

2013

BEKAMAK

bandsawing machines

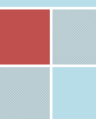
SEMI AUTOMATIC TWIN PILLAR BANDSAWING MACHINES

BMSY 810C



RUNNING VOLTAGE

SERIAL NUMBER



Manufacturer / imalatçı : Beka-mak Makina Sanayi ve Tic. A.ş.

Address / Adres: İzmir yolu 25.km Marmarabirlik yani 16370 Başköy-Bursa/Türkiye

Telefon : 02244490361 (4 hat)

Fax : 02244490360 Nilüfer / Bursa

Http : // www.bekamak.com.tr

E-mail : bekamak@bekamak.com

Warranty

- The firm guarantees the machine described hereby, designed in compliance with all regulations in force, in particular safety and health regulations; the machine has undergone successful testing.
- The warranty covers a period of 12 months. It doesn't cover electrical motors and tools.
- The purchaser is entitled 'replacement of faulty parts'. Shipping and packing costs are at his expense.
- The warranty doesn't cover the parts damaged by falls or careless handling of the machine, incorrect operation, non-compliance with the maintenance rules. Any tampering with the machine, especially with the safety devices automatically expires the warranty and the manufacturer will be freed from any responsibility.
- Any kind of alteration on the machine ends the warranty and the manufacturer becomes free from every kind of responsibility.
- No claim for damages shall be accepted in case the machine lays idle for a long period of time.
- Machine is designed to be run indoors. It is not recommended to run the machine outdoors.

The serial number on the machine is a 'main reference for the warranty', instructions manual, after sale service and identify the machine in case of need.

Important

Upon the delivery of the machine, the consumer must make himself sure that all the devices indicated in the paragraph of the safety manual are present and working correctly. Furthermore, he must mount in conformity with the instructions indicated those devices which are not mounted at the time of delivery to facilitate transport.

When ordering spare parts

It is necessary to state:

- Machine model
- Serial number and year of production
- Item reference number

Without serial number no spare parts will be delivered

General Information

- The machines are manufactured in compliance with the accident prevention rules in force.
- Strictly comply with the instructions contained in this manual to obtain the best performance from the machine. Strict compliance with the rules contained herewith will ensure optimum results and avoid any inconvenience caused by the non-compliance of operation and maintenance instructions.
- Closely follow the instructions given below to avoid contacting the manufacturer for the problems which can be easily solved..
- If after having strictly compliance with the given instructions, the purchaser still needs the help of our technical assistance service, he must supply all the technical indications necessary to determine the type of problem and/or the parts which are not functioning correctly. This will enable our technical assistance service to intervene quickly and efficiently on the machine.

Copies of the instruction manual may be requested upon indication of the machine serial number.

General Safety Notes

All installation work including the electrical connection must only be carried out by qualified personnel.

The machine must only be operated by a technically trained and experienced operative who is also instructed in 'safety at work' procedures.

Any adjustments, cleaning, repairs or changing of the saw blade must under no circumstances be performed unless the machine is fully isolated from the electrical power supply. Ensure the emergency stop button on the control binnacle is pressed and the power supplies at the mains are disconnected."

The band saw must be regularly inspected and maintained in good serviceable condition. Eye protection, ear protection, gloves and protective clothing must be worn when any of the above procedures are being carried out, as well as when cutting fluid is prepared, introduced or displaced from the band saw machine (the relevant environmental regulations must be observed in case of the use and disposal of cutting fluid etc.)

The band saw must be installed on ground. Observe the permissible floor load. Than the band saw machine has been properly bolt to ground securely.

Allow sufficient working space around the band saw of at least 1 meter. Installations of stock roller conveyors require additional space and possibly a lifting mechanism for heavy work pieces.

Always ensure that the working area around the band saw is well lit.

