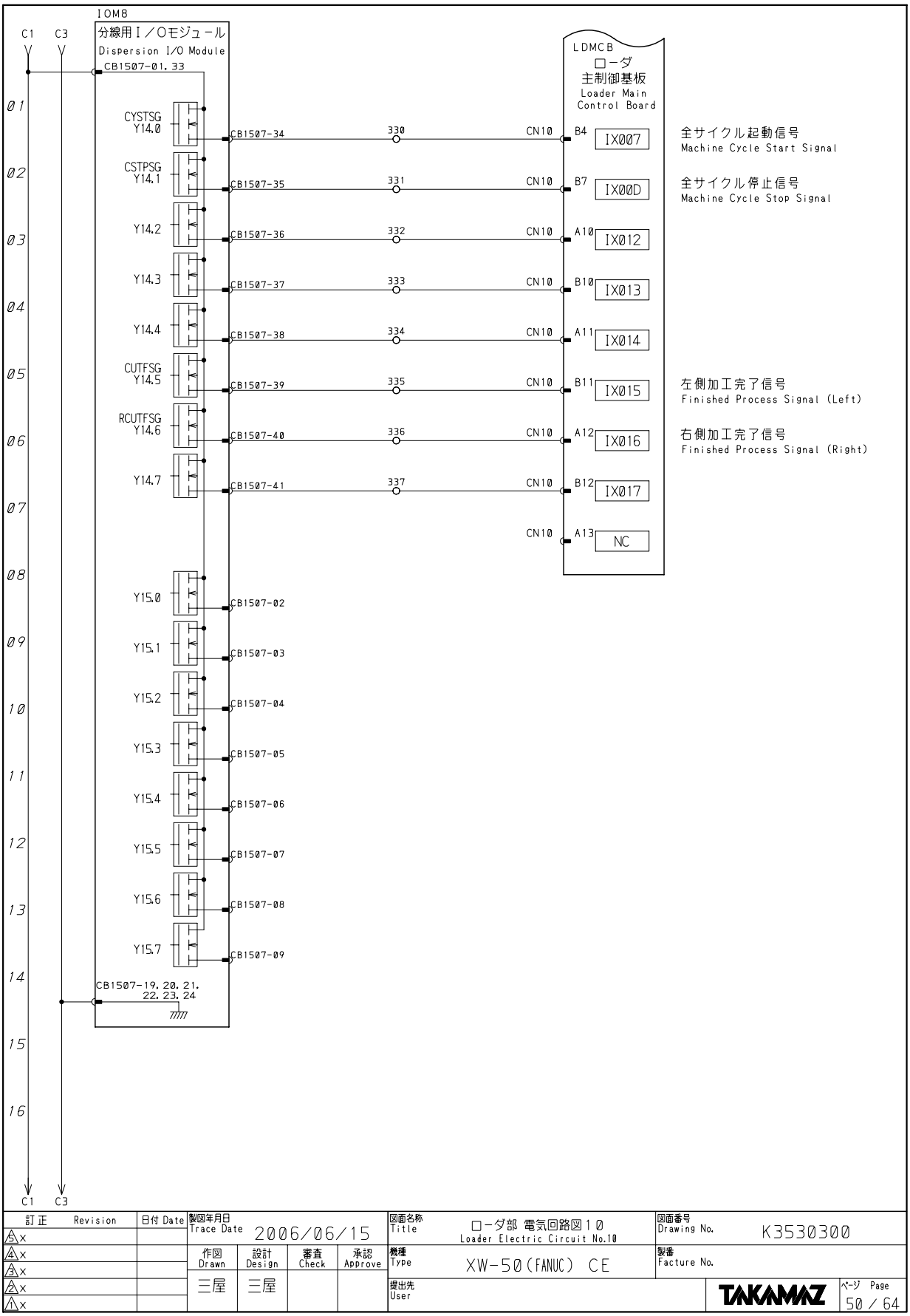
Euro

Loader electric circuit diagram 9



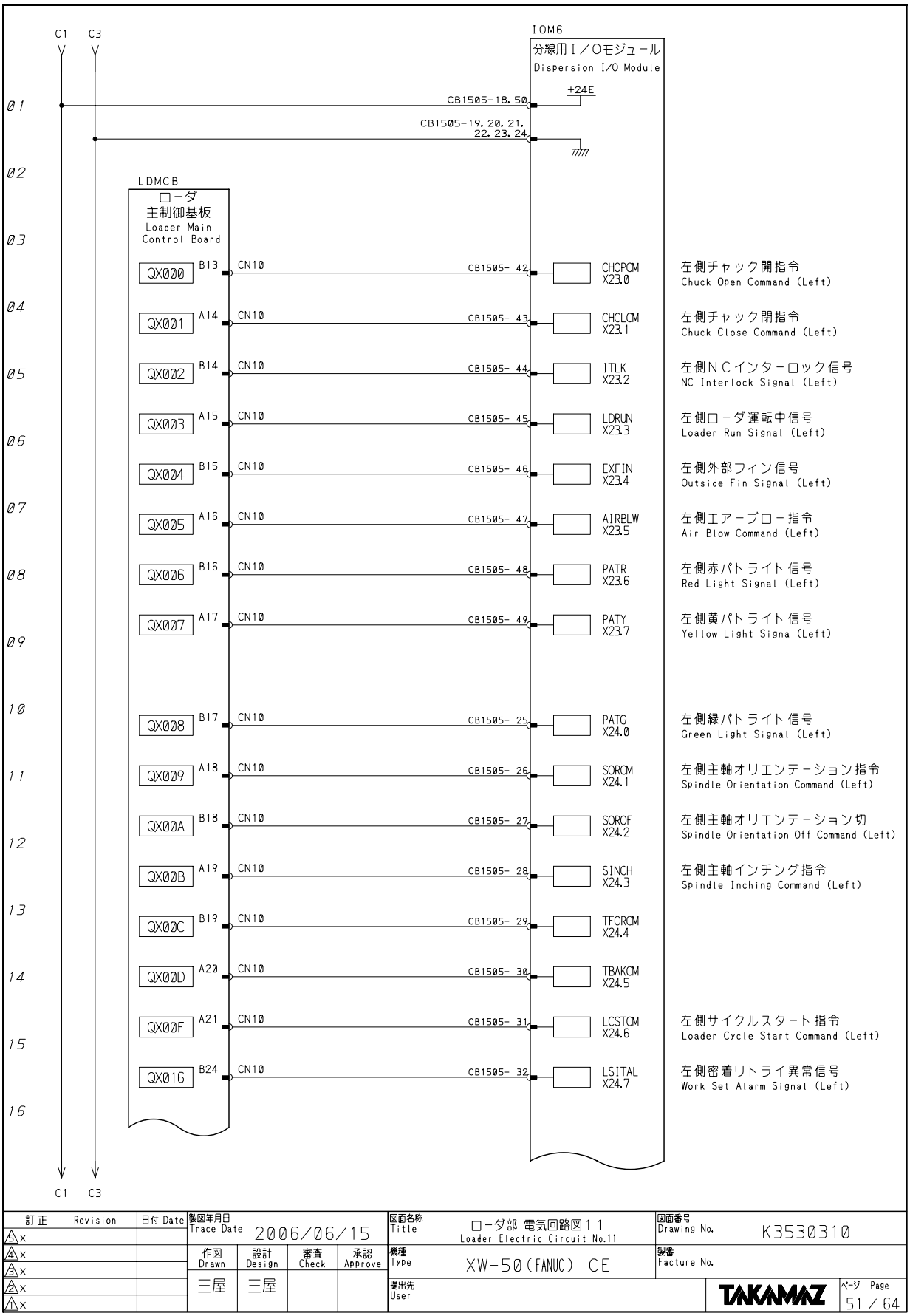
Euro

Loader electric circuit diagram 10



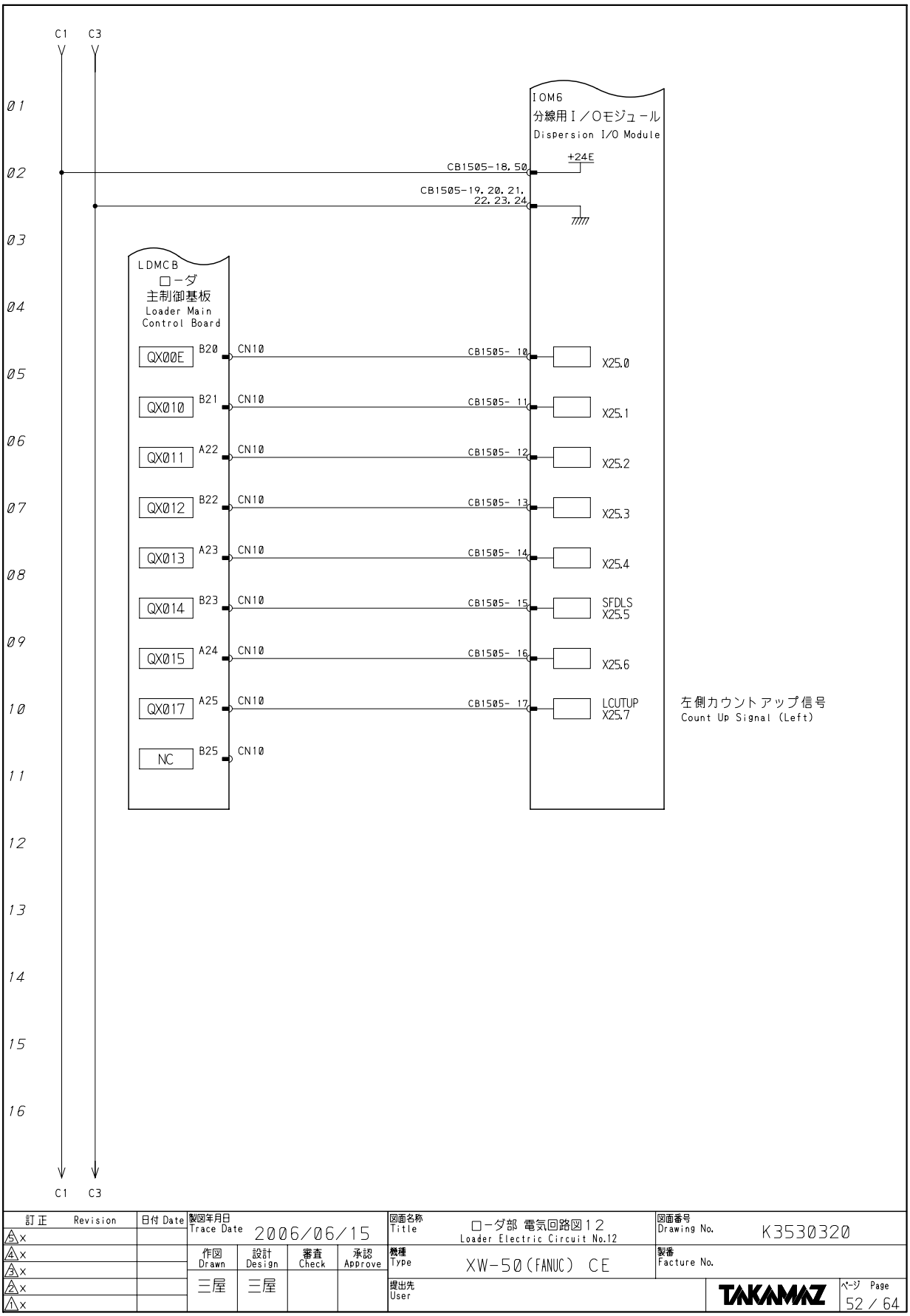
Euro

Loader electric circuit diagram 11



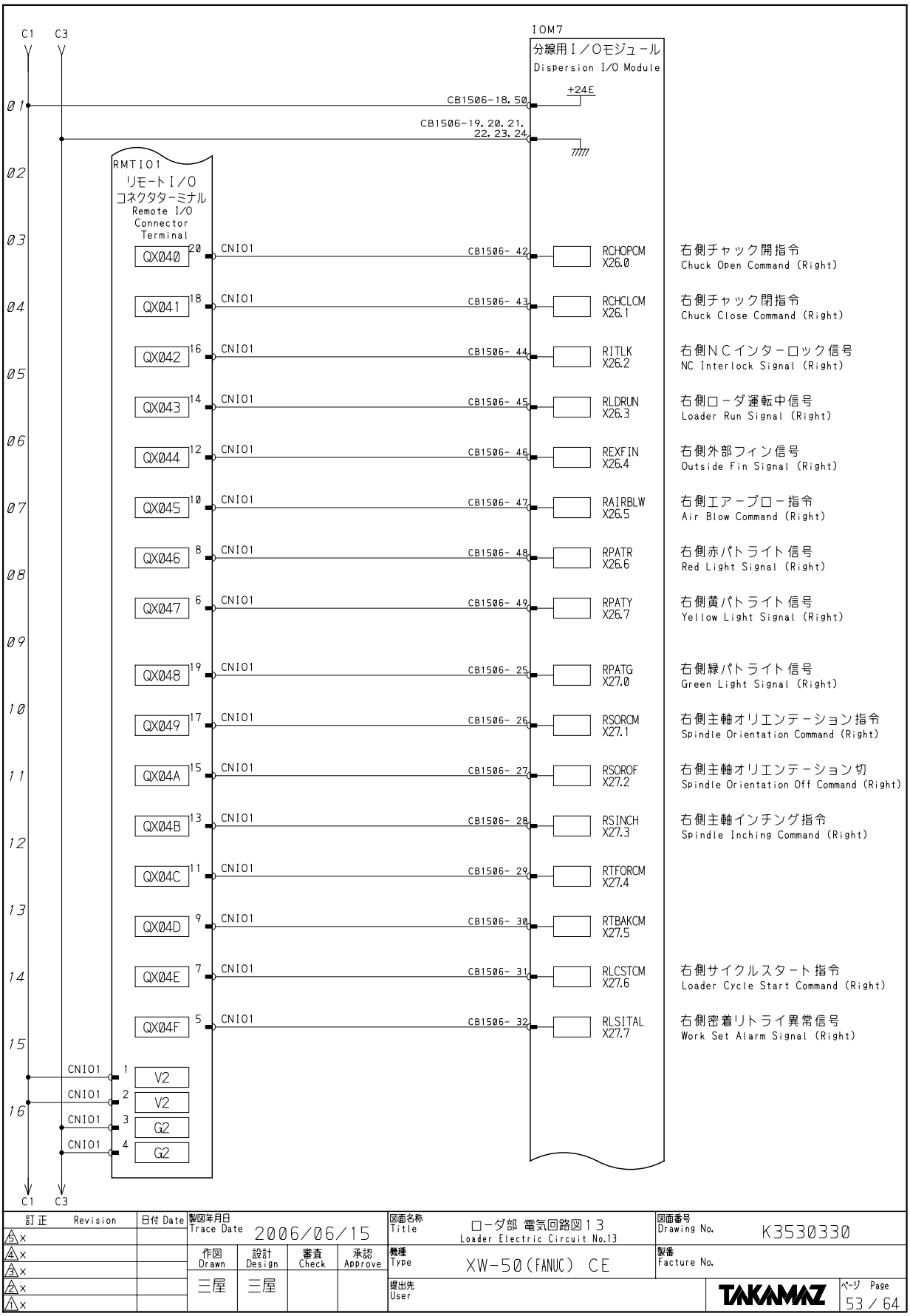
Euro

Loader electric circuit diagram 12



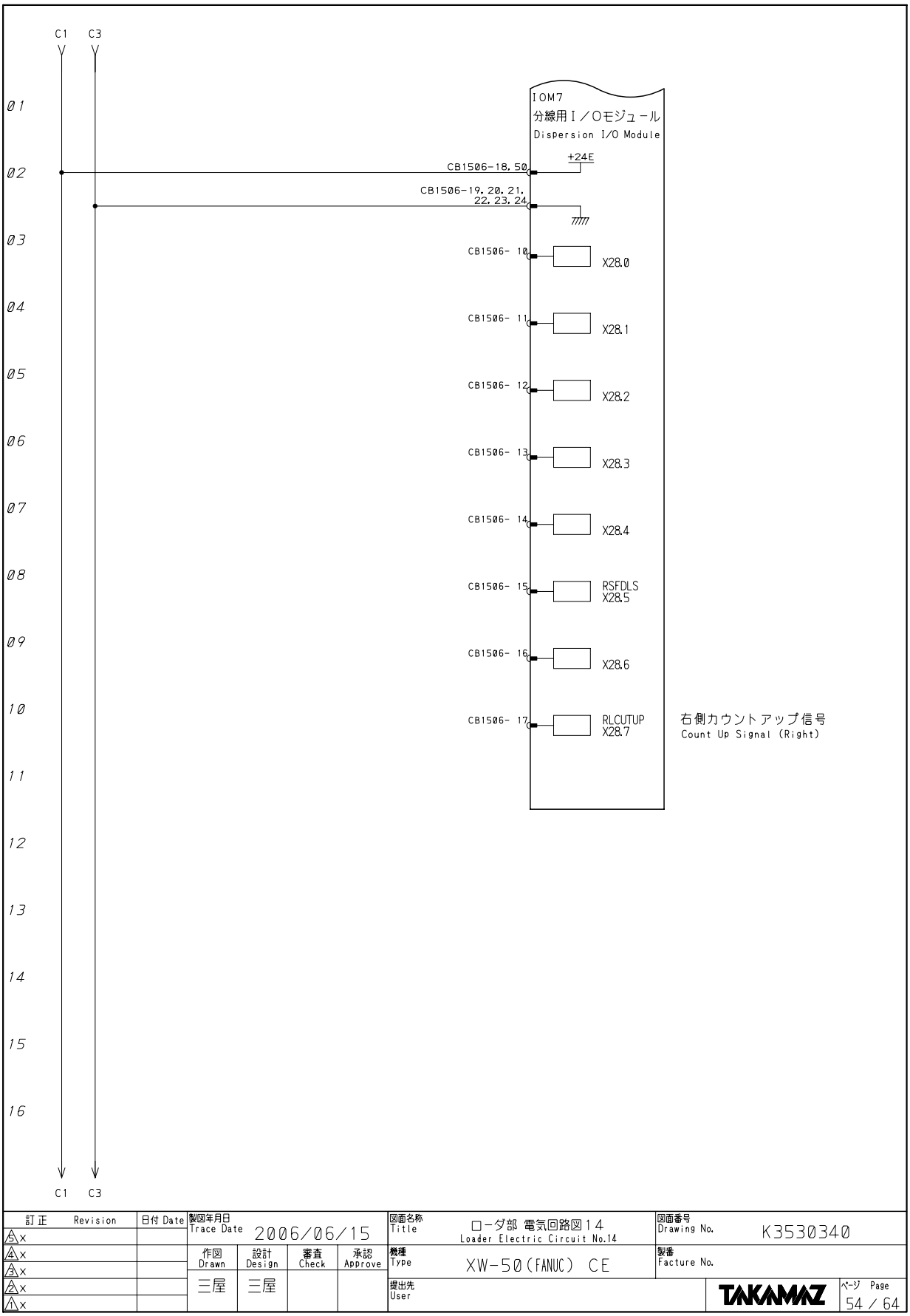
Euro

Loader electric circuit diagram 13



