



Technical Construction File

File No: TCF250619001MD

According to

2006/42/EC Machinery Directive

related to the

Roll Forming Machine

Model: JCX-1, JCX-2, JCX-3, JCX-4, JCX-5, JCX-CZ, JCX-C, JCX-Z, JCX-1000, JCX-1220, JCX-1250, JCX-S, JCX-R, JCX-L, JCX-G, JCX-D, JCX-B, JCX-E, JCX-H, JCX-L, JCX-O, JCX-A, JCX-P, JCX-C89, JCX-C140, JCX-M, JCX-T

presented by

Botou Golden Integrity Roll Forming Machine Co.,Ltd
Development zone of Botou City, Hebei Province, China

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1. General description

This machine is a kind of Roll Forming Machine.

Basically, this kind of machine belongs to general machine and with low risk when using it. All possible risks have been analysis in the risk assessment report and been prevent by suitable ways.

The main risk of this kind of machine could be:

- The risk of access to the moving parts.
- The risk of access to the power transmission elements.

In order to prevent the main risks mentioned above, the protection guarding system are provided, and all the detail safety provision are constructed in accordance with the requirement of EN ISO 12100:2010, EN 60204-1:2018+A1:2025.

In order to ensure the conformity for CE marking for these machines, some main European and/or International standards have been used to made assessment of conformity, they are :

- EN ISO 12100:2010 for checking of mechanical structures and carrying out risk assessment;
- EN 60204-1:2018+A1:2025 for checking of Electrical equipment of machines

The test reports for these applicable standards in detail have been included in the relevant sub-clauses of this technical construction file.

2. Variations of the series products

Regarding the whole family of the series, they can be divided into various different groups according to their main features. They are: JCX-1, JCX-2, JCX-3, JCX-4, JCX-5, JCX-CZ, JCX-C, JCX-Z, JCX-1000, JCX-1220, JCX-1250, JCX-S, JCX-R, JCX-L, JCX-G, JCX-D, JCX-B, JCX-E, JCX-H, JCX-L, JCX-O, JCX-A, JCX-P, JCX-C89, JCX-C140, JCX-M, JCX-T

All models are with the same machine structure but with some small differences as described as the following:

1. The weight is different.
2. The power and dimension are different.

To present the conformity of this series machine with Machinery Directive, we discuss the conformity systematically with the relative Directive and standards for GMC0916 as a basic evaluation in clause.

3. List of applicable regulations and standards

Regulations

- Machinery Directive: 2006/42/EC

Standards

- EN ISO 12100: 2010

Safety of machinery — General principles for design — Risk assessment and risk reduction.

- EN 60204-1:2018+A1:2025

Safety of machinery —Electrical equipment of machines —Part 1: General requirements

4. Quality control system

In order to ensure the conformity of the series production, the Botou Golden Integrity Roll Forming Machine Co.,Ltd . has taken the related procedures mentioned below :

(1) Apply for the consultant form the qualified body in Italy.

The MANUFACTURER has applied for the consultant from Technical Inspection Certification. The complete technical construction file (TCF) have been established before applying for the CE marking certificate.

(2) Carry out the inspection for parts and components according to the TCF

Before the assemblies of the series production, the QC engineers of MANUFACTURER has to check and inspect the technical specifications and intended functions of parts and components to ensure the correct use of them according to the contents of TCF and principle described in the related technical information.

(3) Carry out the inspection & testing for the products before packing

Before packing the products, the QC engineers of MANUFACTURER have to do the necessary inspection and testing to ensure the conformity of related requirements. In particular, they should do the testing and inspection of electrical characteristics and outer feature.

(4) Carry out the inspection for the package.

After finishing the necessary inspection and testing for the products, an inspection for the packing has to be done to ensure the necessary elements being included in this packing before shipment.

(5) Provision for the change of design

Any change of the products described in this TCF must be checked in detail and written down again in the TCF by the designer of MANUFACTURER if the change may effects the related electrical or mechanical characteristics.

(6) Provision for the Quality Assurance

For the provisions of internal control measures to ensure the conformity of series production of the machines, MANUFACTURER has built an internal quality control system in accordance with the international standard of ISO-9001.

5. Declaration of conformity

EC Declaration of conformity
DOC-20250619001

Council Directive 2006/42/EC on Machinery Directive

Botou Golden Integrity Roll Forming Machine Co.,Ltd
Development zone of Botou City, Hebei Province, China

Certify that the product described is in conformity with the MD Directive

Roll Forming Machine

Models No.: JCX-1, JCX-2, JCX-3, JCX-4, JCX-5, JCX-CZ, JCX-C, JCX-Z, JCX-1000,
JCX-1220, JCX-1250, JCX-S, JCX-R, JCX-L, JCX-G, JCX-D, JCX-B, JCX-E, JCX-H, JCX-L,
JCX-O, JCX-A, JCX-P, JCX-C89, JCX-C140, JCX-M, JCX-T

The product has been assessed by the application of the following standards:

EN ISO 12100:2010, EN 60204-1:2018+A1:2025

Company stamp and Signature of authorized personnel

6. Essential health and safety requirements checklist

Clause	Requirement-Test	Verdict and Result-Remark
1	Essential health and safety requirements	-
1.1	General remarks	-
1.1.1	Definitions	-
1.1.2	Principles of safety integration	-
a)	Machinery must be designed and constructed so that it is fitted for its function, and can be operated, adjusted and maintained without putting persons at risk when these operations are carried out under the conditions foreseen but also taking into account any reasonably foreseeable misuse thereof.	Pass. These requirements have been complied with.
	The aim of measures taken must be to eliminate any risk throughout the foreseeable lifetime of the machinery including the phases of transport, assembly, dismantling, disabling and scrapping.	Pass. These requirements have been complied with.
b)	In selecting the most appropriate methods, the manufacturer or his authorized representative must apply the following principles, in the order given:	-
	- eliminate or reduce risks as far as possible (inherently safe machinery design and construction),	Pass. Effective means have been carried out for this purpose.
	- take the necessary protective measures in relation to risks that cannot be eliminated	Pass. It meets the requirements after checking.
	- inform users of the residual risks due to any shortcomings of the protective measures adopted, indicate whether any particular training is required and specify any need to provide personal protective equipment.	Pass. It meets the requirements after checking.
c)	When designing and constructing machinery and when drafting the instructions, the manufacturer or his authorized representative must envisage not only the intended use of the machinery but also any reasonably foreseeable misuse thereof	Pass. It meets the requirements after checking.
	The machinery must be designed and constructed in such a way as to prevent abnormal use if such use would engender a risk. Where appropriate, the instructions must draw the user's attention to ways – which experience has shown might occur – in which the machinery should not be used.	Pass. These requirements have been complied with, and the related information also has been provided within the instruction manual.
d)	Machinery must be designed and constructed to take account of the constraints to which the operator is subject as a result of the necessary or foreseeable use of personal protective equipment.	Pass. These requirements have been taken into account during the design of this machine.
e)	Machinery must be supplied with all the special equipment and accessories essential to enable it to be adjusted, maintained and used safely.	Pass. These requirements have been complied with.
1.1.3	Materials and products	-
	The materials used to construct machinery or	Pass.

Clause	Requirement-Test	Verdict and Result-Remark
	products used or created during its use must not endanger persons' safety or health. In particular, where fluids are used, machinery must be designed and constructed to prevent risks due to filling, use, recovery or draining	They cannot endanger exposed person's safety or health.
1.1.4	Lighting	-
	Machinery must be supplied with integral lighting suitable for the operations concerned where the absence thereof is likely to cause a risk despite ambient lighting of normal intensity	Not applicable.
	Machinery must be designed and constructed so that there is no area of shadow likely to cause nuisance, that there is no irritating dazzle and that there are no dangerous stroboscopic effects on moving parts due to the lighting	Pass. It meets the requirements after checking.
	Internal parts requiring frequent inspection and adjustment, and maintenance areas must be provided with appropriate lighting.	Not applicable.
1.1.5	Design of machinery to facilitate its handling	-
	Machinery or each component part thereof must:	-
	- be capable of being handled and transported safely	Pass. It meets the requirements after checking.
	- be packaged or designed so that it can be stored safely and without damage	Pass. It meets the requirements after checking.
	During the transportation of the machinery and/or its component parts, there must be no possibility of sudden movements or of hazards due to instability as long as the machinery and/or its component parts are handled in accordance with the instructions	-
	- either be fitted with attachments for lifting gear, or	Not applicable.
	be designed so that it can be fitted with such attachments, or	Not applicable.
	be shaped in such a way that standard lifting gear can easily be attached	Not applicable.
	Where machinery or one of its component parts is to be moved by hand, it must:	-
	- either be easily movable, or	Pass.
	- be equipped for picking up and moving safely.	Pass.
	Special arrangements must be made for the handling of tools and/or machinery parts which, even if lightweight, could be hazardous.	Pass.
1.1.6	Ergonomics	-
	Under the intended conditions of use, the discomfort, fatigue and physical and psychological stress faced by the operator must be reduced to the minimum possible, taking into account ergonomic principles such as:	-

Clause	Requirement-Test	Verdict and Result-Remark
	allowing for the variability of the operator's physical dimensions, strength and stamina	Pass
	providing enough space for movements of the parts of the operator's body,	Pass
	avoiding a machine-determined work rate,	Pass
	avoiding monitoring that requires lengthy concentration,	Pass
	adapting the man/machinery interface to the foreseeable characteristics of the operators.	Pass
1.1.7	Operating positions	
	The operating position must be designed and constructed in such a way as to avoid any risk due to exhaust gases and/or lack of oxygen.	Pass The designed and constructed is complied with
	If the machinery is intended to be used in a hazardous environment presenting risks to the health and safety of the operator or if the machinery itself gives rise to a hazardous environment, adequate means must be provided to ensure that the operator has good working conditions and is protected against any foreseeable hazards.	Not applicable the machinery is not intended to be used in a hazardous environment
	Where appropriate, the operating position must be fitted with an adequate cabin designed, constructed and/or equipped to fulfil the above requirements	Pass
	The exit must allow rapid evacuation. Moreover, when applicable, an emergency exit must be provided in a direction which is different from the usual exit.	Pass
1.1.8	Seating	
	Where appropriate and where the working conditions so permit, work stations constituting an integral part of the machinery must be designed for the installation of seats	Not applicable
	If the operator is intended to sit during operation and the operating position is an integral part of the machinery, the seat must be provided with the machinery.	Not applicable
	The operator's seat must enable him to maintain a stable position. Furthermore, the seat and its distance from the control devices must be capable of being adapted to the operator.	Not applicable
	If the machinery is subject to vibrations, the seat must be designed and constructed in such a way as to reduce the vibrations transmitted to the operator to the lowest level that is reasonably possible. The seat mountings must withstand all stresses to which they can be subjected. Where there is no floor beneath the feet of the operator, footrests covered with a slip-resistant material must be provided.	Not applicable