Safety Instructions

- Be sure that electrical connection is made carefully. To avoid unwanted situations like electrical shock, protect the main supply cable with a holster.
- Before running the machine, be sure that all of the protections are mounted properly and all the covers are closed.
- Avoid from smoke and moisture.
- Please use the parts and equipments which are recommended. Usage of unsuitable parts and materials which are bigger than the capacity of the machine can cause unwanted situations.
- Check the machine and inform the defects everyday.
- Don't leave any material after chancing the band.
- Do not hold the material while the machine is cutting. Always tighten the material by using essential parts.
- Please pay attention to choose the area of the machine which doesn't include anything that creates difficulties to control the machine
- Please be sure that the teeth of the band are looking to correct direction.
- Don't leave the band on the ground or any place that is dangerous for other people.
- Be careful when using the machine and keep the working area clean (clean the saw dusts and oil traces)
- Pay attention to security instructions when using the machine.
- Don't wear loose cloths when using the machine.
- Regardless use the protective gloves when using the machine.
- Don't get close too much to the machine when running.
- Before carrying out any cleaning or maintenance procedure, disconnect the machine from main supply.
- In some conditions, noise level can be about 85 db. Band choice and cutting speed is important factor for noise level.
- Illumination is an important factor for security.
- Ratio of coolant liquid is important for obtaining optimum lubrication.
- Never use the machine if you notice any fault of the machine or absence of any part of the machine.
- Control the emergency button at least once a week and be sure that it is working properly.

RELATED DIRECTIVES AND STANDARDS /İLGİLİ YÖNETMELİK VE STANDARTLAR

DIRECTIVES/DİREKTİFLER

MACHINERY DIRECTIVE-/MAKİNE DİREKTİFİ **2006/42/EC**

LOW VOLTAGE DIRECTIVE/DÜŞÜK VOLTAJ DİREKTİFİ **2006/95/EC**

ELECTROMAGNETIC COMPATIBILITY DIRECTIVE/ELEKTRO MANYETİK UYUMLULUK DİREKTİFİ- **2004/108/EC**

STANDARDS/STANDARTLAR

EN İSO 13857:2008; SAFETY OF MACHINERY-SAFETY DISTANCES TO PREVENT DANGER ZONES BEİNG REACHED BY UPPER LOWER LIMBS/KOL VE BACAKLARIN ULAŞABİLECEĞİ BÖLGELERDE TEHLİKENİN ÖNLENMESİ İÇİN GÜVENLİK MESAFELERİ

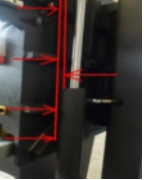
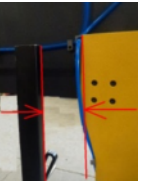
EN İSO 4413:20106: HYDRAULIC FLUID POWER – GENERAL RULES AND SAFETY REQUIREMENTS FOR SYSTEMS AND THEIR COMPONENTS / HİDROLİK AKIŞKAN GÜÇ – SİSTEMLER VE BİLEŞENLERİ İÇİN GÜVENLİK KURALLARI VE GENEL KURALLAR.

EN İSO 13849 -1:2008/AC:2009; SAFETY OF MACHINERY - SAFETY-RELATED PARTS OF CONTROL SYSTEMS - PART 1: GENERAL PRİNCİPLES FOR DESIGN / MAKİNELERDE GÜVENLİK- KUMANDA SİSTEMLERİNİN GÜVENLİKLE İLGİLİ KISIMLARI- BÖLÜM 1: TASARIM İÇİN GENEL PRENSİPLER

EN 13898:2003+A1:2009/AC:2010: MACHİNE TOOLS - SAFETY - SAWİNG MACHİNES FOR COLD METAL /TAKİM TEZGÂHLARI – GÜVENLİK - METALLERİ SOĞUK İŞLEME İÇİN TESTERE TEZGAHLARI

EN İSO 12100:2010 ; SAFETY OF MACHİNERY - GENERAL PRİNCİPLES FOR DESIGN – RİSK ASSESMENT AND RİSK REDUCT İON/ MAKİNALARDA GÜVENLİK – TASARIM İÇİN GENEL PRENSİPLER- RİSK DEĞERLENDİRİLMESİ VE RİSK AZALTILMASI.