Euro

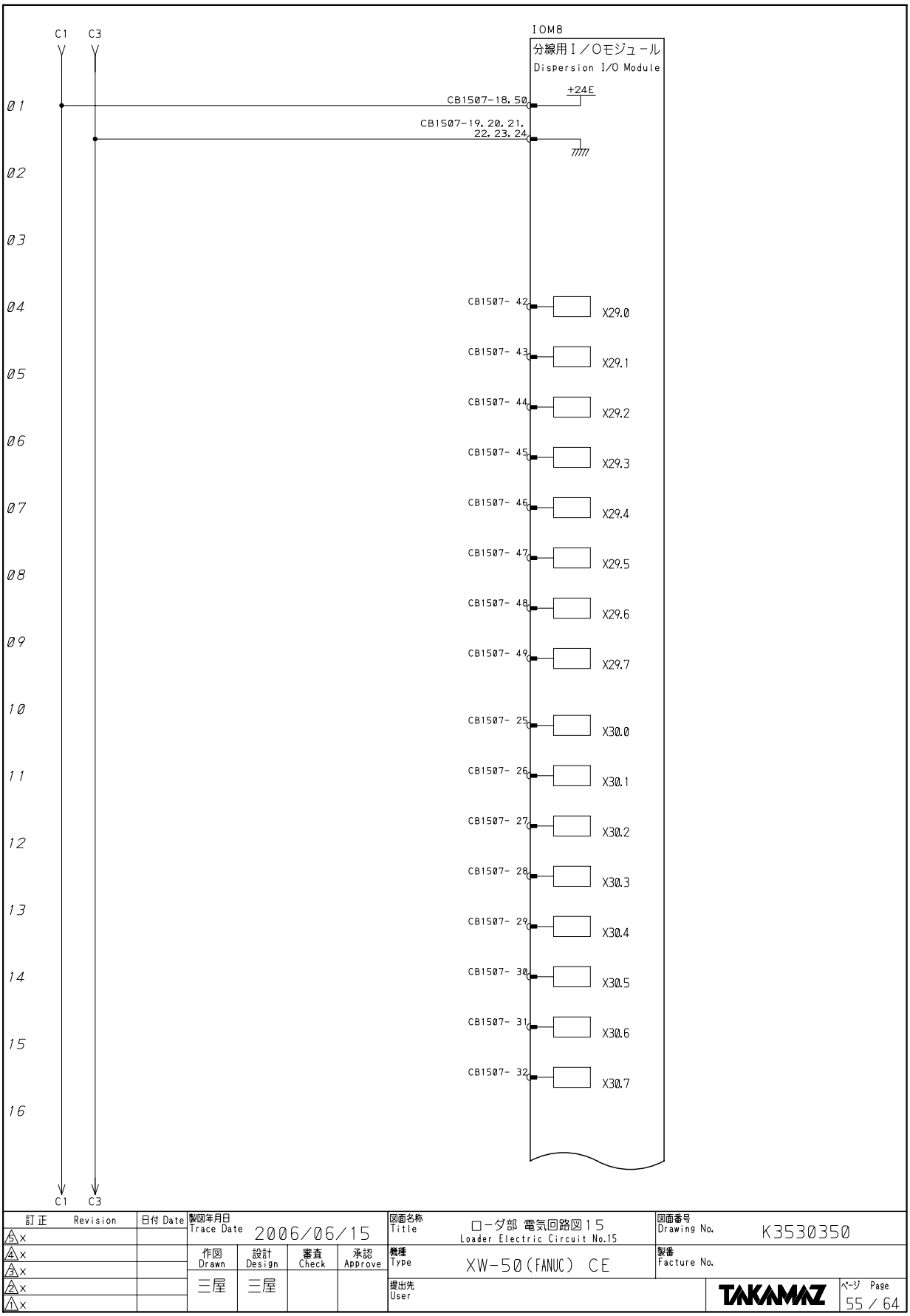
Loader electric circuit diagram 14



訂正 Revision	日付 Date	製図年月日 Trace Date				図面名称 Title		図面番号 Drawing No.	
△x		2006/06/15				ロータ部 電気回路図14 Loader Electric Circuit No.14		K3530340	
△x		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type		製番 Facture No.	
△x		三屋	三屋			XW-50(FANUC) CE			
△x						提出先 User		ページ Page	
△x							TAKAMAZ	54 / 64	