Clause	Requirement-Test	Verdict and Result-Remark
1.2	Controls	-
1.2.1	Safety and reliability of control systems	-
	in such a way as to prevent hazardous situations from arising. Above all, they must be designed and constructed in such a way that:	Pass. The control system for this machine is safe and reliable.
	they can withstand the intended operating stresses and external influences	Pass.
	- a fault in the hardware or the software of the control system does not lead to hazardous situations,	Pass.
	errors in the control system logic do not lead to hazardous situations,	Pass
	reasonably foreseeable human error during operation does not lead to hazardous situations.	Pass
	the machinery must not start unexpectedly,	Pass
	the parameters of the machinery must not change in an uncontrolled way, where such change may lead to hazardous situations	Pass
	the machinery must not be prevented from stopping if the stop command has already been given,	Pass
	no moving part of the machinery or piece held by the machinery must fall or be ejected,	Pass
	automatic or manual stopping of the moving parts, whatever they may be, must be unimpeded,	Pass
	the protective devices must remain fully effective or give a stop command	Pass
	the safety-related parts of the control system must apply in a coherent way to the whole of an assembly of machinery and/or partly completed machinery	Pass
	For cable-less control, an automatic stop must be activated when correct control signals are not received, including loss of communication.	Not applicable It is not a cable-less control
1.2.2	Control devices	-
	Control devices must be:	-
	- clearly visible and identifiable, using pictograms where appropriate,	Pass. These requirements have been complied with.
	-positioned in such a way as to be safely operated without hesitation or loss of time and without ambiguity,	Pass. Appropriate positions have been taken into account during design.
	- designed in such a way that the movement of the control device is consistent with its effect,	Pass.
	-located outside the danger zones, except where necessary for certain control devices such as an emergency stop or a teach pendant,	Pass. All control devices have been located outside the danger zones.
	-positioned in such a way that their operation cannot cause additional risk,	Pass. All operation of control devices

Clause	Requirement-Test	Verdict and Result-Remark
		can't cause additional risk.
	- designed or protected in such a way that the desired effect, where a hazard is involved, can only be achieved by a deliberate action,	Pass. This requirement has been complied with.
	-made in such a way as to withstand foreseeable forces; particular attention must be paid to emergency stop devices liable to be subjected to considerable forces.	Pass. This requirement has been complied with.
	Where a control device is designed and constructed to perform several different actions, namely where there is no one-to one correspondence, the action to be performed must be clearly displayed and subject to confirmation, where necessary.	Not applicable
	Control devices must be so arranged that their layout, travel and resistance to operation are compatible with the action to be performed, taking account of ergonomic principles.	Pass
	Machinery must be fitted with indicators as required for safe operation. The operator must be able to read them from the control position.	Not applicable
	From each control position, the operator must be able to ensure that no-one is in the danger zones, or the control system must be designed and constructed in such a way that starting is prevented while someone is in the danger zone.	Not applicable
	If neither of these possibilities is applicable, before the machinery starts, an acoustic and/or visual warning signal must be given. The exposed persons must have time to leave the danger zone or prevent the machinery starting up.	Pass.
	If necessary, means must be provided to ensure that the machinery can be controlled only from control positions located in one or more predetermined zones or locations.	Not applicable
	Where there is more than one control position, the control system must be designed in such a way that the use of one of them precludes the use of the others, except for stop controls and emergency stops.	Not applicable.
	When machinery has two or more operating positions, each position must be provided with all the required control devices without the operators hindering or putting each other into a hazardous situation.	Not applicable
1.2.3	Starting	-
	It must be possible to start machinery only by voluntary actuation of a control provided for the purpose	Pass.
	The same requirement applies:	-
	- when restarting the machinery after stoppage,	Pass.

Clause	Requirement-Test	Verdict and Result-Remark
	whatever the cause	
	- when effecting a significant change in the operating conditions	Pass.
	However, the restarting of the machinery or a change in operating conditions may be effected by voluntary actuation of a device other than the control device provided for the purpose, on condition that this does not lead to a hazardous situation.	-
	For machinery functioning in automatic mode, the starting of the machinery, restarting after a stoppage, or a change in operating conditions may be possible without intervention, provided this does not lead to a hazardous situation.	Pass.
	Where machinery has several starting control devices and the operators can therefore put each other in danger, additional devices	Not applicable
	must be fitted to rule out such risks. If safety requires that starting and/or stopping must be performed in a specific sequence, there must be devices which ensure that these operations are performed in the correct order.	Pass.
1.2.4	Stopping device	-
	Normal stopping	-
	Each machine must be fitted with a control whereby the machine can be brought safety to a complete stop	Pass. A normal stop control has been provided.
	Each workstation must be fitted with a control device to stop some or all of the functions of the machinery, depending on the existing hazards, so that the machinery is rendered safe.	Pass. A normal stop control has been provided.
	The machinery's stop control must have priority over the start controls.	Pass. It has priority over the start control.
	Once the machinery or its hazardous functions have stopped, the energy supply to the actuators concerned must be cut off.	Pass.
	Operational stop	
	Where, for operational reasons, a stop control that does not cut off the energy supply to the actuators is required, the stop condition must be monitored and maintained.	Not applicable
	Emergency stop	-
	Machinery must be fitted with one or more emergency stop devices to enable actual or impending danger to be averted.	Pass.
	The following exceptions apply:	-
	- machinery in which an emergency stop device would not lessen the risk, either because it would not reduce the stopping time or because it would	Not applicable

Clause	Requirement-Test	Verdict and Result-Remark
	not enable the special measures required to deal with the risk to be taken,	
	portable hand-held and/or handguided machinery.	
	The device must:	-
	- have clearly identifiable, clearly visible and quickly accessible control devices,	Not applicable
	- stop the hazardous process as quickly as possible, without creating additional risks,	Not applicable
	- where necessary, trigger or permit the triggering of certain safeguard movements.	Not applicable
	Once active operation of the emergency stop device has ceased following a stop command, that command must be sustained by engagement of the emergency stop device until that engagement is specifically overridden; it must not be possible to engage the device without triggering a stop command; it must be possible to disengage the device only by an appropriate operation, and disengaging the device must not restart the machinery but only permit restarting.	Not applicable
	The emergency stop function must be available and operational at all times, regardless of the operating mode.	Not applicable
	Emergency stop devices must be a back-up to other safeguarding measures and not a substitute for them.	Not applicable
1.2.4.4	Assembly of machinery	
	In the case of machinery or parts of machinery designed to work together, the machinery must be designed and constructed in such a way that the stop controls, including the emergency stop devices, can stop not only the machinery itself but also all related equipment, fits continued operation may be dangerous.	Pass
1.2.5	Selection of control or operating modes	-
	The control or operating mode selected must override all other control or operating modes, with the exception of the emergency stop.	Not applicable
	If machinery has been designed and constructed to allow its use in several control or operating modes requiring different protective measures and/or work procedures,	Not applicable. No this kind of mode selection has been found.
	it must be fitted with a mode selector which can be locked in each position. Each position of the selector must be clearly identifiable and must correspond to a single operating or control mode.	Not applicable
	The selector may be replaced by another selection method which restricts the use of certain functions of the machinery or certain categories of operator	Not applicable. No this kind of mode selection has been found.
	If, for certain operations, the machinery must be	Not applicable.

Clause	Requirement-Test	Verdict and Result-Remark
	able to operate with its protection devices neutralized, the control or operating mode selector must simultaneously	No this kind of mode selection has been found.
	- disable all other control or operating modes,	Not applicable.
	- permit operation of hazardous functions only by control devices requiring sustained action,	Not applicable.
	- permit the operation of hazardous functions only in reduced risk conditions	Not applicable.
	- permit the operation of hazardous functions only in reduced risk conditions while preventing hazards from linked sequences,	Not applicable.
	prevent any operation of hazardous functions by voluntary or involuntary action on the machine's sensors.	Not applicable. No this kind of mode selection has been found.
	If these four conditions cannot be fulfilled simultaneously, the control or operating mode selector must activate other protective measures designed and constructed to ensure a safe intervention zone.	Not applicable
	In addition, the operator must be able to control operation of the parts he is working on from the adjustment point.	Not applicable
1.2.6	Failure of the power supply	-
	The interruption, re-establishment after an interruption or fluctuation in whatever manner of the power supply to the machinery must not lead to a dangerous situation	Pass. No any dangerous situation has been found.
	Particular attention must be given to the following points:	-
	- the machinery must not start unexpectedly	Pass.
	- the parameters of the machinery must not change in an uncontrolled way when such change can lead to hazardous situations,	Pass.
	- the machinery must not be prevented from stopping if the command has already been given,	Pass.
	no moving part of the machinery or piece held by the machinery must fall or be ejected,	Pass
	- automatic or manual stopping of the moving parts whatever they may be must be unimpeded	Pass.
	- the protective devices must remain fully effective or give a stop command.	Pass.
1.3.1.	Risk of loss of stability	-
	Machinery and its components and fittings must be stable enough to avoid overturning, falling or uncontrolled movements during transportation, assembly, dismantling ,and any other action involving the machinery.	Pass
	If the shape of the machinery itself or its intended installation doesn't offer sufficient stability,	Pass