EN 60204-1:2006/A1:2009; SAFETY OF MACHINERY - ELECTRICAL EQUIPMENT OF MACHİNES - PART 1: GENERAL REQUIREMENTS / MAKİNELERİN EMNİYETİ – MAKİNELERİN ELEKTRİK DONANIMI – BÖLÜM 1: GENEL GEREKLER

Residual Risks		
Do Not Touch Below Mentioned Moving Or Movable Parts Of The Machine While It Runs.		
	Mechanical Dangers	Residual Risks
	There might be the risk of hand/arm incerceration between wheel cover and control panel.	Necessary warnings are mentioned in the manual. There are warning signs on the machine.
	There might be the risk of hand incerceration between piston hose and piston when the head is down.	There is necessary and enough warnings in the manual. There is warning sign at first part. There is warning sign on the cover.
	There might be the risk of hand/arm incerceration between movable vice profile and arm withdraw point.	There is necessary and enough warnings in the manual. Warning sign has been put at related section.
	There might be the risk of hand/arm incerceration between arm and ear when movable arm is at last point	There is necessary and enough warnings in the manual. Warning sign has been put at related section.
	There might be the risk of hand/arm incerceration between hydraulic lifting piston pipe and lug support profile, movable arm piston pipe and piston upper connection block during the up and down movement of bow .	There is necessary and enough warnings in the manual. Warning sign has been put at related section.
	There might be snipping risk between movable vice profile and movable arm	There is necessary and enough warnings in the manual. Warning sign has been put at related section.

Warning

This chapter outlining the safety devices and norms was drawn up bearing in mind the normal use of the machine as stated in the chapter on the operation of the machine and the adequate preparation of the operators as regards the specific risks linked to the operation of the machine.

If the machine isn't used according to instruction given in the 'purpose of the machine' chapter in this manual, the manufacturer isn't responsible for any damage caused to people and things.

Furthermore, the manufacturer isn't responsible for any damage to people and things and things resulting from the non-compliance with the following warnings.

- A) Adopt all the necessary precautions during loading, calibration, part replacement, cleaning, and repair or maintenance operations to prevent someone else from turning the machine on.
- B) Do not temper with the safety devices and guards on the machine.
- C) Do not remove any of the safety devices and guards on the machine.

Always make sure that safety devices and guards are remounted after their temporary removal for technical reasons ordered by the boss

Connection To The Electrical System

Control panel is mounted on the electric panel. Machine is connected to the main supply in the electrical panel. **R, s and t shows the phases** , **n is** neuter and **pe is grounding**. Connection will be from the 13(l1) klemens which is at right klemens group.

Check the voltage which is mentioned at the first page of the manuel before setting the electrical connection of the machine.

If the cable phase line is correct phase control led lightens in that way it is prevented to motors move on wrong ways. Be sure that the out-put voltage at the power supply is 22 ~ 28 vdc.

The machine is protected against short circuit with interrupters and against high voltage with thermal relays. Grounding and neutralizing have to be done to protect the machine .

TECHNICAL DATA/TECHNISCE DATEN			BMSY 810C
Cutting Capacity Schnittbereich 0°	Round/Rund	mm	810
	Flat/Flach	mm	810 x 850
	Square/Vierkant	mm	810
Cutting Capacity Schnittbereich 45°	Round/Rund	mm	480
	Flat/Flach	mm	480 x 850
	Square/Vierkant	mm	480
Main Drive Motor/Hauptmotor		kW	4
Hydraulic Motor/Hydraulikmotor		kW	1,5
Coolant Motor/Kühlmittelpumpe		kW	0,12
Chip Conveyor Motor/Spaneförderer		kW	0,25
Cutting Speeds/Schnittgeschwindigkeit		m/min	20 - 100
Band Dimensions/Sagebandabmessung		mm	8200 x 41 x 1,3
Working Height/Arbeitshöhe		mm	585
Weight/Gewicht		Kg	3068
Dimensions/Masse	Length/Länge	mm	3900
	Width/Breite	mm	1200
	Height/Höhe	mm	2350

Technical Data

Transportation And Carrying Of Machine

Important

Carry well-balanced with a strong rope which will be hooked to carrying rings

Statementbf Noise

Conditions for measurement

Tested Machine: BMSY 810C Blade size: 820 0x 41 x m1,3

Material in use: ø250 Solid Material

A Nominal sound pressure level in warehouse

Lpfa,1m=77db(a) Coefficient of uncertainty k:4 db (testing capr 11202)