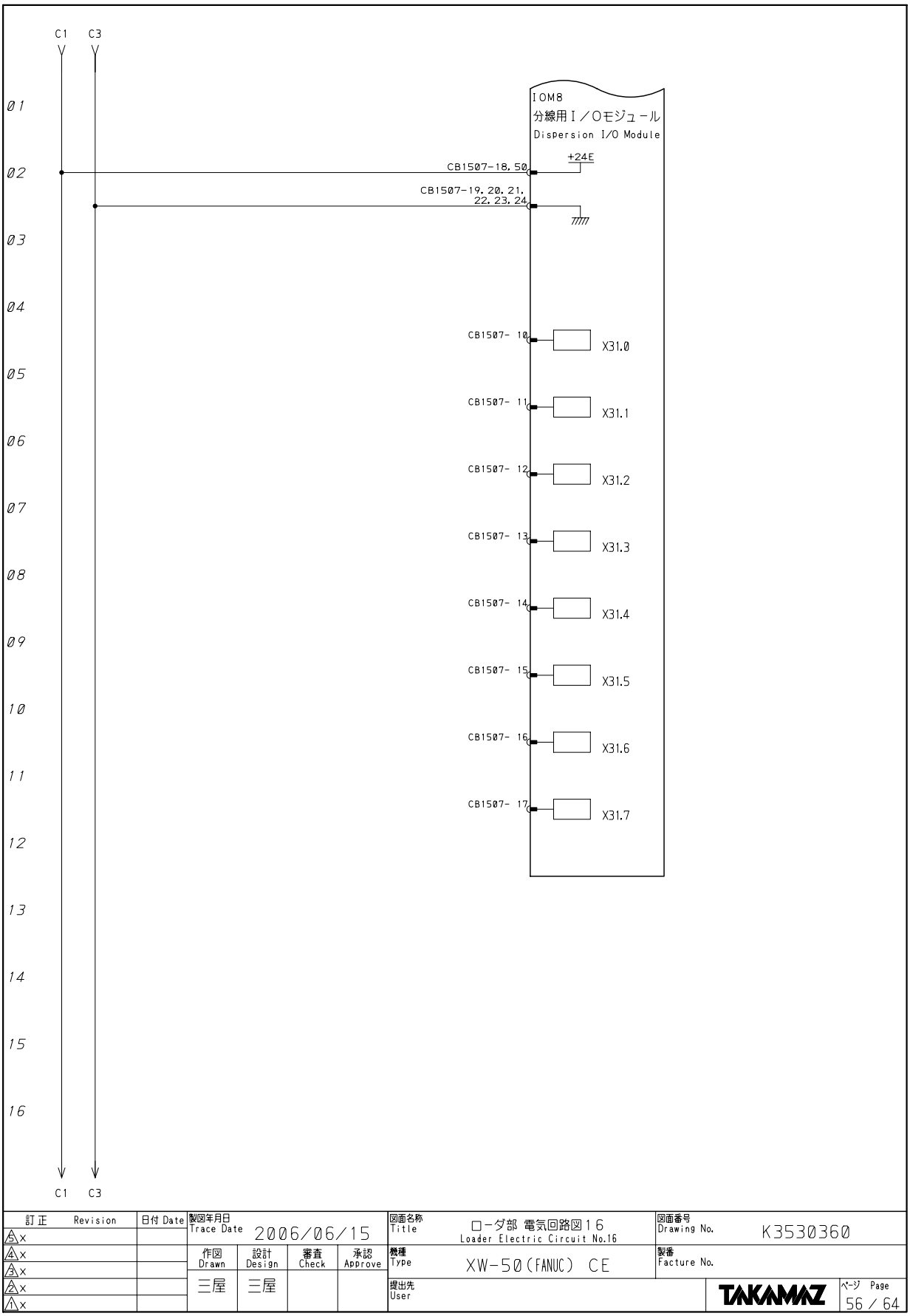
Euro

Loader electric circuit diagram 15



Euro

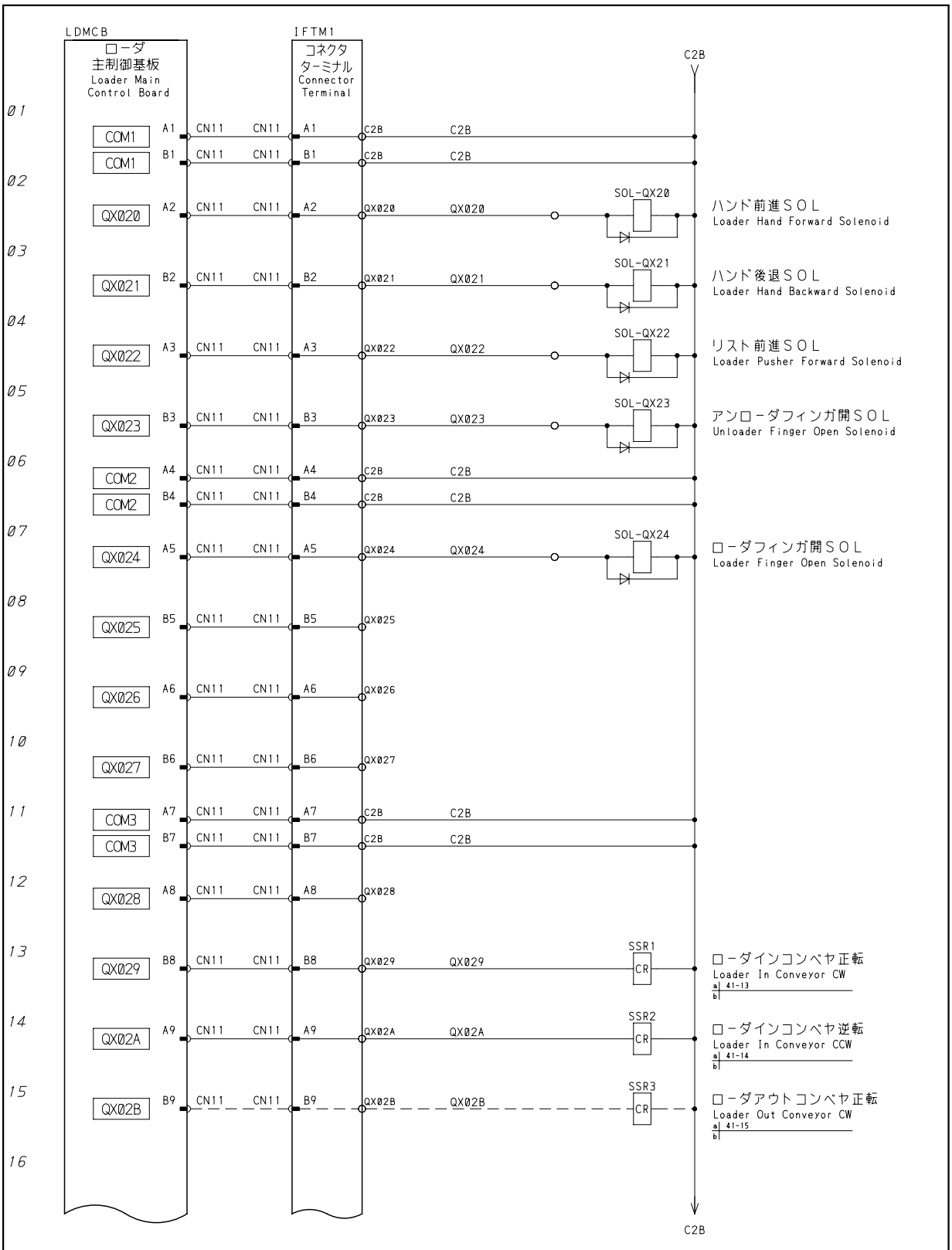
Loader electric circuit diagram 16



訂正 Revision	日付 Date	製図年月日 Trace Date				図面名称 Title		図面番号 Drawing No.	
△x		2006/06/15				ロータ部 電気回路図16 Loader Electric Circuit No.16		K3530360	
△x		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type		製番 Facture No.	
△x		三屋	三屋			XW-50(FANUC) CE			
△x						提出先 User	TAKAMAZ	ページ Page	56 / 64
△x									

Euro

Loader electric circuit diagram 17



訂正 Revision	日付 Date	製図年月日 Trace Date				図面名称 Title		図面番号 Drawing No.	
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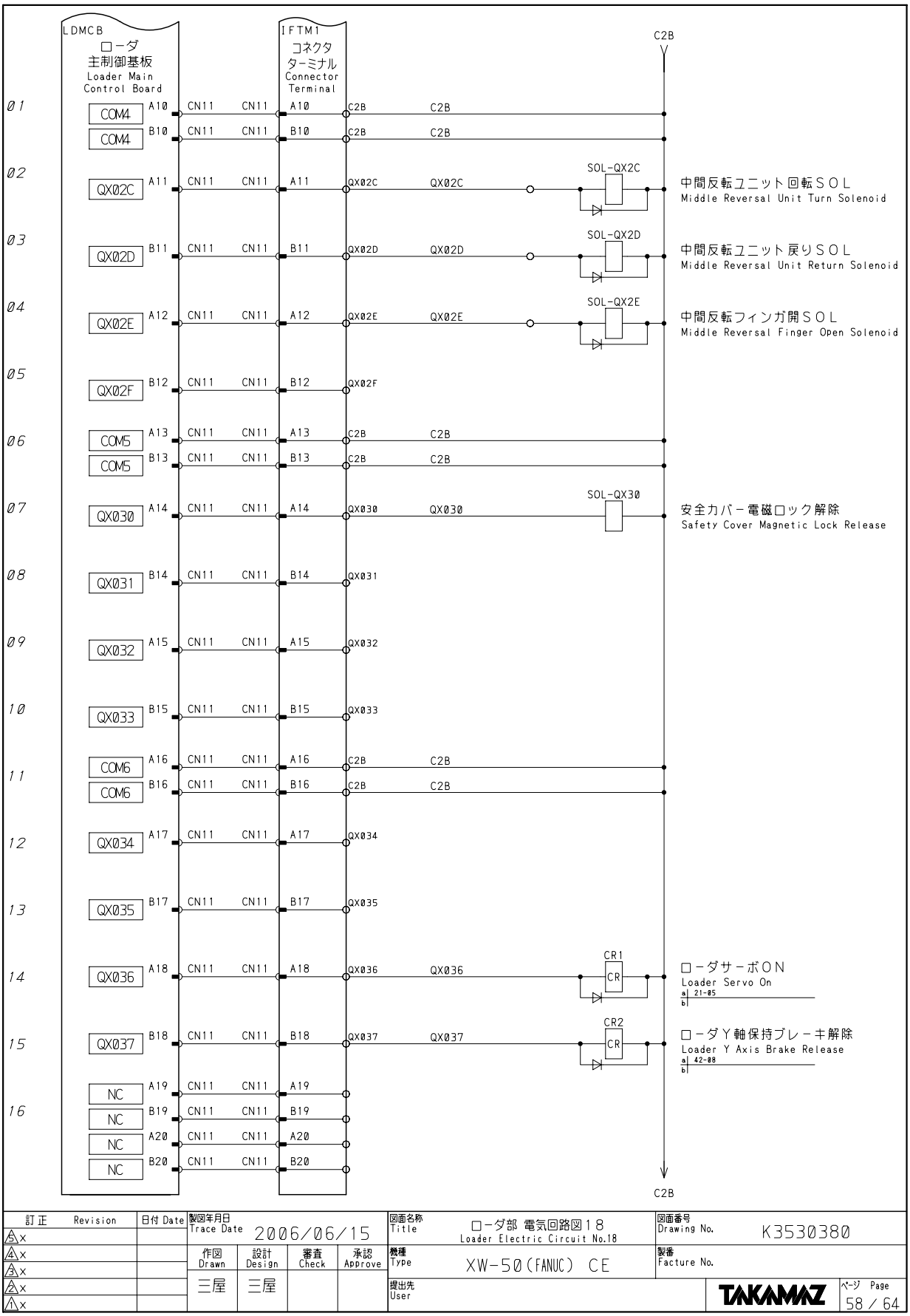
△x		作図 Drawn	設計 Design	審査 Check	承認 Approve	機種 Type		製番 Facture No.	
△x							XW-50(FANUC) CE		
△x		三屋	三屋			提出先 User		TAKAMAZ	ページ Page 57 / 64
△x									