Clause	Requirement-Test	Verdict and Result-Remark
	appropriate means of anchorage must be incorporated and indicated in the instructions	
1.3.2	Risk of break-up during operation	-
	The various parts of machinery and their linkages must be able to withstand the stress to which they are subject when used when as foreseen by the manufacturer	Pass. All parts of the machine can withstand related stress when they are used.
	The durability of the materials used must be adequate for the nature of the working environment foreseen by the manufacturer or his authorized representative , in particular as regards the phenomena of fatigue, ageing, corrosion and abrasion	Pass. All materials used for this machine are appropriate for their intended use.
	The instructions must indicate the type and frequency of inspections and maintenance required for safety reasons. They must, where appropriate, indicate the parts subject to wear and the criteria for replacement.	Pass. The related information have been provided within the instruction manual.
	Where a risk of rupture or disintegration remains despite the measures taken, the parts concerned must be mounted, positioned and/or guarded in such a way that any fragments will be contained, preventing hazardous situations.	Pass.
	Both rigid and flexible pipes carrying fluids, particularly those under high pressure, must be able to withstand the foreseen internal and external stresses and must be firmly attached and/or protected to ensure that no risk is posed by a rupture.	Pass. All these requirements have been complied with.
	Where the material to be processed is fed to the tool automatically, the following conditions must be fulfilled to avoid risks to the persons exposed :	-
	- when the work piece comes into contact with the tool the later must have attained its normal working conditions	Not applicable.
	- when the tool starts and/or stops the feed movement and the tool movement must be coordinated	Not applicable.
1.3.3	Risked due to falling or ejected objects	-
	Precautions must be taken to prevent risks from falling or ejected object	Pass
1.3.4	Risks due to surfaces, edges or angles	-
	In so far as their purpose allows, accessible parts of the machinery must have no sharp edges, no sharp angles, and no rough surfaces likely to cause injury	Pass. This requirement has been complied with.
1.3.5	Risks related to combined machinery	-
	Where the machinery is intended to carry out several different operations with the manual removal of the piece between each operation, it	Not applicable. This machinery does not carry out with the manual removal of the

Clause	Requirement-Test	Verdict and Result-Remark
	must be designed and constructed in such a way as to enable each element to be used separately without the other element constituting a danger or risk for the exposed person	piece.
	For this purpose, it must be possible to start and stop separately and elements that are not protected	Not applicable.
1.3.6	Risks related to variations in operating conditions	-
	When the machine is designed to perform operations under different conditions of use, it must be designed and constructed in such a way that selection and adjustment of these conditions can be carried out safely and reliably	Pass
1.3.7	Prevention of risks related to moving parts	-
	The moving parts of machinery must be designed, built and laid out to avoid hazards or, where hazards persist, fixed with guards or protective devices in such a way as to prevent all risk of contact which could lead to accidents	Pass. This kind of contacts have been prevented by appropriate guards.
	All necessary steps must be taken to prevent accidental blockage of moving parts involved in the work. In cases where, despite the precautions taken, a blockage is likely to occur, the necessary specific protective devices and tools must, when appropriate, be provided to enable the equipment to be safely unblocked.	Pass. All necessary steps have been taken.
	The instructions and, where possible, a sign on the machinery shall identify these specific protective devices and how they are to be used.	Not applicable. No this kind of need.
1.3.8	Choice of protection against risk related to moving parts	-
	Guards or protection devices used to protect against the risks related to moving parts must be selected on the basis of the type of risk	Pass. It is in accordance with the risk assessment.
	The following guidelines must be used to help make the choice	-
	A. Moving transmission parts Guards designed to protect exposed persons against the risks associated with moving transmission parts must be :	-
	- either fixed, complying with requirements 1.4.1 and 1.4.2.1 or	See the related clauses.
	- interlocking movable guards as referred to in section 1.4.2.2.	See the related clauses.
1.3.8.2	Moving parts involved in the process	
	Guards or protective devices designed to protect persons against the hazards generated by moving parts involved in the process must be:	-
	- either fixed guards as referred to in section 1.4.2.1, or	See the related clauses.

Clause	Requirement-Test	Verdict and Result-Remark
	- interlocking movable guards as referred to in section 1.4.2.2, or	See the related clauses.
	protective devices as referred to in section 1.4.3, or	
	a combination of the above.	
	However, when certain moving parts directly involved in the process can't be completely or partially inaccessible during operation owing to operations requiring near-by operator intervention, where technically possible such parts must be fitted with :	-
	-fixed guards or interlocking movable guards preventing access to those sections of the parts that are not used in the work,	Pass
	- adjustable guards as referred to in section 1.4.2.3 restricting access to those sections of the moving parts where access is necessary.	See the related clauses.
1.3.9	Risks of uncontrolled movements	
	When a part of the machinery has been stopped, any drift away from the stopping position, for whatever reason other than action on the control devices, must be prevented or must be such that it does not present a hazard	Not applicable
1.4	Required characteristics of guards and protection devices	-
1.4.1	General requirement	-
	Guards and protection devices must:	-
	- be of robust construction	Pass.
	- be securely held in place,	Pass.
	- not be easy to bypass or render non-operational	Pass.
	- be located at an adequate distance from the danger zone	Pass.
	- cause minimum obstruction to the view in the production process	Pass.
	- In addition, guards must, where possible, protect against the ejection or falling of materials or objects and against emissions generated by the machinery.	Pass.
1.4.2	Special requirements for guards	-
1.4.2.1	Fixed guards	-
	Fixed guards must be fixed by systems that can be opened or removed only with tools.	Pass. They all be securely held in place.
	They must be fixed by system that can be opened only with tools	Pass. They all can be opened only with tools.
	Their fixing systems must remain attached to the guards or to the machinery when the guards are removed.	Pass

Clause	Requirement-Test	Verdict and Result-Remark
	Where possible, guards must be unable to remain in place without their fixings	Not applicable.
1.4.4.2	Interlocking movable guards must:	-
	as far as possible remain attached to the machinery when open,	-
	be designed and constructed in such a way that they can be adjusted only by means of an intentional action. [See 3rd hyphen of old 1.4.2.2 B]	Not applicable
	Interlocking movable guards must be associated with an interlocking device that	-
	prevents the start of hazardous machinery functions until they are closed, and	-
	gives a stop command whenever they are no longer closed.	-
	Where it is possible for an operator to reach the danger zone before the risk due to the hazardous machinery functions has ceased, movable guards must be associated with a guard locking device in addition to an interlocking device that	-
	prevents the start of hazardous machinery functions until the guard is closed and locked, and	Not applicable
	keeps the guard closed and locked until the risk of injury from the hazardous machinery functions has ceased.	Not applicable
	Interlocking movable guards must be designed in such a way that the absence or failure of one of their components prevents starting or stops the hazardous machinery functions	Not applicable
1.4.2.3	Adjustable guards restricting access	-
	Adjustable guards restricting access to those areas of the moving parts strictly necessary for the work must:	-
	- be adjustable manually or automatically according to the type of work involved	Not applicable
	- be readily adjustable without the use of tools	Not applicable
	- reduce as far as possible the risk of ejection	Not applicable
1.4.3	Special requirements for protection devices	-
	Protection devices must be designed and incorporated into the control system so that:	-
	- moving parts can't start up while they are within the operator's reach	Not applicable
	- the exposed person can't reach moving parts once they have started up	Not applicable
	- they can be adjusted only by means of an intentional action, such as the use of a tool, etc.	Not applicable
	-the absence or failure of one of their components prevents starting or stops the moving parts	Not applicable
1.5	Protection against other hazards	-
	Electricity supply	-

Clause	Requirement-Test	Verdict and Result-Remark
	Where machinery has an electricity supply it must be designed, constructed and equipped so that all hazards of an electrical nature are or can be prevented	Pass
	The safety objectives set out in Directive 73/23/EEC shall apply to machinery. However, the obligations concerning conformity assessment and the placing on the market and/or putting into service of machinery with regard to electrical hazards are governed solely by this Directive.	Pass
1.5.2	Static electricity	-
	Machinery must be so designed and constructed as to prevent or limit the build-up of potentially dangerous electrostatic charges and/or be fitted with a discharging system	Pass .
1.5.3	Energy supply other than electricity	-
	Where machinery is powered by an energy other than electricity, it must be so designed, constructed and equipped as to avoid all potential hazards associated with these types of energy	Pass. No any additional hazard has been found for energy supply.
1.5.4	Error of fitting	-
	Errors likely to be made when fitting or refitting certain parts which could be a source of risk must be made impossible by the design and construction of such parts or, failing this, by information given on the parts themselves and/or their housings. The same information must be given on moving parts and/or their housings where the direction of movement needs to be known in order to avoid a risk.	Pass.
	Where necessary, the instructions must give further information on these risks.	Pass.
	Where a faulty connection can be the source of risk, incorrect connections must be made impossible by design or, failing this, by information given on the elements to be connected and, where appropriate, on the means of connection	Pass. All related information have been provided within the instruction manual.
1.5.5	Extreme temperatures	-
	Step must be taken to eliminate any risk of injury caused by contact with or proximity to machinery parts or materials at high or very low temperatures	Pass. Sufficient safety protection for extreme temperatures has been provided.
	The necessary steps must also be taken to avoid or protect against the risk of hot or very cold material being ejected.	Pass
1.5.6	Fire	-
	Machinery must be designed and constructed to avoid all risk of fire or overheating posed by the machinery itself or by gases, liquids, dusts, vapors or the other substances produced or used by the	Pass. The design and construction of this machine are in conformity with these requirements.