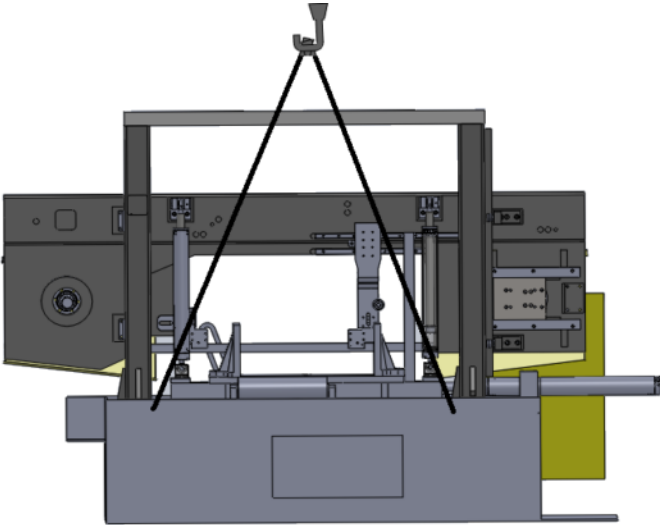
A nominal sound power level

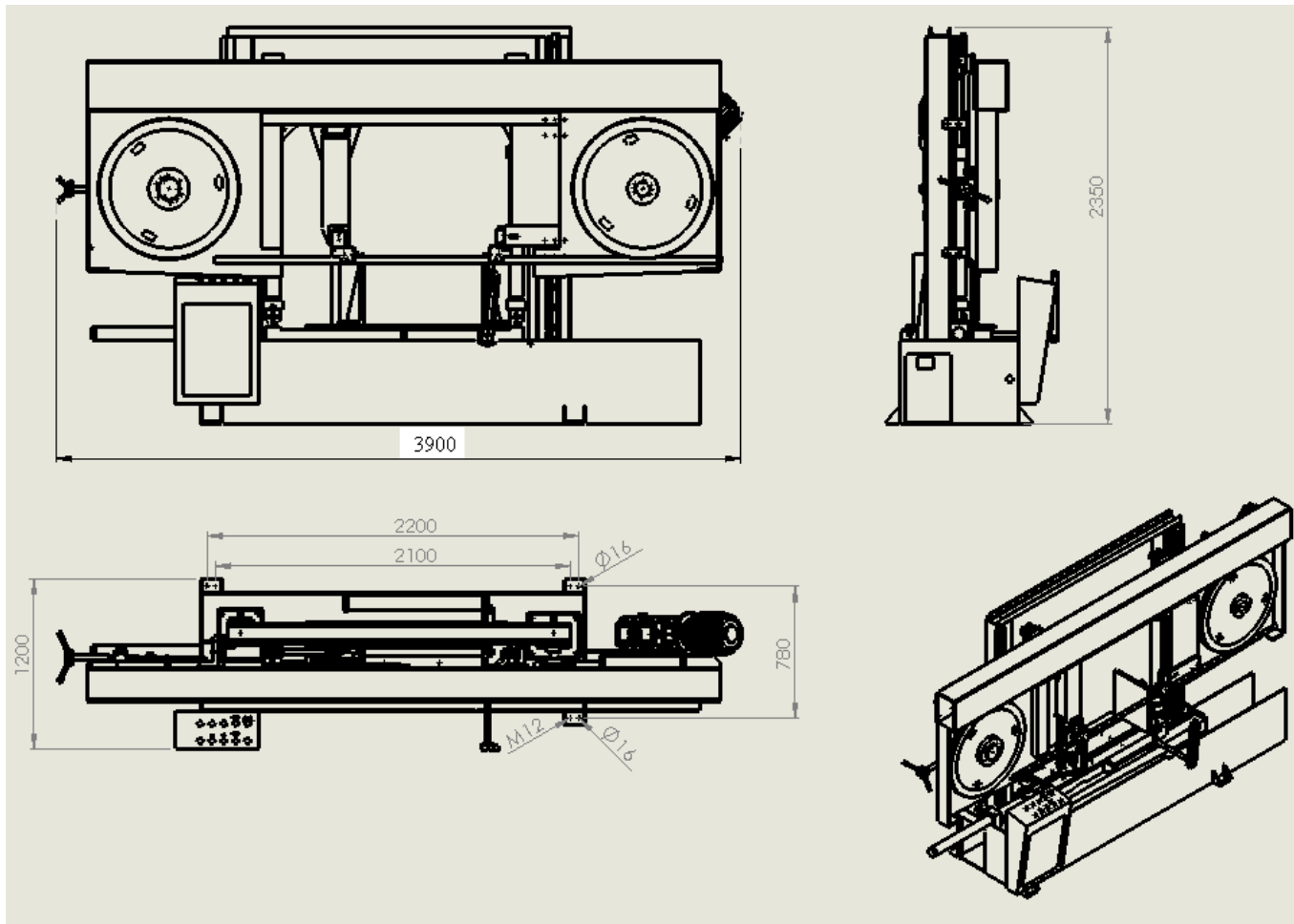
Power level lwa=69,7db(a) (mesaured value)