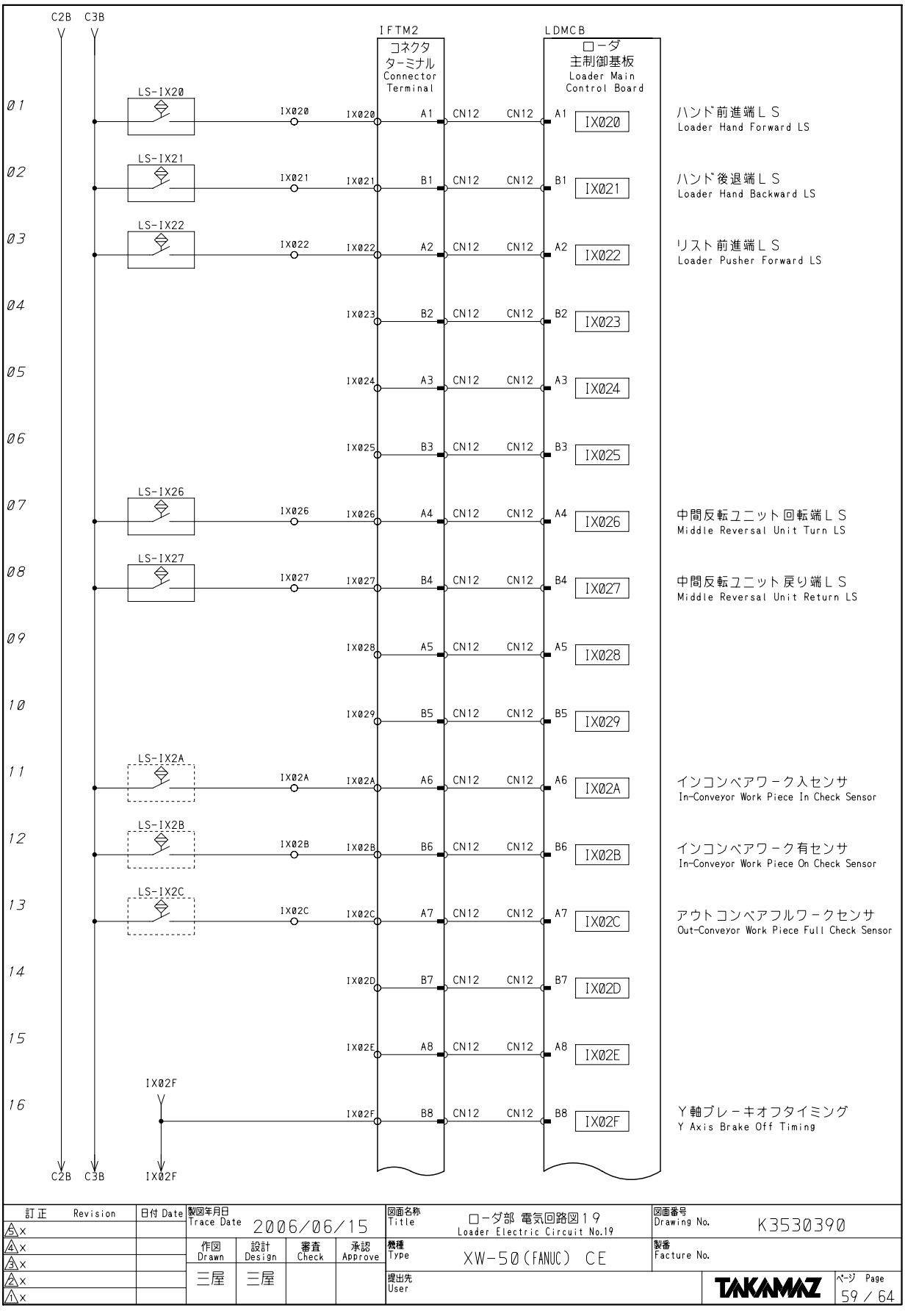
Euro

Loader electric circuit diagram 18



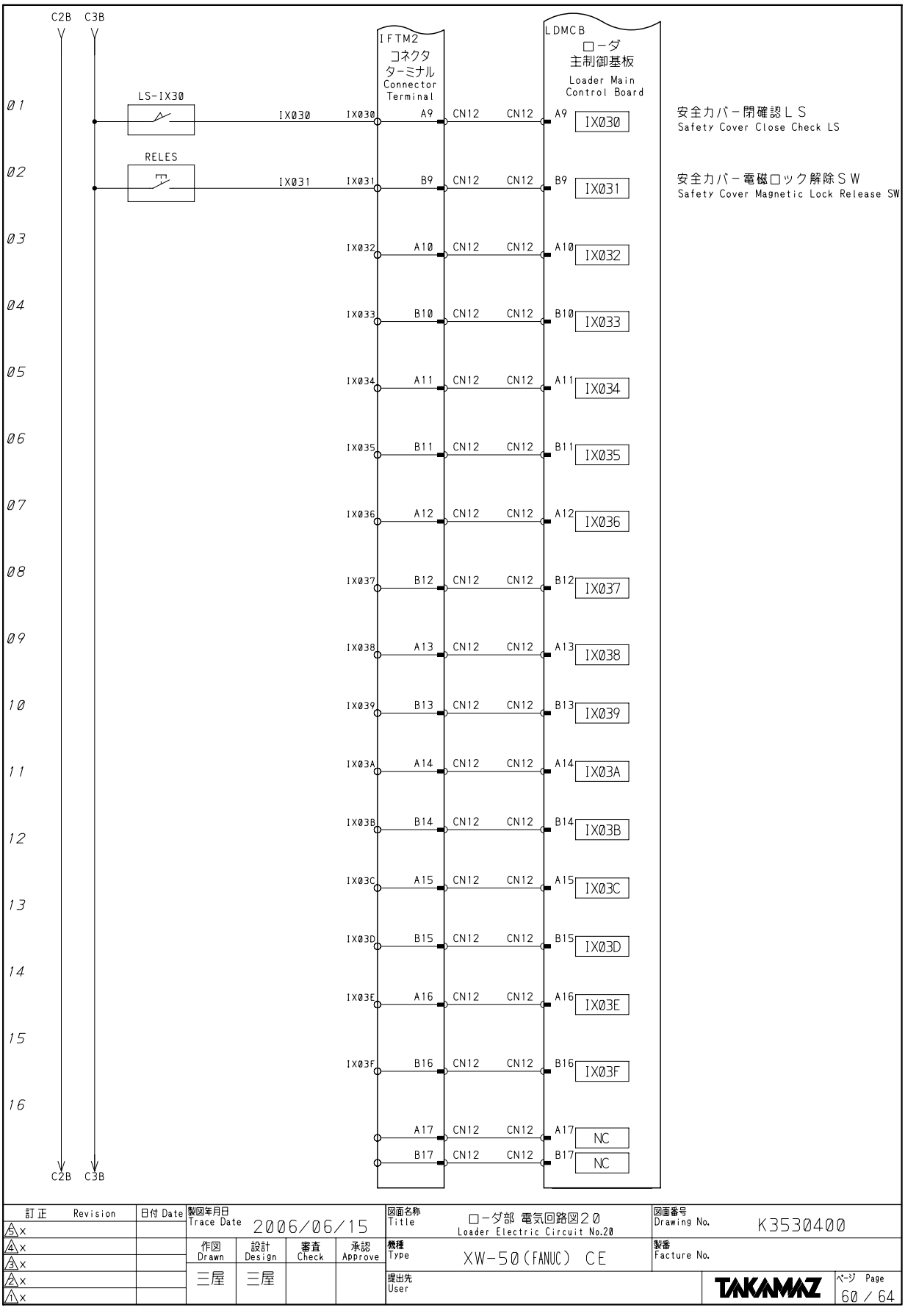
Euro

Loader electric circuit diagram 19



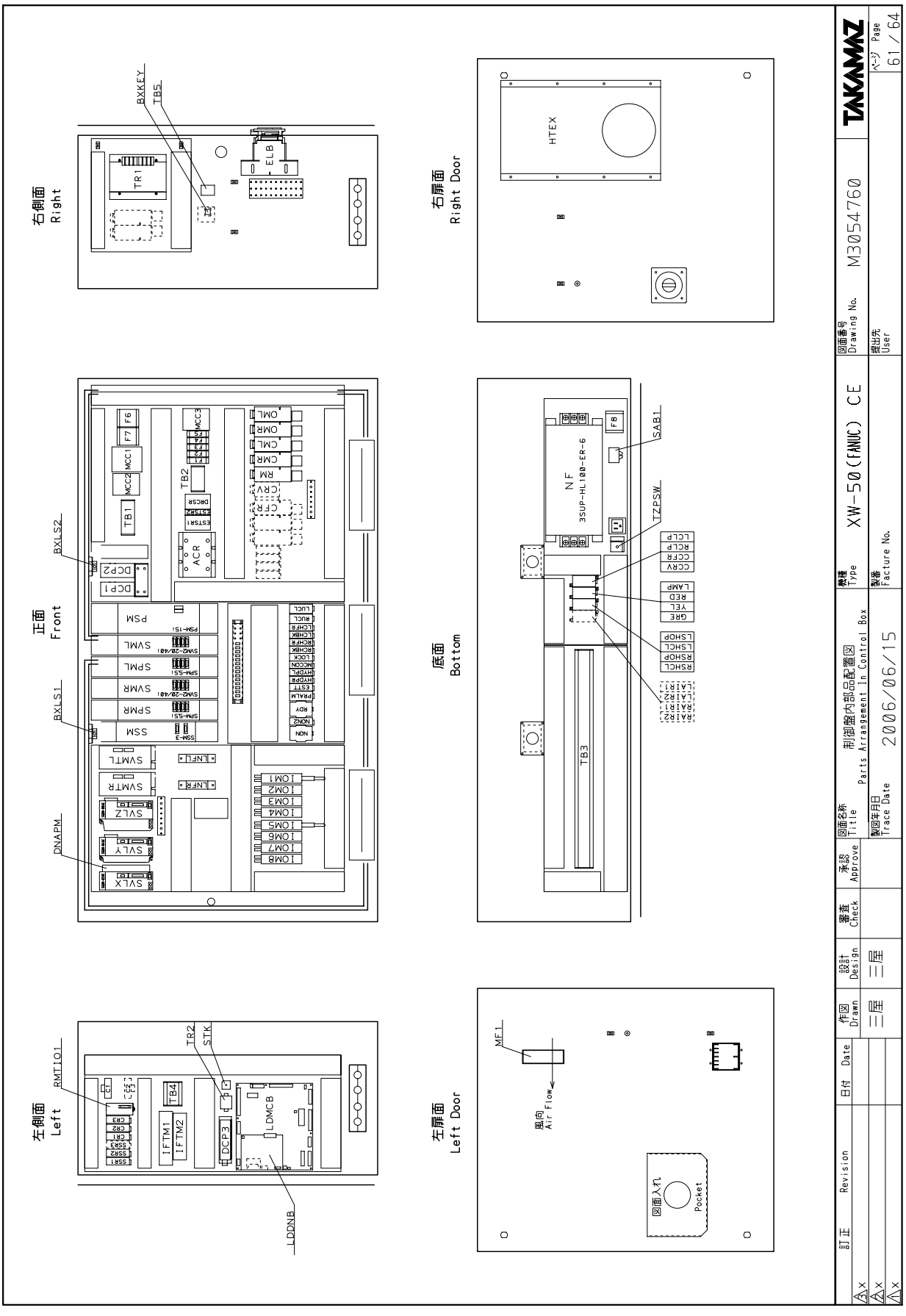
Euro

Loader electric circuit diagram 20



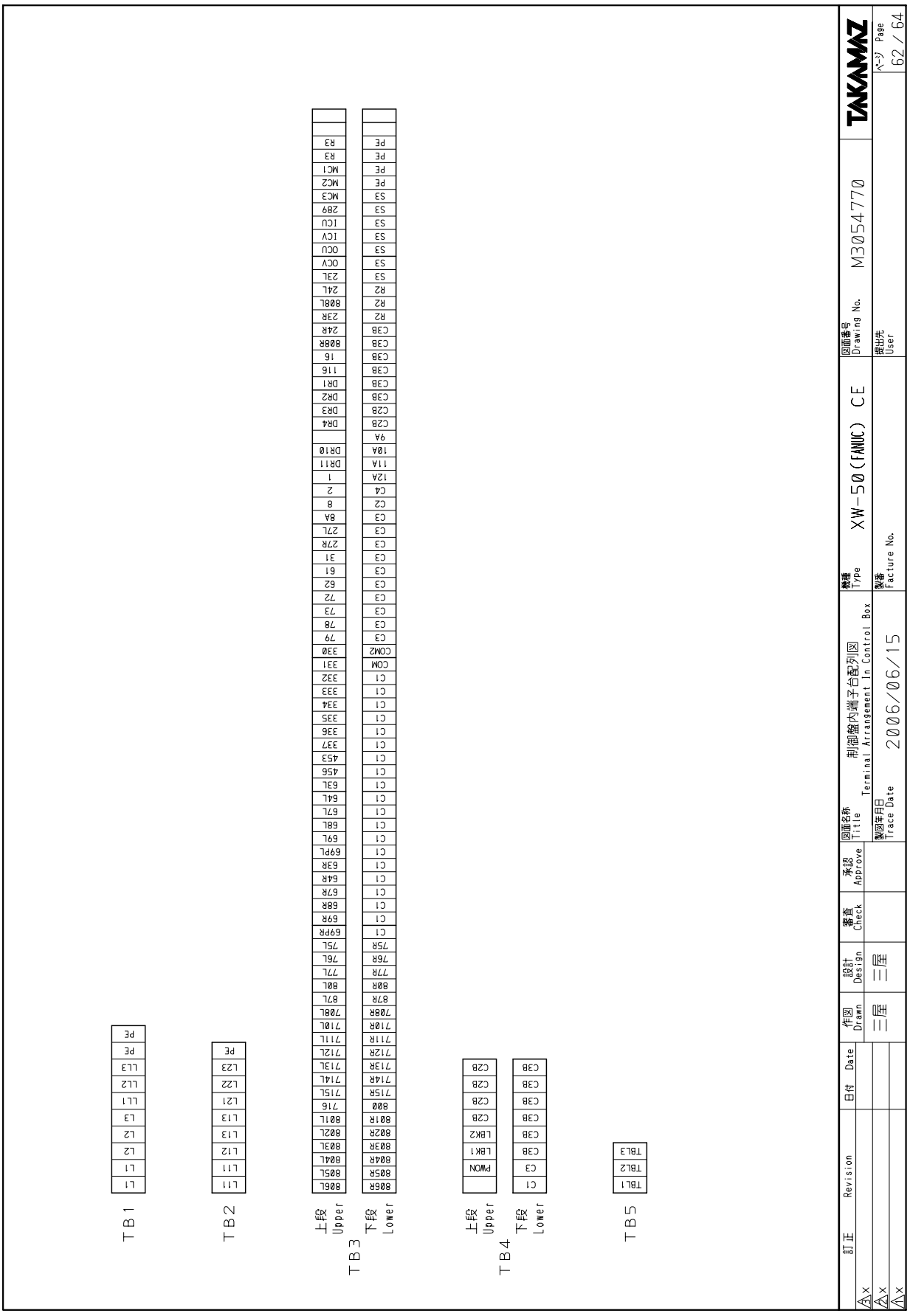
Euro

5-6 Parts Arrangement in the Control Panel



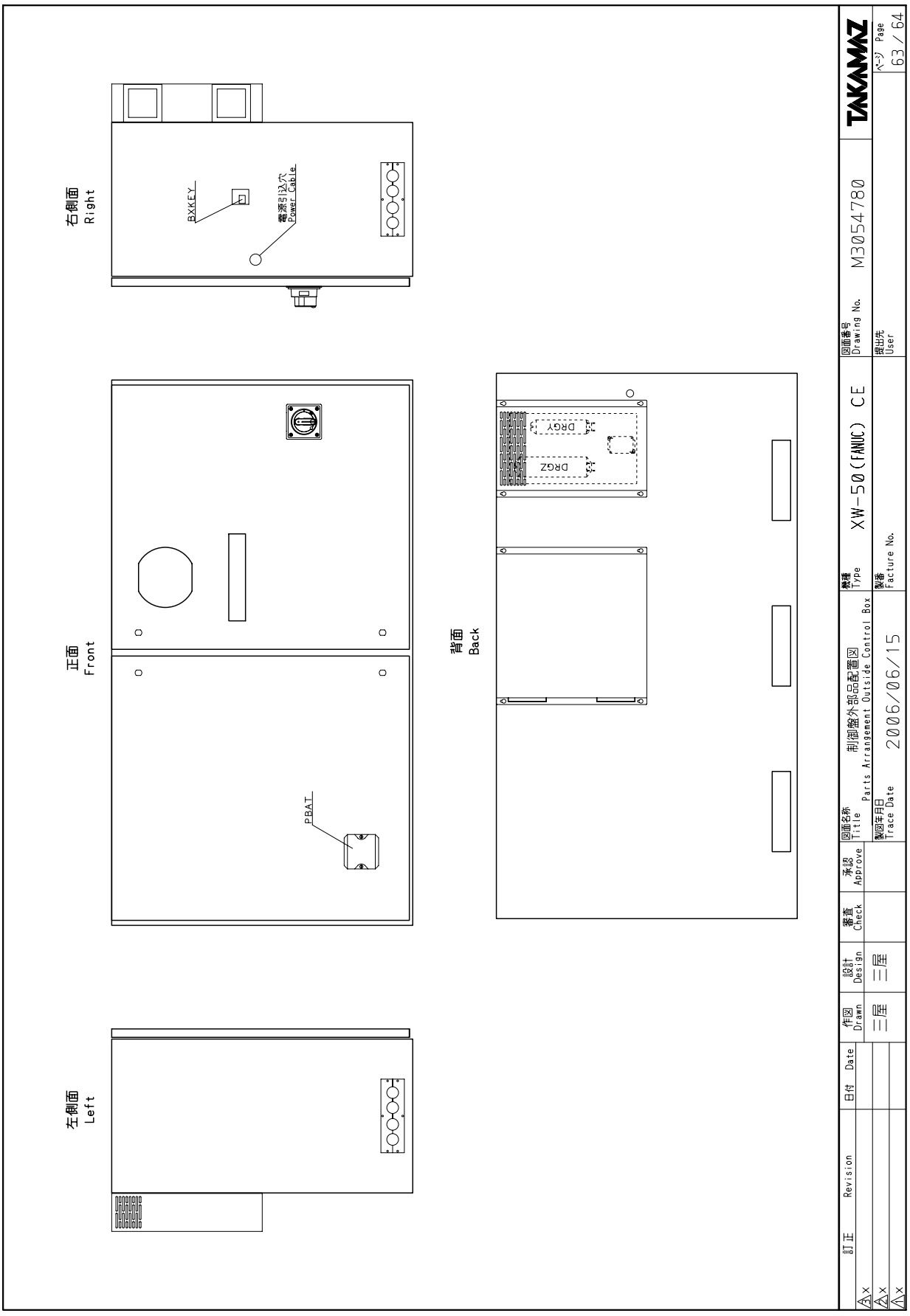
Euro

5-7 Terminal Arrangement in the Control Panel



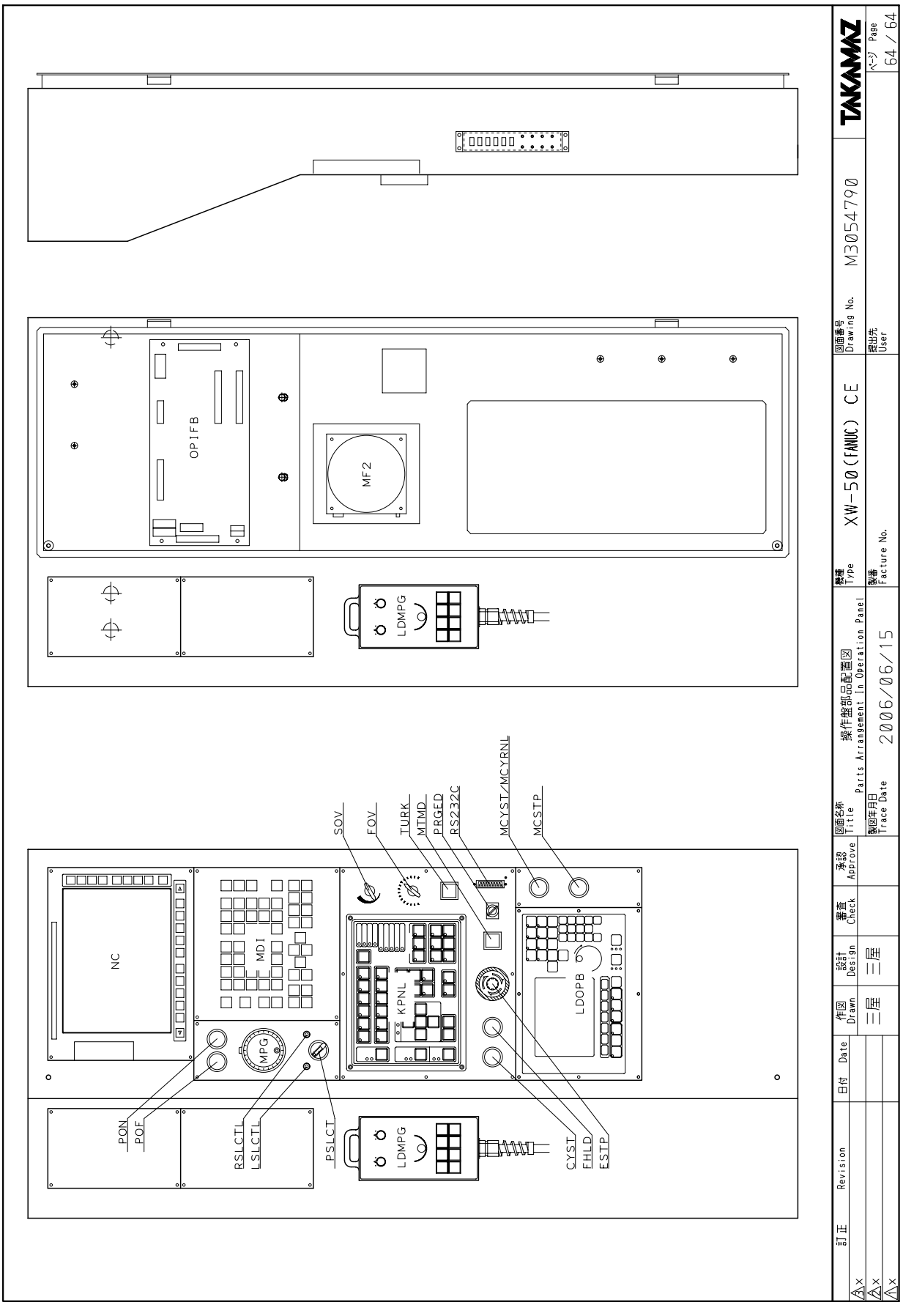
Euro

5-8 Parts Arrangement outside the Control Panel



Euro

5-9 Parts Arrangement on the Operation Panel



Euro

5-10 Electric Parts List

* Specifications are subject to change according to the improvement of the machine. For part replacement, consult Takamatsu about the type and quantity of the replacement part and place an order correctly.

Electric Parts List	Machine : XW-50 (FANUC)	appr.	check	drawn
	Spec. : CE			

No.	Part Name	Maker	Type	Q'ty	Remarks
1	Earth Leakage Breaker	FUJI	EG103C/100-30MA-CE TL	1	ELB
2	Breaker Handle	FUJI	BZ6V10C	1	(ELB)
3	Terminal Cover	FUJI	BZ6TB10C3	1	(ELB)
4	Circuit Protector	FUJI	CP31FM/0.5	1	F5(0.5A)
5	Circuit Protector	FUJI	CP31FM/1	1	F4(1A)
6	Circuit Protector	FUJI	CP31FM/10	1	F1(10A)
7	Circuit Protector	FUJI	CP31FM/15	2	F2,F3(15A)
8	Circuit Protector	FUJI	CP33FM/1	1	F7(1A)
9	Circuit Protector	FUJI	CP33FM/5	1	F8(5A)
10	Circuit Protector	FUJI	CP33FM/30	1	F6(30A)
11	Finger Protector	FUJI	CP-T4	28	Circuit Protector