Clause	Requirement-Test	Verdict and Result-Remark
	machinery	
1.5.7	Explosion	-
	Machinery must be designed and constructed to avoid any risk of explosion posed by the machinery itself or by gases, liquids, dusts, vapors or other substances produced or used by the machinery	Pass. The design and construction of this machine are in conformity with these requirements.
	Machinery must comply, as far as the risk of explosion due to its use in a potentially explosive atmosphere is concerned, with the provisions of the specific Community Directives.	
1.5.8	Noise	-
	Machinery must be designed and constructed in such a way that risks resulting from the emission of airborne noise are reduced to the lowest level, taking account of technical progress and the availability of means of reducing noise, in particular at source.	Pass. The design and construction of this machine are in conformity with this requirements.
	The level of noise emission may be assessed with reference to comparative emission data for similar machinery.	Pass
1.5.9	Vibration	-
	Machinery must be so designed and constructed that risks resulting from the vibrations produced by the machinery are reduced to the lowest level, taking account of technical progress and the availability of means of reducing vibration, in particular at source	Pass
	The level of vibration emission may be assessed with reference to comparative emission data for similar machinery.	Pass
1.5.10	Radiation	-
	Undesirable radiation emissions from the machinery must be eliminated or be reduced to levels that do not have adverse effects on persons	Not applicable
	Any functional ionising radiation emissions must be limited to the lowest level which is sufficient for the proper functioning of the machinery during setting, operation and cleaning. Where a risk exists, the necessary protective measures must be taken.	Not applicable
	Any functional non-ionising radiation emissions during setting, operation and cleaning must be limited to levels that do not have adverse effects on persons.	Not applicable
1.5.11	External radiation	-
	Machinery must be so designed and constructed that external radiation doesn't interfere with its operation	Not applicable
1.5.12	Laser equipment	-
	Where laser equipment is used, the following	Not applicable

Clause	Requirement-Test	Verdict and Result-Remark
	provisions should be taken into account;	
	- laser equipment on machinery must be designed and constructed so as to prevent any accidental radiation	Not applicable.
	- laser equipment on machinery must be protected so that effective radiation, radiation produced by reflection or diffusion and secondary radiation don't damage health	Not applicable.
	-optical equipment for the observation or adjustment of laser equipment on machinery must be such that no health risk is created by the laser rays	Not applicable.
1.5.13	Emissions of hazardous materials and substances	-
	Machinery must be designed and constructed in such a way that risks of inhalation, ingestion, contact with the skin, eyes and mucous membranes and penetration through the skin of hazardous materials and substances which it produces can be avoided.	Not applicable.
	Where a hazard can not be eliminated, the machinery must be so equipped that hazardous materials and substances can be contained, evacuated, precipitated by water spraying, filtered or treated by another equally effective method.	Not applicable
	Where the process is not totally enclosed during normal operation of the machinery, the devices for containment and/or evacuation must be situated in such a way as to have the maximum effect.	Not applicable.
1.5.14	Risk of being trapped in a machine	-
	Machinery must be so designed, constructed or fitted with a means of preventing a exposed person from being enclosed within it or, if that is impossible, with a means of summoning held	Not applicable
1.5.15	Risk of slipping, tripping or falling	-
	Parts of the machinery where persons are liable to move about or stand must be designed and constructed to prevent persons slipping, tripping or falling on or off these parts	Not applicable
	Where appropriate, these parts must be fitted with handholds that are fixed relative to the user and that enable them to maintain their stability.	Not applicable
1.5.16	Lightning	
	Machinery in need of protection against the effects of lightning while being used must be fitted with a system for conducting the resultant electrical charge to earth.	Not applicable
1.6	Maintenance	-
1.6.1	Machinery maintenance	-
	Adjustment, lubrication And maintenance points	Pass.

Clause	Requirement-Test	Verdict and Result-Remark
	must be located outside danger zones	
	It must be possible to carry out adjustment, Maintenance, repair, cleaning and servicing Operations while machinery is at a stand still	Pass.
	If one or more of the above conditions can not be satisfied for technical reasons, measures must be taken to ensure that these operations can be carried out safely (see section 1.2.5).	Not applicable. No this kind of situation.
	In the case of automated machinery and, where necessary, other machinery, a connecting device for mounting diagnostic fault-finding equipment must be provided.	Not applicable
	Automated machinery components which have to be changed frequently	Pass.
	must be capable of being removed and replaced easily and safely. Access to the components must enable these tasks to be carried out with the necessary technical means in accordance with a specified operating method	Pass. All operation methods have been specified by the manufacturer.
1.6.2	Access to operating position and servicing points	-
	Machinery must be designed and constructed in such a way as to allow access in safety to all areas where intervention is necessary during operation, adjustment and maintenance of the machinery.	Pass. Appropriate guards and safety control devices have been used.
1.6.3	Isolation of energy sources	-
	All machinery must be fitted with means to isolate it from all energy sources	Pass. The power switch has been used.
	Such isolators must be clearly identified	Pass. It has been identified clearly.
	They must be capable of being locked if reconnection could endanger exposed persons	Pass
	In the case of machinery supplied with electricity through a plug capable of being plugged into a circuit, separation of the plug is sufficient	Not applicable
	The isolator must be capable of being locked also where an operator is unable, from any of the points to which he has access, to check that the energy is still cut off	Pass.
	In the case of machinery capable of being plugged into an electricity supply, removal of the plug is sufficient, provided that the operator can check from any of the points to which he has access that the plug remains removed.	Pass.
	After the energy is cut off, it must be possible to dissipate normally any energy remaining or stored in the circuits of the machinery without risk to persons.	Not applicable. No this kind of situation.
	As an exception to the requirement laid down in the previous paragraphs, certain circuits may remain connected to their energy sources in order, for	Not applicable

Clause	Requirement-Test	Verdict and Result-Remark
	example, to hold parts, to protect information, to light interiors, etc. In this case, special steps must be taken to ensure operator safety.	
1.6.4	Operator intervention	-
	Machinery must be so designed, constructed and equipped that the need for operator intervention is limited	Pass.
	If operator intervention can't be avoided, it must be possible to carry it out easily and in safety	Not applicable
1.6.5	Cleaning of internal parts	-
	The machinery must be designed and constructed in such a way that it is possible to clean internal parts which have contained dangerous substances or preparations without entering them; any necessary unblocking must also be possible from the outside. If it is impossible to avoid entering the machinery, it must be designed and constructed in such a way as to allow cleaning to take place safely.	Pass. The design of this machine is allowed to carried out this work.
1.7	Indicators	-
	Information and warnings on the machinery should preferably be provided in the form of readily understandable symbols or pictograms. Any written or verbal information and warnings must be expressed in an official Community language or languages, which may be determined in accordance with the Treaty by the Member State in which the machinery is placed on the market and/or put into service and may be accompanied, on request, by versions in any other official Community language or languages understood by the operators. [Compare with 1.7.2 of the old directive]	Not applicable
1.7.1	Information and information devices	
	The information needed to control machinery must be provided in a form that is unambiguous and easily understood. It must not be excessive to the extent of overloading the operator.	Pass.
	Visual display units or any other interactive means of communication between the operator and the machine must be easily understood and easy to use.	Pass.
1.7.2	Warning devices	-
	Where risks remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted, the necessary warnings, including warning devices, must be provided	Pass
1.7.3	Marking of machinery	-
	All machinery must be marked visibly, legibly and indelibly with the following minimum particulars:	-

Clause	Requirement-Test	Verdict and Result-Remark
	- the business name and full address of the manufacturer and, where applicable, his authorized representative,	Pass.
	- designation of the machinery,	Pass.
	- the CE Marking (see Annex III),	Pass.
	- designation of series or type,	Pass.
	serial number, if any,	Pass
	the year of construction, that is the year in which the manufacturing process is completed.	Pass
	It is prohibited to pre-date or post-date the machinery when affixing the CE marking.	Pass
	Furthermore, machinery designed and Constructed for use in a potentially explosive atmosphere must be marked accordingly.	Pass
	Machinery must also bear full information relevant to its type and essential for safe use. Such information is subject to the requirements set out in section 1.7.1.	Pass.
	Where a machine part must be handled during use with lifting equipment, its mass must be indicated legible, indelibly and unambiguously	Not applicable
	The interchangeable equipment referred to in Article 1 (2) , third subparagraph, must bear the same information	Pass.
1.7.4	Instruction	-
	All machinery must be accompanied by instructions in the official Community language or languages of the Member State in which it is placed on the market and/or put into service.	Pass
	- The instructions accompanying the machinery must be either 'Original instructions' or a 'Translation of the original instructions', in which case the translation must be accompanied by the original instructions.	Pass.
	-By way of exception, the maintenance instructions intended for use by specialized personnel mandated by the manufacturer or his authorized representative may be supplied in only one Community language which the specialized personnel understand.[Compare with old 1.7.4 b]	Pass.
	- The instructions must be drafted in accordance with the principles set out below.	Pass.
1.7.4.1	General principles for the drafting of instructions	
	- (a) The instructions must be drafted in one or more official Community languages. The words 'Original instructions' must appear on the language version(s) verified by the manufacturer or his authorized representative.	Pass.

Clause	Requirement-Test	Verdict and Result-Remark
	- (b) Where no 'Original instructions' exist in the official language(s) of the country where the machinery is to be used, a translation into that/those language(s) must be provided by the manufacturer or his authorized representative or by the person bringing the machinery into the language area in question. The translations must bear the words 'Translation of the original instructions'.	Pass.
	- (b) Where no 'Original instructions' exist in the official language(s) of the country where the machinery is to be used, a translation into that/those language(s) must be provided by the manufacturer or his authorized representative or by the person bringing the machinery into the language area in question. The translations must bear the words 'Translation of the original instructions'.	Not applicable
	(c) The contents of the instructions must cover not only the intended use of the machinery but also take into account any reasonably foreseeable misuse thereof.	Pass
	(d) In the case of machinery intended for use by non-professional operators, the wording and layout of the instructions for use must take into account the level of general education and acumen that can reasonably be expected from such operators.	Pass
1.7.4.2	Contents of the instructions	
	Each instruction manual must contain, where applicable, at least the following information:	
	(a) the business name and full address of the manufacturer and of his authorized representative;	Pass
	(b) the designation of the machinery as marked on the machinery itself, except for the serial number (see section 1.7.3);	Pass
	(c) the EC declaration of conformity, or a document setting out the contents of the EC declaration of conformity, showing the particulars of the machinery, not necessarily including the serial number and the signature;	Pass
	(d) a general description of the machinery;	Pass
	(e) the drawings, diagrams, descriptions and explanations necessary for the use, maintenance and repair of the machinery and for checking its correct functioning;	Pass
	(f) a description of the workstation(s) likely to be occupied by operators;	Pass
	g) a description of the intended use of the machinery;	Pass