12	Mini-Power Relay	FUJI	HH52P-FL DC24V	9	NON2, MCCON, LOCK, CR1, CR2 LCHFR, LCHBK, RCHFR, RCHBK
13	Mini-Power Relay	FUJI	HH52P-CRL AC200V	1	CR3
14	Mini-Power Relay	FUJI	HH54P-FL DC24V	1	PRALM
15	Bi-Power Relay	FUJI	HH62P-FL DC24V	2	LUCL, RUCL
16	Bi-Power Relay	FUJI	HH64P-L DC24V	2	NON, RDY
17	Solid State Relay	FUJI	SR202P5-ZD2	2	SSR1, SSR2
18	Super Timer	FUJI	ST7P-2 DC24V 5sec	1	ESTT
19	Super Timer	FUJI	ST7PF DC24V 0.3sec	2	HYDPL, HYDPR
20	Relay Socket	FUJI	TP58X1	12	HH52P, SR202
21	Relay Socket	FUJI	TP514X1	1	HH54P-FL
22	Relay Socket	FUJI	TP68X2	2	HH62P-FL
23	Relay Socket	FUJI	TP614X2	2	HH64P-L
24	Timer Socket	FUJI	TP88X1	3	ST7P-2, ST7PF
25	Terminal Relay	FUJI	RS4N-DE	3	LCLP/RCLP/CCFR/CCRV LAMP/RED/YEL/GRE LSHOP/LSHCL/RSHOP/RSHCL
26	Finger Protector	FUJI	RZ52X1	15	HH52P, SR202, ST7P
27	Finger Protector	FUJI	RZ54X1	1	HH54P-FL
28	Finger Protector	FUJI	RZ62X2	2	HH62P-FL
29	Finger Protector	FUJI	RZ64X2	2	HH64P-L
30	Finger Protector	FUJI	RZ4N	3	RS4N
31	Select Switch	FUJI	AH165-J2D11	1	BXKEY
32					
33	Magnetic Contactor	HITACHI	HK20(FP) AC100V	2	MCC2, MCC3
34	Magnetic Contactor	HITACHI	HK35(FP) AC100V	1	MCC1
35	Magnetic Switch	HITACHI	HK10-TK(FP) AC100V RC0.5A	1	RM(0.1kw)
36	Magnetic Switch	HITACHI	HK10-TK(FP) AC100V RC1.3A	2	CML, CMR(0.25kw)
37	Magnetic Switch	HITACHI	HK10-TK(FP) AC100V RC3.6A	2	OML, OMR(0.75kw)
38	Coil Surge Absorber	HITACHI	CSK-24AC	8	SK7, SK8, SK9, SK10, SK11, SK12, SK13, SK14
39	Diode	HITACHI	V07E	5	D1, D2, D3, D4, D5
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TAKAMAZ	REVISIONS	LIST NO.	1/4page