Clause	Requirement-Test	Verdict and Result-Remark
	(h) warnings concerning ways in which the machinery must not be used that experience has shown might occur;	Pass
	(i) assembly, installation and connection instructions, including drawings, diagrams and the means of attachment and the designation of the chassis or installation on which the machinery is to be mounted;	Pass
	(j) instructions relating to installation and assembly for reducing noise or vibration;	Pass
	(k) instructions for the putting into service and use of the machinery and, if necessary, instruct	Pass
	(l) information about the residual risks that remain despite the inherent safe design measures, safeguarding and complementary protective measures adopted;	Pass
	(m) instructions on the protective measures to be taken by the user, including, where appropriate, the personal protective equipment to be provided	Pass
	(n) the essential characteristics of tools which may be fitted to the machinery;	Pass
	o) the conditions in which the machinery meets the requirement of stability during use, transportation, assembly, dismantling when out of service, testing or foreseeable breakdowns;	Pass
	(p) instructions with a view to ensuring that transport, handling and storage operations can be made safely, giving the mass of the machinery and of its various parts where these are regularly to be transported separately; [Compare with the 10th hyphen of old 1.7.4. (a)]	Pass
	(q) the operating method to be followed in the event of accident or breakdown; if a blockage is likely to occur, the operating method to be followed so as to enable the equipment to be safely unblocked;	Pass
	(r) the description of the adjustment and maintenance operations that should be carried out by the user and the preventive maintenance measures that should be observed;	Pass
	(s) instructions designed to enable adjustment and maintenance to be carried out safely, including the protective measures that should be taken during these operations;	Pass
	(t) the specifications of the spare parts to be used, when these affect the health and safety of operators;	Pass
	(u) the following information on airborne noise emissions:	
	the A-weighted emission sound pressure level at	Pass

Clause	Requirement-Test	Verdict and Result-Remark
	workstations, where this exceeds 70 dB(A); where this level does not exceed 70 dB(A), this fact must be indicated,	The emission sound pressure level at workstations does not exceed 70 dB(A)
	the peak C-weighted instantaneous sound pressure value at workstations, where this exceeds 63 Pa (130 dB in relation to 20 µPa),	Pass
	the A-weighted sound power level emitted by the machinery, where the A-weighted emission sound pressure level at workstations exceeds 80 dB(A).	the A-weighted sound power level emitted does not exceed 80 dB(A).
	These values must be either those actually measured for the machinery in question or those established on the basis of measurements taken for technically comparable machinery which is representative of the machinery to be produced.	Pass
	In the case of very large machinery, instead of the A-weighted sound power level, the A-weighted emission sound pressure levels at specified positions around the machinery may be indicated.	Pass
	Where the harmonised standards are not applied, sound levels must be measured using the most appropriate method for the machinery. Whenever sound emission values are indicated the uncertainties surrounding these values must be specified.	Pass
	The operating conditions of the machinery during measurement and the measuring methods used must be described.	Pass
	Where the workstation(s) are undefined or cannot be defined, A-weighted sound pressure levels must be measured at a distance of 1 metre from the surface of the machinery and at a height of 1,6 metre from the floor or access platform. The position and value of the maximum sound pressure must be indicated.	Not applicable the workstation is defined
	Where specific Community Directives lay down other requirements for the measurement of sound pressure levels or sound power levels, those Directives must be applied and the corresponding provisions of this section shall not apply;	Not applicable
	where machinery is likely to emit nonionising radiation which may cause harm to persons, in particular persons with active or non-active implantable medical devices, information concerning the radiation emitted for the operator and exposed persons.	Not applicable
1.7.4.3	Sales literature	
	Sales literature describing the machinery must not contradict the instructions as regards health and safety aspects. Sales literature describing the performance characteristics of machinery must	Pass

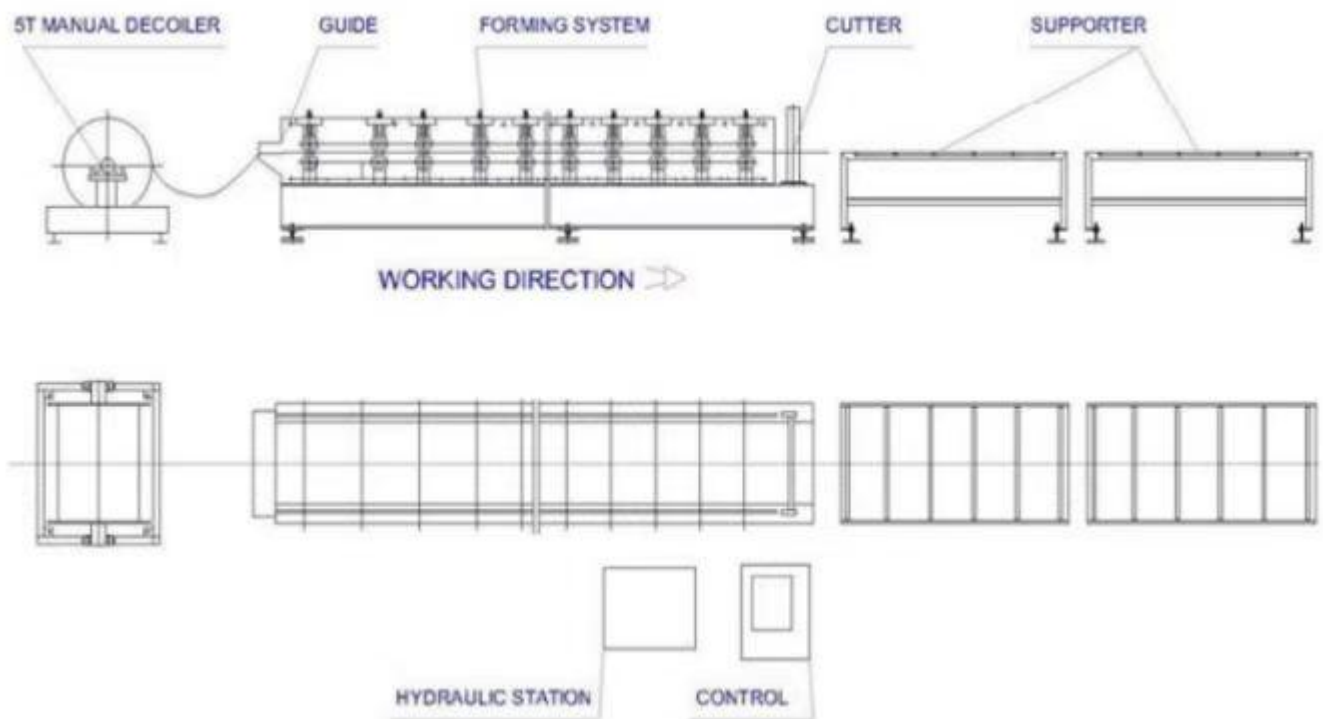
Clause	Requirement-Test	Verdict and Result-Remark
	contain the same information on emissions as is contained in the instructions.	
2	Supplementary essential health And safety requirements for certain categories of machinery	Not applicable
2.1.	Foodstuffs machinery and machinery for cosmetics or pharmaceutical products	Not applicable
2.2	Portable hand-held and/or Hand-guided machinery	Not applicable
2.3	Machinery for working Wood and material with similar Physical characteristics	Not applicable
3	Essential health and safety requirement to offset the particular hazards due to the mobility machinery	Not applicable
4	Essential health and safety requirement to offset the particular hazards due to a lifting operation	Not applicable
5	Essential health and safety requirement for machinery intended for underground work	Not applicable
6	Essential health and safety requirement to offset the particular hazards due to the lifting or moving of persons	Not applicable

Annex: Photos, Drawing and Manual

A.1 Photos



P1 machine



P2 drawing

A.2 Manual

See the following pages:

Manual

Roll Forming Machine

Operational Instruction

original version”

Manual

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1.3 It is necessary to arrange professionals or the employee owning the right quality responsible for the time check and maintenance, avoiding the exceptions. The notice board must be showed beside the on-off switch when the machine tool stops under the condition of check or maintenance. The color and the character must be easy to catch the eye. If necessary, there should be someone responsible for the switch.	8
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I. Notices for safe operation

- 1.1 The operator should transit, install, adjust and try to operate the machine tool referring to the Instruction before turning on the machine.
- 1.2 The operator must be trained to have the operating quality. Before operation, the operator should read the Instruction first, make sure to understand the content comprehensively, and to hold the full ability to operate this type of machine tool. At the same time, follow the safe manufacturing clauses: protective clothing, safety helmet, long hair in the helmet, glove.
- 1.3 It is necessary to arrange professionals or the employee owning the right quality responsible for the time check and maintenance, avoiding the exceptions. The notice board must be showed beside the on-off switch when the machine tool stops under the condition of check or maintenance. The color and the character must be easy to catch the eye. If necessary, there should be someone responsible for the switch.
- 1.4 Hands or fingers are not allowed in the working areas of chain wheels, chains or shears when the machine is running.
- 1.5 After installment or long-time's stop, the machine line should rollform itself before decoiling for several hours, and every movable part needs new lubricating oil.

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- 1.6 The operator should often notice the working condition of machine line. It must stop timely for inspection if the tool quivers and sounds abnormal.
- 1.7 It is necessary to clean the line after its daily working. Wipe up the dust and impurity on parts and keep the tool in a wonderful working environment. Remember fixed inspection of the hydraulic oil condition. If it is much polluted, the oil should be replaced.
- 1.8 In order to make sure the safety of the operator and avoid the danger of electric shock, never touch the transformer, electromotor and the end connecting with high pressure.

Main counting parameters :

Demension: 6000mm*1600mm*1700mm

Width range: 1000mm

Thickness range: 0.3-0.7mm

Inner diameter range: $\Phi 70$ mm

Speed of product: 10-15 m/min

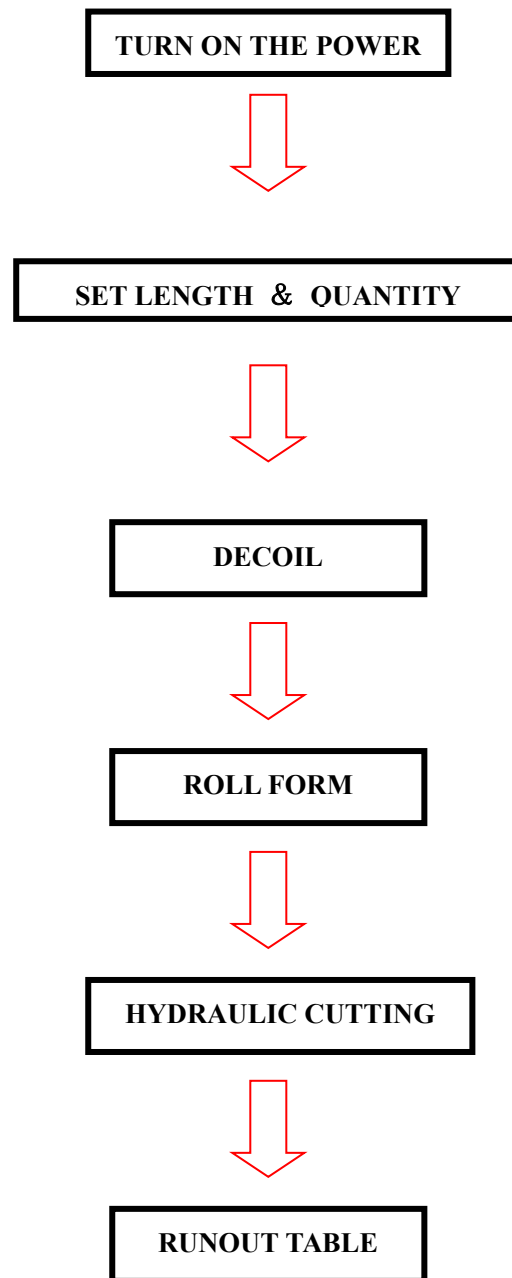
Passes: 12+13

Roller material: 45 steel(Cr coating)

Total power: 5.5+4KW

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II. Processing Flow



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Caution:

No.	Marks	Meaning
4.1		No touching
4.2		Caution , danger
4.3		Danger! electric shock
4.4		Caution , mechanical injury

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4.5		High temperature caution
-----	---	-----------------------------

III.Product Introduction

This type of machine line adopts PLC control, adjusts speed steplessly with transducer and cuts with hydraulic shears. The steel coil is guided by manual decoiler, formed and outputs through the main machine. Turning-type encoder measures the length and its impulse signal feedback is set and controlled by computer. When the length of the output profile comes to the set criterion, the cutting machine works and then the main machine continuously runs.

This machine line has two motors. The one ahead is feeding motor. Between the feeding motor and the chain wheel, there is a clutch which should be engaged when feeding begins. Under the driving power of the feeding motor, the panel will be roll formed in the main machine. It must cut down the clutch when the panel is to be roll formed. The one behind is forming motor which drives to accomplish feeding.

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This type of cold roll forming machine is composed mainly of electric control cabinet, manual decoiler, body machine, hydraulic station, cutter.

3.1 Electric control cabinet

By using the PLC control completely, all the operations of this cold roll forming machine are accomplished on the touching screen of the control board. The electronic board is composed mainly of the breaker, PLC, encoder, transformer etc. and these electronics have been tested and installed.

3.2 Active decoiler or Passive decoiler

When the decoiler is working, the operator should put the coil onto the axle, strain the axle manually, fix the coil on the axle, send the coil into to entry, turn on machine and then the coil comes to form.

3.3 Body machine

The main machine, as the main component of the roll forming machine, includes the motor reducer, the frame, the roller, the chain wheel or universal coupling, the wall panel or the separate iron casting frame, wheel box, etc. The roller begins to form after the coil entering into the main machine from the decoiler.

3.4 Hydraulic station

Hydraulic station, which is composed of oil box, motor, cylinder and

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control valve, is used to supply hydraulic oil for the cylinder to keep the its reciprocating movement

3.5 Cutter

The function of the cutter is to cut. Hydraulic station transports the oil to the cylinder of the cutter, the power from which drives the top blade to move up and down and at the end accomplishes cutting.

III.The driving system of the machine line

4.1 The Main Driving System

This machine has two ways of driving:

- ① Decelerated by cycloidal-pin wheel, the motor of this machine line transmits power through the chain and chain wheel to every stand of roller so that they can rotate comparatively.
- ② Decelerated by reducer, the motor transmits the power through wheel box and universal joint to each stand of roller so that they could keep rotate comparatively.

4.2 Hydraulic driving system

The motor drives the hydraulic oil pump to send the oil which will go through the high pressure pipe line, to the cylinder. Regulated and controlled by the hydraulic components, the piston reciprocates to drive the

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top blade and the upper punch head to move up and down, thus the punching and cutting movement are accomplished.

● Actuating medium of the hydraulic system : General hydraulic oil YA-N32.

Under the working temperature, the oil's viscosity is $27.5 \times 10^{-6} \text{m}^2/\text{s}$, and its density is $900 \text{kg}/\text{m}^3$.

● The normal working temperature of the hydraulic system is 30°C -- 55°C , and the operating pressure is 16Mpa .

V.The forming process of the machine

5.1 Decoiling:

① The machine adopts active decoiler or passive decoiler to finish this action.

In the operation process, the user should put the coil onto the shaft of the decoiler first, tension the shaft, fix the coil onto it, and then send the material into the feed inlet, at last turn on the power. The forming process will be accomplished.

5.2 Main machine

5.2.1 Voltage and power of the main machine

The voltage of the power: three phases/ $380 \text{V}/50 \text{HZ}$, the power of the

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hydraulic station: 4 KW, the power of the main motor: 5.5 KW.

5.3.2 The touching picture of the electric control box:

(1) Main picture

(Referring to fig.5.1) after the power's turning on, the indicator light on the operational board lights. It is time to operate. The touching screen appears in the main picture of the control system; operate according to the needed order.

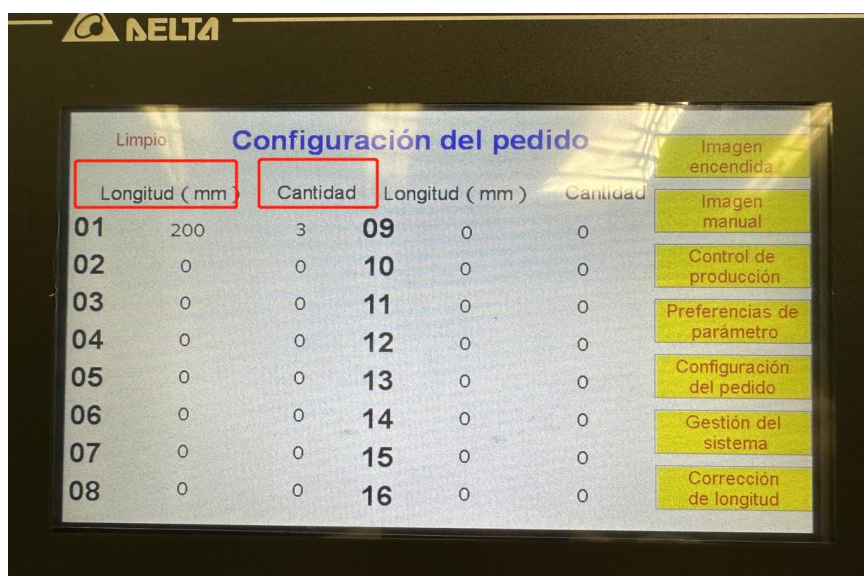


Fig.5.1 Main picture

CAUTION:

1. Press the key **SET** and come to the setting menu on the condition that the machine is in manual condition.
2. Cut off The power when the arc welding machine is working. If not, the user will pay for the after sale cost owing to the damage of the transducer.

(2)According to fig.5.2, press the button SET PARAMETER to entry the setting picture.

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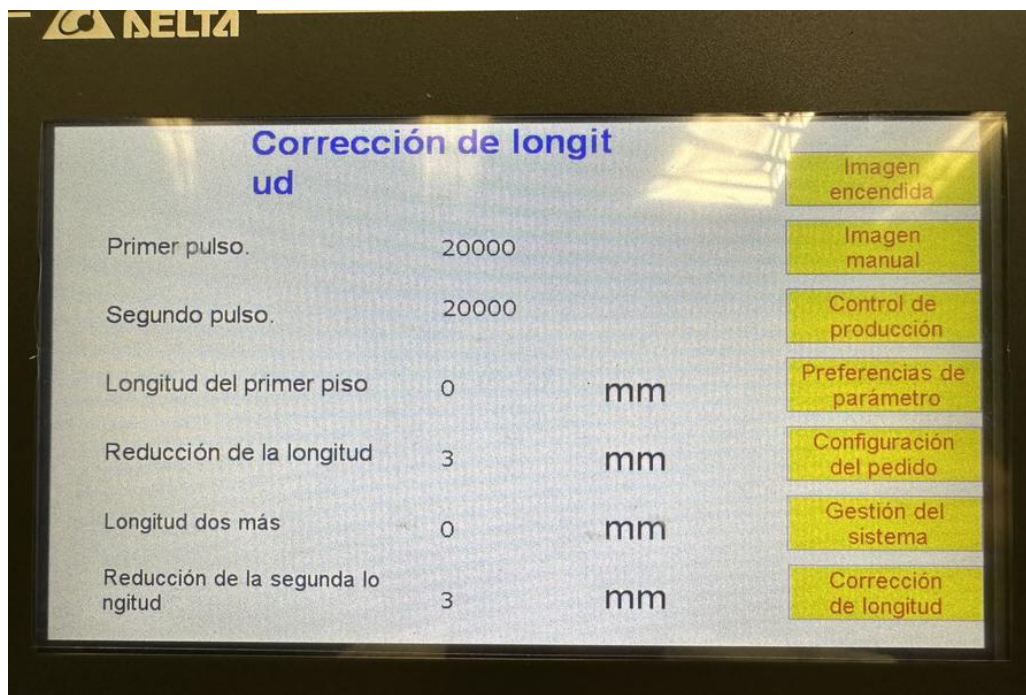


Fig.5.2 Setting picture

- ① Press the key SET LENGTH and the figure keyboard appears. Input the data needed (from 1 to 300,000 mm), and then press the key ENT and accomplish the order. Press the key CLR input again if making mistake.
- ② Press the key NO. and input the expected output.
- ③ You must press the key END to affirm when accomplish the setting of the breaking length, the length, the number etc. Or, there will be the notice of “fault” and the system will be breakdown.
- ④ When setting process is over; press the key BACK to turn back the main menu. And then press the key AUTO to enter the automatic menu. If there is some breakdown appearing in the menu, press the turn-on button and the trouble will disappear. If breakdown is still there, it needed to check

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the urgent stop and to set the data.