Euro

Electric Parts List	Machine : XW-50 (FANUC)	appr.	check	drawn
	Spec. : CE			

No.	Part Name	Maker	Type	Q'ty	Remarks
1	Terminal Block	FUJI	LT2F-020	12	TB2, TB5
2	Terminal Block	FUJI	LT2F-030	10	TB1
3	Terminal Block	FUJI	LT2F-020W	89	TB3, TB4
4	Terminal Side Plate	FUJI	LT9F-E2	4	(TB2, TB5)
5	Terminal Side Plate	FUJI	LT9F-E3	2	(TB1)
6	Terminal Side Plate	FUJI	LT9F-E2W	2	(TB3, TB4)
7	Fixture	FUJI	LT9E-T2	10	
8	Terminal Cover	FUJI	LT9E-C1		(LT2F-020)
9	Terminal Cover	FUJI	LT9E-C2		(LT2F-030)
10	Terminal Cover	FUJI	LT9F-C1		(LT2F-020W)
11	Mark Plate	FUJI	LT9E-M1		
12	Mark Plate	FUJI	LT9F-M1		
13	Connecter Terminal	FUJI	LP5W-34H4	1	IFTM2
14	Connecter Terminal	FUJI	LP5W-40H4	1	IFTM1
15					
16	DIN Rail	TOYO GIKEN	DAV4		
17	Terminal Box	TOYO GIKEN	BOXTC-4A	4	
18	Terminal Box	TOYO GIKEN	BOXTM-401	2	
19	Terminal Box	TOYO GIKEN	BOXTM-802	1	
20	Terminal Box	TOYO GIKEN	BOXTM-2002	1	
21					
22	Fan Motor	MINEBEA	4710PS-10T-B30-B00	1	MF2
23	Fan Motor	MINEBEA	4715MS-10T-B50-B00	1	MF1
24	Fan Guard	MINEBEA	PG-47	3	(MF1, MF2)
25					
26	Electrical Outlet	MATSUSHITA	WK3001	1	SVC1
27					
28	24VDC Power Supply	COSEL	PBA300F-24	2	DCP1, DCP2
29	5VDC Power Supply	COSEL	PBA50F-5-N	1	DCP3
30	Mounting Plate	COSEL	F-PBA50-1	1	(DCP3)
31					
32	Toggle Switch	NIKKAI	M-2012	1	TZPSW
33					
34	3RMS Spark Killer	OKAYA	3RMES-121334	2	SK2, SK3
35	Spark Killer	OKAYA	CR-10201	1	SK1
36	Surge Absorber	OKAYA	RCM-601BUZ-4	1	SAB1
37	Noise Filter	OKAYA	3SUP-HL100-ER-6B	1	NF
38					
39	Safety Switch	OMRON	D2D-1000	2	BXLS1, BXLS2
40	Safety Relay	OMRON	G9SA-321-T075 DC24V	1	ESTSR1
41	Safety Relay	OMRON	G9SA-EX301	1	ESTSR2
42	Safety Relay	OMRON	G9SA-301 DC24V	1	DRCSR
43					
44	Remote I/O Terminal	OMRON	DRT2-MD32ML-1	1	RMTI01
45					
46	Ferrite Core	TDK	ZCAT3035-1330	2	FC1, FC2
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TAKAMAZ	REVISIONS	LIST NO.	2/4page

Euro

Electric Parts List	Machine : XW-50 (FANUC)	appr.	check	drawn
	Spec. : CE			

No.	Part Name	Maker	Type	Q'ty	Remarks
1	Transformer	YOKOYAMA	200,220/100V 1KVA	1	TR1
2	Transformer	YOKOYAMA	TF09H-35	1	TR2
3					
4	Bridge Diode	SHINDENGEN	S10VB60	1	STK
5					
6	Resistor		120Ω 1/4W 1%	2	RG1, RG2
7					
8	Terminal Box	OHM	OA-QTM34	2	Turret LS
9					
10	Grommet	TAKIGEN	G-30SG-20A	8	
11					
12	Heat Exchanger	MARUYASU	TCHAI-25B1B	1	HTEX
13					
14	Select Switch	FUJI	AR22PR-210B	1	PSLCT
15	Push Button Switch	FUJI	AR22G4L-10E3G	1	MCYST/MCYRNL
16	Push Button Switch	FUJI	AR22F0R-10B	1	MCSTP
17	Push Button Switch	FUJI	AR22F0R-10W	1	PON
18	Push Button Switch	FUJI	AR22F0R-01B	1	POF
19					
20	Manual Pulse Generator	TOSOKU	RE45T 1S M5D1	1	MPG
21					
22	LED Lamp	SAKAZUME	D0H-8T G DC24V	2	LSLCTL, RSLCTL
23					
24	Push Button Switch	IDEC	HW1X-BW110B	1	RELES(Lock Release)
25	Lid Washer	IDEC	HW9Z-W	1	HW1X-BW
26					
27	Dust Cover	DDK	17-37SN-2	1	(Loader M.P.G BOX)
28					
29					
30	Operation Panel Assy	YOKOYAMA	PND-M01P	1	XW-50F(CE Spec.)
	[PND-M01P Parts]				
	1. Panel 1	YOKOYAMA	PND-M01P-P	1	
	2. Panel Sheet	YOKOYAMA	PNA-M05S-P	1	
	3. Panel Frame	YOKOYAMA	PW-001	1	
	4. Main Panel Board	YOKOYAMA	PN-001	1	
	5. Button Switch	FUJI	AR22F0R-10G	1	CYST
	6. Button Switch	FUJI	AR22E0R-01B	1	FHLD
	7. Button Switch	FUJI	AR22V0R-02R	1	ESTP
	8. Button Switch	FUJI	AH165-2SFB11	2	TURK, MTMD
	9. Select Switch	FUJI	AH165-JK3A22A	1	PRGED
	10. Rotary Switch	TOSOKU	DP-P01-0-15G 15° L=16	2	FOV, SOV
	11. Switch Knob	FUJITSU	R.antr 60a	2	(FOV, SOV)
	12. Dust Cap	J.A.E.	DB-59-J2	1	(RS232C)
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TAKAMAZ	REVISIONS	LIST NO.	3/4page

Euro

Electric Parts List	Machine : XW-50(FANUC)	appr.	check	drawn
	Spec. : CE			

No.	Part Name	Maker	Type	Q'ty	Remarks
1	NC Control Unit	FANUC	A02B-0308-B500	1	NC(32i-TA)
2	10.4"Color LCD Unit	FANUC	A02B-0303-H120	1	(NC)
3	MDI Unit	FANUC	A02B-0303-C125#T	1	MDI
4	Battery	FANUC	A02B-0200-K102	-	BATNC
5	Dispersion I/O Module	FANUC	A03B-0815-C001	2	IOM1, IOM5
6	Dispersion I/O Module	FANUC	A03B-0815-C003	6	IOM2, 3, 4, 6, 7, 8
7	Cable for I/O Module	FANUC	A03B-0815-K100	6	IOCAB1, 2, 3, 4, 5, 6
8	Operation Panel I/F Unit	FANUC	A16B-2201-0110	1	OPIFB
9	Optical Fiber Cable(7m)	FANUC	A66L-6001-0026#L7R003	1	FCAB1
10	Optical Fiber Cable(0.3m	FANUC	A02B-0236-K852	1	FCAB2
11	Cable for MDI(45cm)	FANUC	A02B-0236-K813	1	MDICAB
12	DC Link Short Bar	FANUC	A06B-6078-K803	4	SHB1-4(64mm)
13	Power Supply Module	FANUC	A06B-6110-H015	1	PSM(PSM-15i)
14	Spindle Amp. Module	FANUC	A06B-6111-H006#H570	2	SPML, R(SPM-5.5i)
15	Servo Amp. Module	FANUC	A06B-6117-H206	2	SVML, R(SVM2-20/40i)
16	AC Reactor	FANUC	A81L-0001-0156	1	ACR(PSM-15i)
17	Battery Case	FANUC	A06B-6050-K060	1	(PBAT)
18	Battery	FANUC	A06B-6050-K061	1	PBAT
19	Spindle Speed Monitor	FANUC	A06B-6088-H001	1	SSM(SSM-3)
20					
21	Servo Amplifier	MITSUBISHI	MR-J2S-40A-QW219	2	SVMTL, SVMTR
22	Battery	MITSUBISHI	MR-BAT	2	BATTL, BATTR
23	Line Noise Filter	MITSUBISHI	FR-BSF01	2	LNFL, LNFR
24					
25	Servo Pack	YASUKAWA	SGDH-02AE	1	SVLX
26	Servo Pack	YASUKAWA	SGDH-04AE	1	SVLY
27	Servo Pack	YASUKAWA	SGDH-08AE	1	SVLZ
28	DeviceNet Module	YASUKAWA	JUSP-NS300	1	DNAPM
29	Battery	YASUKAWA	JZSP-BA01	3	BATX, BATY, BATZ
30	Discharge Resistor	YASUKAWA	RH120 70W 40Ω	1	DRGY
31	Discharge Resistor	YASUKAWA	RH220 120W 40Ω	1	DRGZ
32					
33	Condenser	ORIENTAL	CH100CFAUL(10μF)	1	C1
34					
35					
36	Loader Control Board	YOKOYAMA	TACS-13-1	1	LDMCB
37	Loader Panel Board	YOKOYAMA	TACS-13-5	1	LDOPB
38	DeviceNet Board	YOKOYAMA	TACS-13-2	1	LDDNB
39	Loader Board Battery	YOKOYAMA	BAT-13-1	1	BATLD
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Euro

Installation

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Chapter 1 Safety Precautions for Installation

DANGER	• Power connection, crane and forklift operation and slinging work should be done only by qualified personnel. • Never put your body partially or wholly under the lifted machine. • When placing electric cables over the floor, use rigid covers to protect them from being damaged by chips and workers.
WARNING	• Transportation and installation of the machine should be done by qualified personnel according to “Installation”. • Power cables from the primary terminal in the factory to the main power switch should have a rated cross sectional area in order to supply stable power required for operation. • Check the following points to ensure safety at the installation site. - When foundation bolts are buried, mark these points clearly to protect workers from stumbling over and to protect the machine and carriages from bumping. - When a pit is provided for waste oil, chips and piping, mount a tentative cover to protect workers from falling down. - The floor should be clean and dry, and free from obstacles, oil and waste oil in order to protect workers from slipping or falling. • Use a stable step or platform when it is needed to reach a high level. • Never put your fingers between the bed and the floor when locating the machine at a designated place. • When lifting a machine, use wire ropes, shackles and hoisting jigs that are rigid enough to withstand the machine weight. • When working in a team, choose a leader to give instructions. - Give signals with one another to check other workers’ safety before going to the next step. - Follow the procedures step by step. • Never give excessive shock to the machine during lifting and transporting.

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CAUTION	• When rust preventive oil is applied to the slideways, remove it thoroughly with cleaning oil before starting operation. • Remove eye bolts used for transportation as well as other fixing jigs and wood used as shipping brackets. • Levelling of the machine should be done accurately. (Adjust levelling referring to the attached inspection sheet.) • When installation is finished, check the following points before turning the power on. - All the bolts and connectors are securely tightened. - Hydraulic hose, air hose and other piping are securely connected and fixed. - New grease and oil are properly supplied to each section as instructed. - Water and dust on the machine are all wiped off. - There is no oil leakage around the machine.

Euro

Chapter 2 Preparation for Installation

2-1 Environment

To ensure machine accuracy and efficiency, check the following items before installation.

- Avoid direct sunlight or heat source which will generate a partial temperature rise.
  - * Ambient temperature: 0 - 40°C (20°C±2 is most recommended.)
  - * Change in temperature: Max. 1°C/min.
- Keep apart from other machines which may splash water, oil or chips.
- Keep apart from press machines and forging machines to prevent transmission of vibration.
  - * Installation site should be below 0.5G. Take anti-vibration measures if necessary.
- Humidity should be below 75% without dew condensation.
- Avoid a location of a bad atmosphere with dust, mist, salt, corrosive gas, etc.
- The foundation of the machine should have sufficient strength without inclination or unevenness.

2-2 Foundation

Euro

The machine should be installed on concrete of more than 300 mm in thickness. The machine is so designed that foundation work is not particularly necessary if the ground is solid enough. However, it is necessary in the following cases.

- Ground is not solid enough and depression or inclination may occur after the machine is installed.
- High accuracy and efficiency are required in operation.

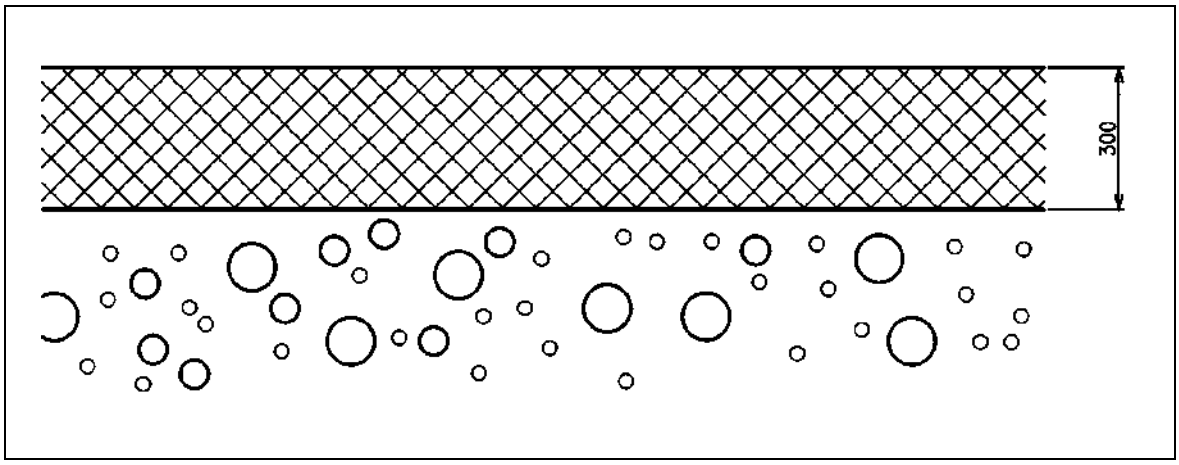


Fig. 1

2-3 Air Source

WARNING Use clean, dry compressed air. Otherwise, the air unit may be damaged.

* When the air source is shared with other facilities, care should be exercised so that the pressure does not become low.

Pressure: 0.5 MPa

2-4 Electrical Wiring

Prepare the primary power and cables as described below on your side.

- Supply voltage

  Within 200/220 V ± 10%, 3-phase, within 50/60 Hz ± 2 Hz

CAUTION If normal voltage is not supplied, the machine may not actuate correctly.

Be sure to measure voltage with a tester. When voltage fluctuation exceeds ±10%, provide a voltage stabilizer.

- Cables (to the main power switch from the primary power source in the factory)

  Cable thickness: More than 22 mm^2 (in the case of single-wire cables)

  Total power capacity: 33 kVA

- Grounding

  Comply with the electrical rules and regulations on grounding prescribed in your country.

  Grounding resistance: Below 100 Ω

  Grounding cable: More than 22 mm^2 (in the case of single-wire cables)

* For the optional specifications, the electric cables (power cable and grounding cable) to use may be different in thickness. Contact Takamatsu before connecting the electric cables.

Euro

2-5 Installation Space

Installation space should comply with the following:

- There is enough room to open/close the doors.
- There is enough room to supply oil and discharge chips.
- Workpieces can be mounted/removed without hindrance.

* Required installation space may change slightly according to optional accessories and/or a destination of the machine.

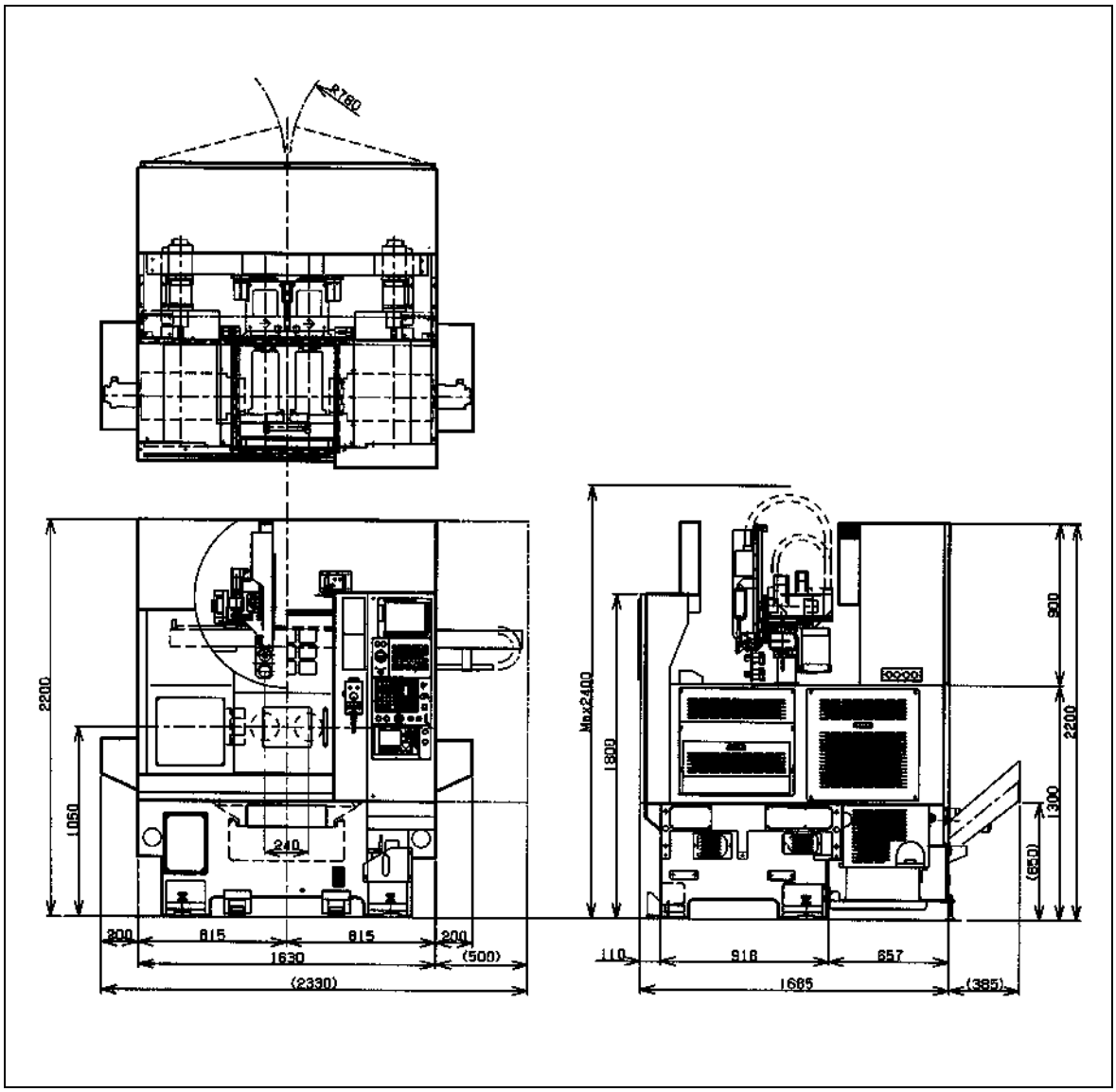


Fig. 2

Euro

Chapter 3 Transportation

The standard machine weighs about 4,200 kg. Use transportation equipment which is rigid enough to withstand the machine weight.

DANGER

- Crane and forklift operation and slinging work should be done only by qualified personnel.
- Never put your body partially or wholly under the lifted machine.

WARNING

- When lifting a machine, use wire ropes, shackles and hoisting jigs that are not damaged and rigid enough to withstand the machine weight.

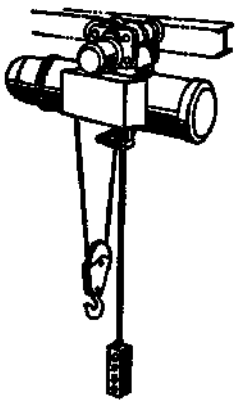
  (Wire rope: More than ϕ18 mm)

  * The thickness of the above wire rope is for the standard specifications. For optional specifications, the total machine weight differs for respective specifications so that the thickness of the wire rope to use may differ as well. Contact Takamatsu before starting the work.

Euro

CAUTION

- When working in a team, choose a leader to give instructions.
  - Give signals with one another to check other workers' safety before going to the next step.
  - Follow the procedures step by step by giving signals.
- Use waste cloth, etc. to protect the machine from being damaged by wire ropes.
- Never give excessive vibration or shock to the machine during lifting and transporting.



[Required jigs]

Dedicated hoisting jigs

Crane

Wire rope (more than ϕ18 mm)

* The thickness of the above wire rope is for the standard specifications. For optional specifications, the total machine weight differs for respective specifications so that the thickness of the wire rope to use may differ as well. Contact Takamatsu before starting the work.

1. Clean the installation site.
2. Check that the Z-axis slide is at its zero position.
   * The center of gravity of the machine comes around the spindle nose.
3. Set the dedicated hoisting jigs.
4. Hang wire ropes on the dedicated hoisting jigs.
5. Lift the machine slightly once to check the balance.
6. Transport the machine to the installation site.

* These hoisting jigs are optionally provided.

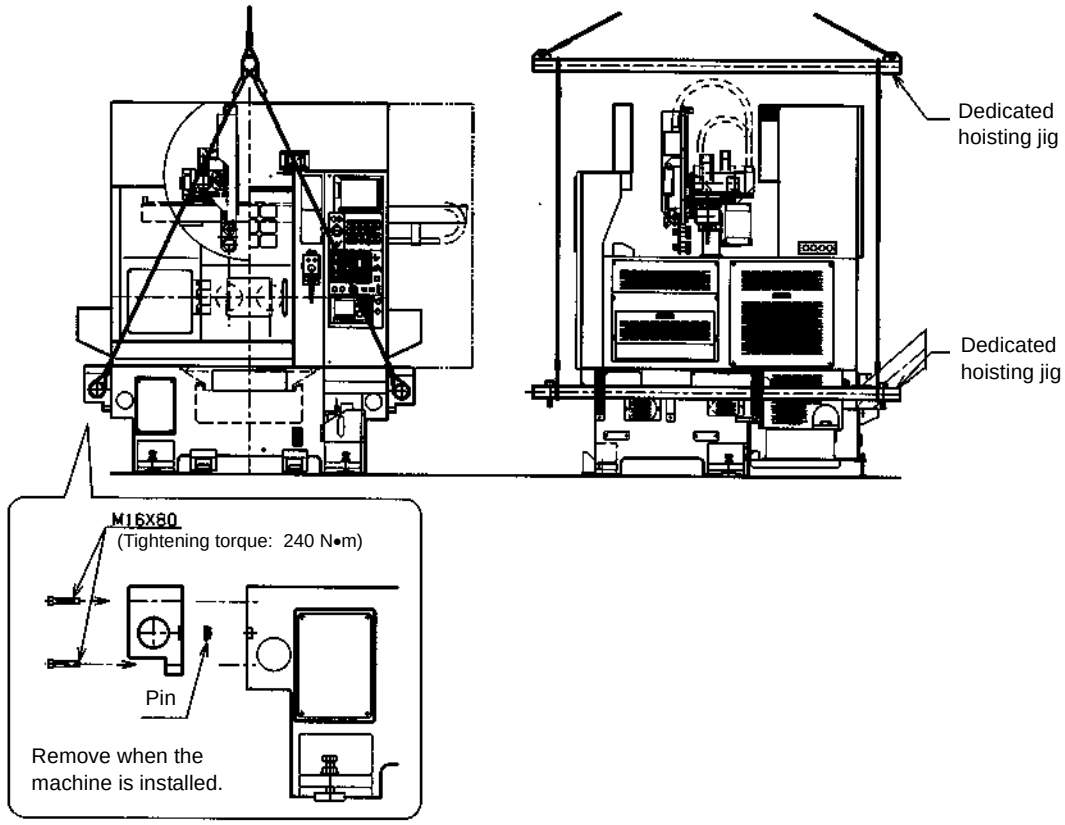


Fig. 3

Euro

Chapter 4 Cleaning of Machine

Remove rust preventive oil applied on the slideways and metal surfaces thoroughly with nonflammable cleaning agent after unpacking.

CAUTION

- Do not operate the machine before cleaning is finished.
- Never use compressed air, like air gun, for cleaning the machine.

Euro

Chapter 5 Power Connection

- Electric connection should be done only by qualified electric engineers.
- Turn off the primary power in the factory first. Never connect to the primary power until after connection work and grounding work are completed.
- When carrying out connection work, put the “KEEP POWER OFF” panel so that power is not turned on by mistake.
- Check that cable sheating is not damaged, as defective sheating may cause a short circuit or an electric shock.

[Required tools]

Phillips screwdriver

1. Open the electric cabinet door.
2. Put a power cable through the cable connection port.
3. Connect the power cable to the main power switch.
   * Connection of the L1, L2, L3 terminals as well as earth (PE) should be correctly done.
4. Close the electric cabinet door.