5.3.3 How to turn on the machine

Enter the automatic menu and choose the automatic operation mode (press the button **AUTO**) after setting the relative data. If there is not “breakdown” showing on top right corner, press the turn-on button (green) under the touching screen, and then the machine will run automatically. When it is needed to stop, press the stop button (red), and then the machine will stop working after cutting the panel transmitted. Next time just press the turn-on button, the machine will start working. If come across the urgent condition, press the urgent stop button (red mushroom top), and the machine will stop immediately. But next move needs input data again. (Press this button only in urgent condition. Or, waste appears.) The red mushroom button owns self-lock function. It will bounce again by turning it right along the arrow. If not, both the auto and manual working condition will not work.

VI Transportation, swing and installation of the machine

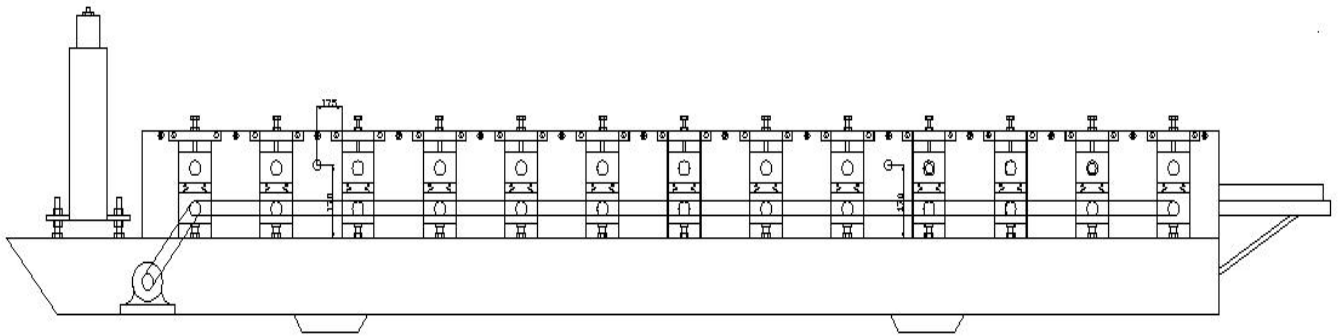
6.1 Transportation of the machine

Moisture-resistant, corrosion-resistant and impact-resistant measurements should be taken in the transportation of the machine. Measurement should be taken to prevent against sea water erosion in the

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transport of shipping. The working temperature of this machine is: $-15^{\circ}\text{C} \sim 45^{\circ}\text{C}$, relative humidity: 30%~95%.

Transportation Storage: the machine and equipped electrical components can bear the temperature from -25°C - 55°C . For the short time transportation less than 24 hours, the tempereture can not be over 70°C .



6.2 Swing of the machine

Crane is used to swing the machine. In order to protect the machine from damage, some planks must be put onto the contact position between the wire cable and the machine, or rubber pipe onto the position of the wire cable which is contacting with machine is feasible. The crane capacity should over 10T, and the diameter of the wire cable should over 22mm.

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Notes:

- In order to keep the machine being swung in balance transversely and horizontally, the machine line should be kept in balance when it is just away from the floor.
- The angle of the wire cable being used to swing the machine should never be over 60°.
- Whenever the machine is shifted, the operators who are two people at least should do teamwork by sending signals to each other.

6.3 Installation of the machine

6.3.1 Preparation for the installation

The machine line should be installed and operated under the following condition:

- The environment temperature: being under 5°C ~ 40°C; the average temperature in 24h never being over 35°C; when the temperature is under 4°C, the hydraulic oil should be changed and the heater should be turned on.
- relative humidity: being under 30%~95%, and condensation should never be caused by the change of the humidity.
- Sea level elevation: under 1000m.
- Air: no heavy dust, sour gas, corrosive air or salinity.

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- To avoid the direct sunlight to the machine, or the change of the environment temperature caused by the heat emission to the machine.
- The position for installation should be far away from vibration source.
- The position for installation should be far away from the flammable and explosive goods.
- The machine line should be installed in the workshop in the area of where has lightening arrestor.
- The floor for installation must be solid and flattening.
- If the machine line has to be installed near around the vibration source, some measurement to reduce the vibration should be taken, e.g. digging grooves around the machine.
- Noise: if noise is over 85db, it needs to advise user to wear earmuffs. Meanwhile, show the alarm notice on the product instruction and machine.



6.3.2 The connector for the power

The power-line terminal R, S, T, zero line N and earthing screw are all in the

lower right corner of the electric mounting board in the electric control box.

6.3.3 The general power

The voltage, the frequency and its allowable fluctuation range of the machine on the condition that there is no special requirement in orders.

Voltage: 380V; the voltage in steady state is $0.9 \sim 1.1$ times as much as the rated voltage.

Frequency: 50HZ; the frequency in steady state is $0.99 \sim 1.01$ times as much as the rated frequency,(continuous servicing) and $0.98 \sim 1.02$ times as much as the rated frequency, (short-term running)

6.3.4 Installation

The way to install the machine influences its functions much. If the installation is out of reason, there will be some defects appearing, such as transporting belt running out of its way, the entirety twisting, so that the running condition of the machine could not come to the good state in the first adjustment and preoperation.

6.3.4.1 Foundation

When install the machine, the operator should choose a piece of solid and flattening land first, fix the installation position according to the environmental requirement, and then flatten the foundation.

The foundation for the installation should be concrete with the thickness

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150 mm, the specific surface area less than 6mm, the levelness smaller than 2°.

Besides the space for the machine line, the floor area also should include the space for adjustment and maintenance.

6.3.4.2 Installation procedure

- First fix the installation position for the machine line, and then inspect whether the base of the machine is stable on the floor; if there is clearance between the base of the machine and the floor, leveling wedge is needed to take some appropriate adjustment.
- For easy operation, the electric control cabinet is better to install beside the sidewalk with enough light. In general situation, it will be fixed in front of the machine, the position on the right about one meter away from the machine. The operation direction should face the machine line.

6.3.4.3 Connotation of the inner facilities

After finishing the adjustment and connection, the tasks should be taken before turning on the machine:

- Inspect again whether each connection is firm or not.
- Inspect and make sure the phrase of the power inputted accurate. If the phrase is opposite, the rotating direction will be different with the regulation. The power should be connected again. The connection of the power refers to the parts of the electrics.
- Joint the pneumatic tube and the hydraulic pipes in order, and keep sure the tightness of the connection

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6.3.4.4 Test-run the machine

After finishing the connection of the inner facilities, the preparation for the test-running machine should be done:

- Inspect the components, pipes and shield which are removed for easy transport, to be installed in place.
- Clear all the dust and dirty on the machine.
- The surface of the metal parts have painted the antirust.

There will be dust, pebbles and other dirty things adhering to the machine, so the layer of rust must be clean away.

- Use kerosene to clear the antirust.

- Inspection:

- a. Whether all the components are ok or not?
- b. Whether there is part or accessory lost or not?
- c. Whether each part of the machine gets lubricated or not?
- d. Whether the pneumatic tube and the hydraulic pipe installed get tightly closed or not?

- Test-run the machine

After finishing the preparation for the test-running machine, press the “start” button cautiously, the machine begins to run without panels. In the whole process of the test-running machine, the operator should always stay near the electric control cabinet in order to accomplish the emergence stop once accident happens.

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VII Adjustment and operation of the machine

The clearance between the rollers and the cutter and t directly the shape, position, dimension of the panel, as well as the burr's size. The adjustment of the machine is high technical. The flattening condition of the foundation, the clearance and the position of the rollers, the difference in high and low temperature produced in the roll forming process, the loose or tight edge of the panel cut separately, the thickness and the strength of the panel, all the factors will cause the shape, dimension and shape of the panel, which requires the operator to own rich practical experience and analytical ability.

7.1 The adjustment for the clearance between rollers

The roll forming is a process that several horizontal rollers and accessorially upright rollers move relatively toward the panel, so that flatten, press, bend and from the panel.

Rollers, either horizontal rollers fixed up and down, or the accessorially upright rollers fixed side, are all in pairs. Between two rollers fixed in pairs there is an adjustable clearance, called roll gap.

7.1.1 The adjustment for the position of the horizontal rollers.

Every horizontal roller is installed on the top and bottom shafts respectively. According to the shape requirement of the panel, the rollers on the same shaft are separated by several spacers. The two ends of the shaft are tightened by

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nut. The spacer is locked together. If adjusting the specification of the product is needed, to loosen one of the nuts could replace the spacer, remove the roller and finish the adjustment of the speculation quickly and conveniently.

7.1.2 The adjustment for the clearance of the horizontal roller

The two ends of the rollers in pairs prop against the separate iron casting frame which carries with axle casting guiding. There is adjusting screw on in the separate iron casting frame. To loosen the nut and turn the screw will adjust the clearance of the relative rollers.

Inspect the height of wave, the pitch of wave and the effective width. Adjust the clearance of the last one or two rollers. The height of the wave will add, and the pitch of the wave and the effective width will decrease as the overpressure is produced by reducing the clearance between the rollers. The condition will be opposite as adding the clearance.

7.1.3 Adjustment for accessorily upright rollers

The horizontal rollers could not press the panel to the deformation point as well as continue to finish the left forming procedure when the specification of the panel is too complicated or the angular deformation of the panel smaller than 90°. In this condition, the upright rollers are set to finish the left forming task accessorily.

The accessorily upright rollers are fixed onto the inner wall. There is rabbet

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casted in the position where the bracket of the upright roller is tightened by screws, which is convenient for the upright rollers to be displaced integrally or relatively. The clearance of the upright rollers could be adjusted by loosening the screw and displacing the rollers.

7.1.4 Notes for the adjustment of the roll gap

- The clearance between rollers: generally $0.10 \sim 0.15$ mm smaller than or equal to the thickness of the panel
- Before adjustment, confirm any angular direction of the screw with square head (or hexagon nut) which used to adjust the screw stem, and mark the direction of the screw nut clearly, so that it is easy for it to return.
- Two many circles for one time are not allowed. Generally, $1/6 \sim 1/4$ of one circle is appropriate.
- After adjustment, inspect whether the forming effect come to better or not. If the effect is better, continue adjustment until the panel formed come to normal. If the effect is worse, adjust in opposite way.
- Tighten the screw nut after adjustment.

7.2 Adjustment for the straightness of the panel

Refer to the steel workpiece cold roll formed which is narrow and thick, combining with the comprehensive analysis of forming trend after clearance adjustment, its straightness is generally adjusted by flattener and straightener.

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The shape and position of the kerf by the top blade is generally taken as the adjustment standard. It will be sure to make the panel pass smoothly. On scratch is better.

7.2.1 Crescent bending

When panel is roll formed into crescent bending horizontally, adjust the roll gap on one end of the inner circular arc of the small crescent to product overpress stretching. If necessary, extend the roll gap on one end of the big crescent to assist the production.

For the machine line assembled with equipments used for straightening rollers, the operator should displace relatively and straighten the rollers until the panel is under requirement.

7.2.2 Concavo-convex bending

When the panel is roll formed into Concavo-convex bending, the rollers of the straightener take parallel displacement up and down to bend the panel opposite the direction of the current curve, which realize the purpose of straightening.

7.2.3 Distortion

According to the distortion condition of the panel, adjust one end of the

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straightening roller vertically. It is necessary that the up and down rollers should coordinate to work.

- Generally, flattening for the distortion will be operated and analyzed comprehensively with the flattening for concavo-convex bending simultaneously.
- The flattener and the straightener are generally installed between the last roller and the cutter.
- The material's rebound factor is necessary to be considered in the process of flattening and straightening. The word is "straightening must be perfect."

7.3 Adjustment for deflection

Guide the panel tardily into rollers when the panel just comes into the machine. Check whether there is deflection according to the direction of impression relative to the width of panel when the panel passes through the first or second roller. Adjust the guider for feeding to keep the panel going into rollers as well as the straightener accurately, at the same time, adjust the roll gap accordingly, and press the small edge appropriately.

When the panel goes through rollers, inspect each procedure whether there is deflection or not and adjust the roll gap at any time. If necessary, insert thin snap spacer between roll sleeves to displace the rollers appropriately, so that deflection will disappear.

7.4 Adjustment of cutter

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Cutting is classified into cutting with waste and without waste. Every blade includes the motive blade and the static blade. Cutting with waste is like that one motive blade and two static blades will bring excellent cutting shape with regular kerf and little shape changing. But there will be a piece of waste panel the same thick as the blade. Cutting without waste needs one motive blade and one static blade with not so efficient cutting effect. The kerf is not so regular and the heavy change of shape. But there is no waste produced.

The static blade is fixed on the bottom apron and keeps its guide face vertical. The motive blade is fixed on the hanger board. The guide for up and down movement is controlled by the guide board on bilateral side of the cutter bracket. There are tightening bolt and supporting bolt on the guide board. Adjusting the supporting bolt could regulate motive blade vertical and the cutting clearance of the static blade.

The cutting clearance has been adjusted when leaves the factory, so, in generally, it is no necessary to change it.

- The blade, made of special tool steel, goes through forge and hardening quench, which causes that it is easy to break. So heavy knocking is prohibited.
- Adjustment calls for careful operation. After adjust the guiding boards on two sides relatively, tighten the screw nut.
- When come to waste cutting, the motive blade and the static blades overlap together. Adjust one of the static blades.

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- When adjust the roll gap, the operator need to consider the parallelism between the motive blade's movement locus and the contacting face of the blade.
- The shape of the cutter head is basically equal with the panel cut. There is no need to mend and polish the shape of cutter head.
- Only allow to polish flatly the profile surface contacting with each other to restore the blade damaged.
- In the installation of the blade, the operator should clean the contact surface carefully, and tighten the bolt gradually and equally.
- In the process of test-run cutting, the cutter should run without any cutting material. Inspect the sensitivity of the travel switch and whether the travel is to the up limited.
- keep blade clean.

VIII Trouble Shooting

8.1 The trouble-shooting with fault prompt

When the auto screen displays the “fault”, fault prompt will show after pressing the key FAULT manually.

8.11 “Inspect the main motor and the transducer.” Cut down the connection of the motor and the transducer. If the fault disappears, the motor is out of order; if not, the transducer is in trouble. Please contact the manufacturer.

8.12 “Inspect the motor and the thermo relay of the hydraulic station” The cause: too high the electric current of the hydraulic station lead to the overload protection of the thermo relay. Please press the green button right above the thermo relay and the prompt will disappear. If the machine still displays the overload fault after power on again, it shows the motor is in trouble. Inspect the hydraulic station system and the motor of the oil pump.

8.13 “Input data”: transform into manual state by the methods mentioned above, and then press the button DELETE. Next to input data according to the steps of data setting, and finish this operation by pressing the button END

8.14 The shear does not come to the highest level.

8.15 The shear does not come to the lowest level.

8.16 “EMERGENCE STOP button no up”: inspect whether the emergence stop is up or not, or its contact coheres or not.

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Remarks: the system will quit the auto state and transforms into manual manner when the system comes into trouble or stops emergently, so that it can keep the life and equipments safe.

8.2 The normal breakdown and electric breakdown without prompt:

8.21 The transducer is power on but the touch screen is out of order.

Causes: 1.The fuse breaks; 2.The power is lack of phrases.

Solution: 1. replace the fuse; 2.inspect whether the three phrases of the power is 380V.

8.22 The hydraulic station will not start.

Causes: 1. the power is lack of phrases; 2. AC contactor is lack of phrases.

Solutions: 1. inspect whether the three phrases of the power is 380V; 2. inspect whether the three sets of the main touch contacts of the AC contactor is in good working condition or not. If not, replace them timely.

8.23 AUTO does not work.

Causes: 1.the shear is not up to its working level; 2. the position limit switch is out of order.

Solution: 1. press the button CUTTING END in the manual state to force PLC

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to input X7

and the indicator light on (that is to put up the shear to its upper limit, and inspect whether the up stroke switch is off or not); 2. Replace the position limit switch

8.24 The shear does not work.

Causes: 1. The motor of the hydraulic station rotates reversely; 2. Lack of hydraulic oil;

3. The hydraulic electromagnetic valve is jammed; 4. The hydraulic cylinder leaks oil.

Solutions: 1. Teplace the incoming line of the hydraulic station; 2. Add hydraulic oil; 3. Replace the electromagnetic valve or clean the valve cores; 4. Teplace the sealing device.

8.25 The touch control screen does not display the length.

Causes: 1. The operator set the wheel-diameter modulus too small; 2. The encoder breaks down.

Solutions: 1. Check whether the wheel-diameter modulus setting is right or not. If not, reset the data on the basic of 1.0000; 2. Replace the encoder (Type: OMRON E6B2-CWZ6C 360P/R 2M)

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IX Notes

Never alter the data set on at will when the host machine is running normally.

Never do non-standard operation when the host machine is running normally, such as to check the clearance of rollers, to remove breakdown or to clear the waste.

No operating in loose coat, gloves or long hairs.

Everybody could not turn on, operate, maintenance the machine or touch the electronics without the authorizer's permission.

Connect the motor of the hydraulic station and the main motor. Connect U1, V1, and W1 with the main motor and U2, V2, W2 with the motor of the oil pump.

Connect the voltage of incoming line with alternating current 380V, 3phrases ($\pm 10\%$).

As the touch screen is fragile, never operate with heavy tools. We suggest operating by Col-erase pencil's rubber end so as to keep the screen in good condition and operated in right way.

The useful time of the touch screen light is 5,000 hours. It will go out automatically if there is no operation in 10 minutes in order to protect the screen. And the light will go on again when the fingers or the rubber end touch the screen.

The electric control cabinet needs an environment of no water, no moist

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(35-85%RH) and temperature 0-50°C.

The touch screen of the electric cabinet is fragile, so take care when carry and transport it. No heavy tool to operate it.

The working disc of the encoder must touch with the panel tightly.

For fear of cutting down the accuracy of measure, the disc should avoid touching with impurity, such as oil, water, dust etc.

No collision and rain water

X The Operation and Maintenance of the Hydraulic Station

- ★ Actuating medium: 32# (for winter), 46# (for summer) of hydraulic oil.
- ★ The hydraulic oil filtered over 120 meshes.
- ★ The temperature of the working oil: 0~55°C .
- ★ The working pressure of the system $\leq 16\text{MPa}$.
- ★ On water onto the oil box.
- ★ The Normal Breakdown and the Removal Means:

Breakdown:

1. No oil, no pressure and no move of the punch shear;
2. Heavy noise; strong fluctuation of the pressure;
3. No enough thrust; or the working speed declines, even stops.

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The breakdown analysis and its removal means:

1. Wrong rotation direction of the electric motor; blockage of the oil pipe or the filter;

The removal means:

①exchange the power incoming line; ② dredge the pipeline; Clean the filter; replace the oil.

2. The oil pipe and the filter block; the seal leakage; the oil level is too low.

The removal means:

① clean the filter to smooth the oil pipe; ② inspect the seal and keep sure it recover its function; ③ add oil.

3. The gap between the piston and the hydraulic cylinder is too small; the damage of the o-shaped seal washier leads to inter-transit between the high-low cavities; the curve of the cylinder rod causes the adding of the obstruction.

The removal means:

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- ① check the space between the hydraulic cylinder and the piston rod; ② replace the o-shaped seal washer; ③ regulate the piston rod.

XI The Operation and Maintenance for the Machine

- The temperature of the oil in the oil box of the hydraulic station should be kept between 20°C~40°C;
- Take care the working condition of the hydraulic pump, and remove the exceptional noise;
- No water or dust onto the hydraulic oil box;
- Clean the oil filter often;
- When replace the hydraulic oil, it needs to clear up the useless oil and wash the oil box. The fresh oil should be filtered over 120 meshes;
- The replaced period of the hydraulic oil in normal working condition is 12-18 months;
- Often inspect whether there is the hydraulic oil leakage;
- Often inspect whether there is normal move, exceptional noise of the chain drive system or not; pour the clean lubricant oil or grease lubricant;
- Protect the shear edge carefully and prohibit damage;
- Often clean the deposit builder on, especially on the opposite side of the rubber conveyor belt;
- Start the hydraulic motor first and then the main motor next;

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- No opening the door of the PLC controlled cabinet, protective cover cap and the oil box cover;
- Often inspect whether the hydraulic cooling mechanism or the heating mechanism runs normally or not;
- Turn off the main power timely when the machine stops.