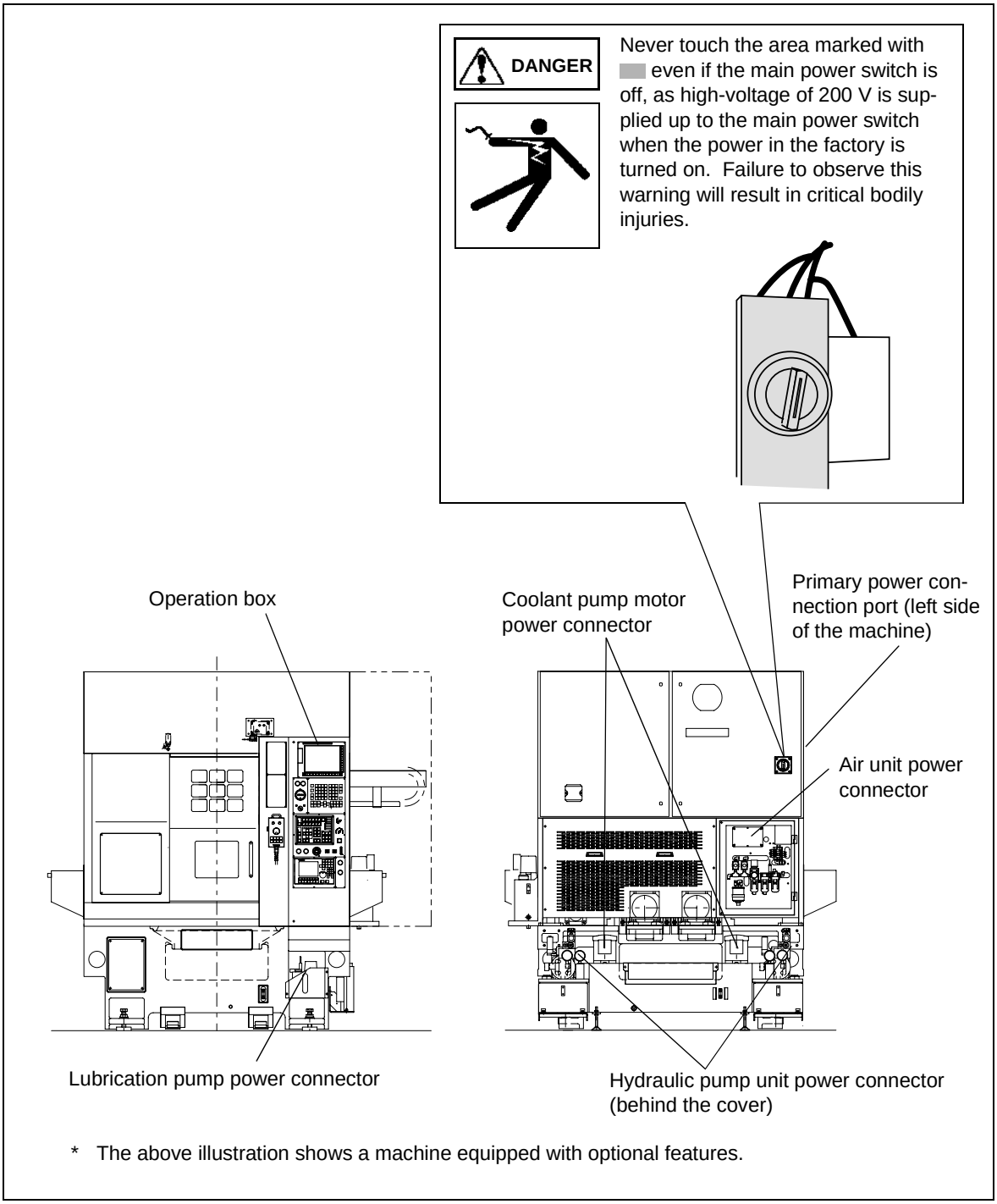
Euro

Phase check

After installation work is finished, check that the phase is correct.

1. Check that the switches on the NC control unit and the control box are all turned to “OFF” or “STOP”.
2. Mount a phase detector on the L1, L2 and L3 terminals on the power breaker input side, and detect the phase.
   - If the phase is wrong, turn off the power once and interchange “L1” and “L3” of the incoming phase cable.

     Turn on the power again and check that the hydraulic pump rotates in the normal direction and the pressure gauge pointer moves accordingly.



* The above illustration shows a machine equipped with optional features.

Fig. 4

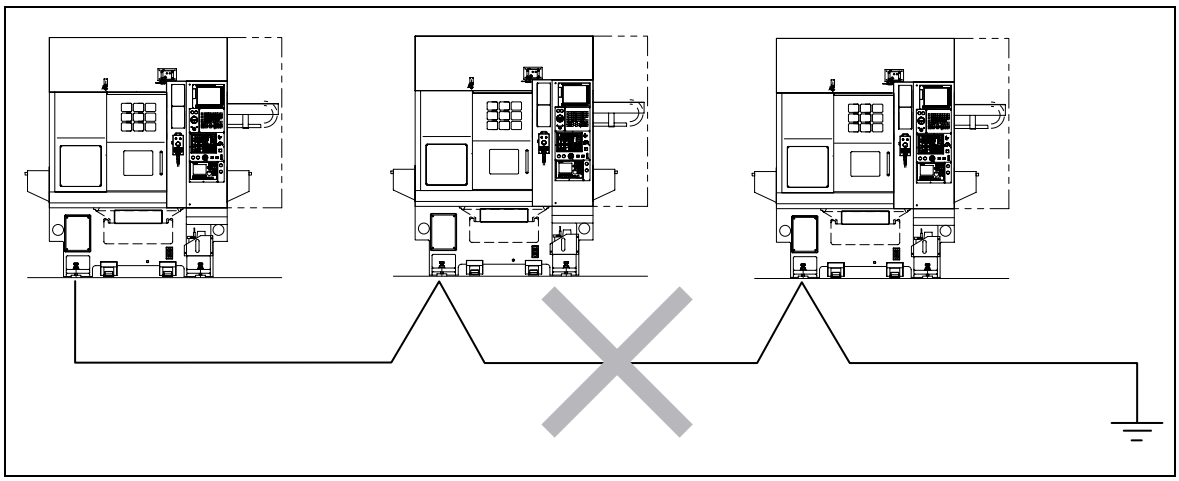
Euro

Chapter 6 Grounding Work

Comply with the electrical rules and regulations on grounding prescribed in your country.

DANGER Each grounding terminal should be connected to power cable individually. Wiring as shown below will result in a critical accident.

WARNING Grounding work should be done only by officially qualified electric engineers.



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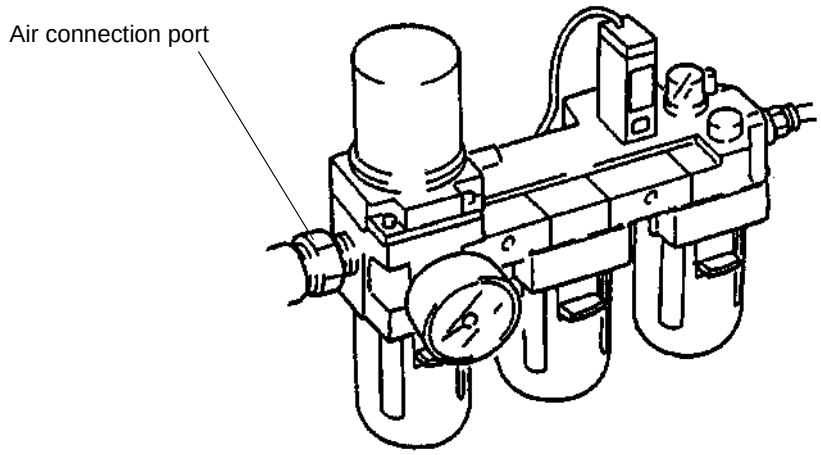
Chapter 7 Air Connection

WARNING

Use clean, dry compressed air. Otherwise, the air unit may be damaged.

* When the air source is shared with other facilities, care should be exercised so that the pressure does not become low.



* The type and location of the air unit may differ depending on the specifications.

Fig. 5

Euro

Chapter 8 Oiling

CAUTION When the machine has been installed, be sure to supply oil before turning the power on. Failure to doing so may cause damage to the machine.

“Chapter 4 Oiling” in “Maintenance”.

Euro

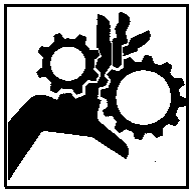
Chapter 9 Levelling

Levelling of the machine should be accurate, because it affects not only cutting accuracy but also machine life.

* If the machine has been left unpacked or in improper status for a long period of time, levelling cannot be stabilized at once. Level the machine once and adjust it again in three or four weeks.

DANGER Turn the main power switch off when it is needed to work inside the cover.

WARNING Covers of the machine should be opened only by qualified maintenance personnel.

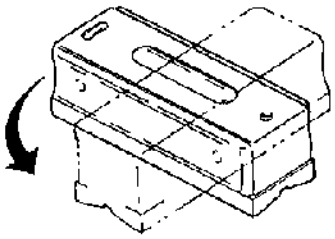


[Required tools]
Levels (0.02 mm/m)
Spanner [36]

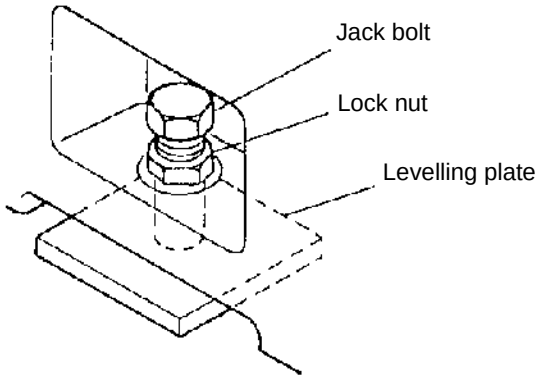
* Execute levelling individually on the right and the left.

1. Return both the X and Z axes to the respective zero points.
2. Place the level gauge on the top surface of the Z-axis slide.
   * Always keep the Z-axis slide surface clean so that no dust may enter between the level gauge and the surface.
3. Adjust the machine level with four jack bolts under each bed so that the reading of the level gauge is to be within 0.02 mm in both the X- and Z-axis directions.
4. Tighten the lock nuts securely.
5. Check the machine level again with the level gauge.
   * If the reading of the gauge is not within 0.02 mm, adjust the machine level again.

Euro



Level gauge



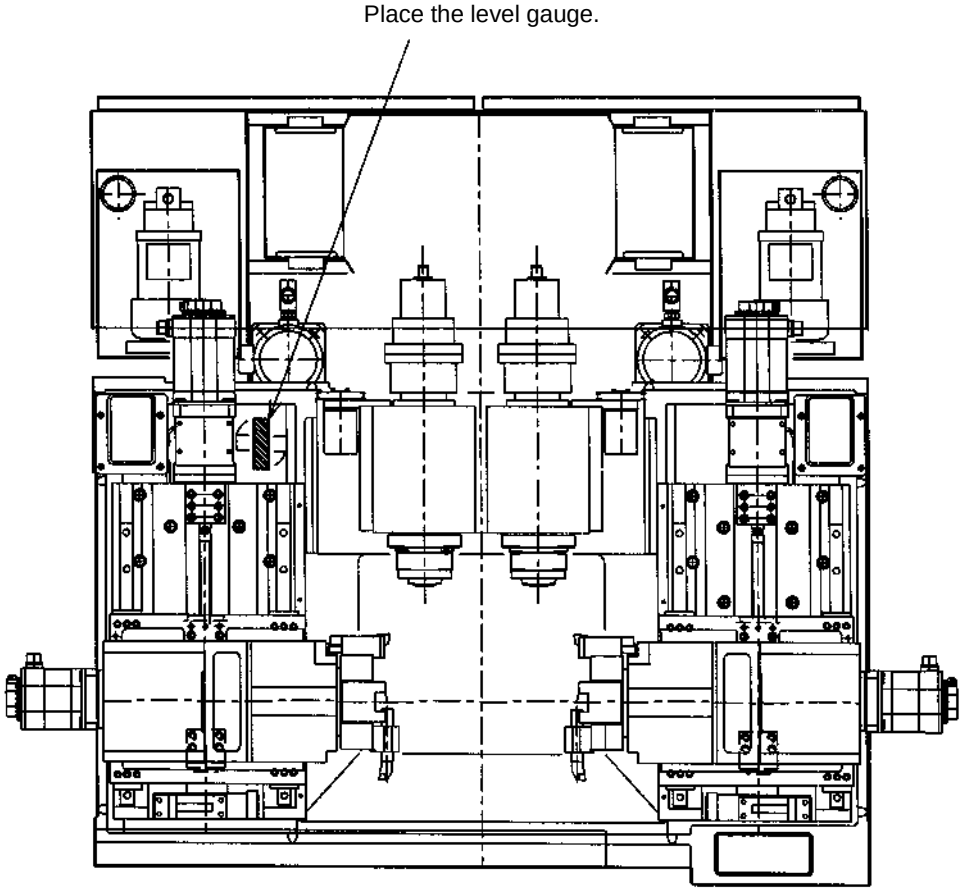


Fig. 6

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