Coefficient of uncertainty k:4 db (testing capr 11202)

Values for noise are level of issue and it doesn't state it's of valid working level. Even if working level connection between Issue and exposure can not be used to decide if advance precautions are needed. Factors that effect the real level of exposure that depends on features of warehouse,(other sources of noise, other works nearby, and machines) including exposure time

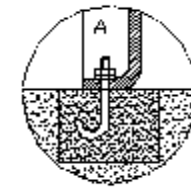
Allowed level of exposure may change from country to another. Beside these, this information clearly states risks. consider th





Fixing

Area that machine will be fixed should be flat and bowless. Machine base should be placed properly , linear and diagonal way . Get the machine to balance with 4pcs m12 screws that are on the legs, you should fix it with $\phi 13$ steel pins.



Operating instruction



Adjusting the cutting pressure;

It is used to adjust stroke rate of saw (in other words to adjust pressure applied to material by saw) according to the material to be cut. Gradually its need to reduce the pressure of saw, when saw becoming blunt. Finally the saw should be changed to prevent skewed cuts



Down feed speed adjustment: adjust speed according to hardness of material to be cut. When blade becomes blunt choose a lower speed to have a better cut.



Speed control potmeter : controls the inverter to adjust the turning speed of blade



Emergency stop button: prevents accidents at unexpected situations.



Start (ready) button: starts power cut of the machine



Start button : start the cutting



Stop button : stops the cutting



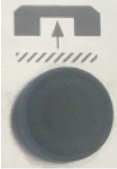
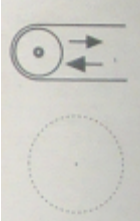
Signal button : show if there is a problem at the machine.



Coolant button : it is used to let the coolant liquid flow.



Vice pres button: it is used to press the material

	Bow up button: moves the bow up manually and stops cutting.		Bow down button: moves down the bow manually.
	Blade tightening button: tighten the blade.		Top clamping selector(optional): this option is for tightenink the material vertically for bundle cutting
	Chip conveyor		

Area 1 : this shows that the tension of the blade is less than it must be. Adjust the blade tension.

Area 2 : this shows that the tension of the blade is normal

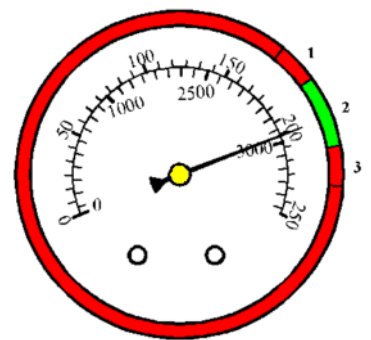
Area 3 : this shows that the tension of the blade is more than it must be. This may break the blade. Reduce the tension.

HYDRAULIC VICE:40 BAR

HYDROMECHANIC BLADE TENSION: 360 BAR

HYDRAULIC BLADE TENSION: 50 BAR

MAIN PRESSURE:80 BAR



Cutting Operation

1-add coolant to the tank

2-check level of hydraulic oil(iso)

3-switch on main switch

4-see energy on light on the control pannel

5-if there is no light change places of input phases

6-press machine ready button



7- push bow up till it's enough for material to be cut

8-open the vice by turning the related button.

9-place the material. Adjust the lenght to be cut by lean shaft and close vice jaws and fix the material.

10-the saw will not start up unless the material is not clamped wit appropriate pressure.

11-start the saw by pressing start button.

12-determine the appropriate saw cutting speed and turn on the coolant according to your need.

13-due to the material detection sensors on the machine approached to the material fastly and then passes to the speed which is adjusted by the valve.

14-when the machine runs to the cutting speed , the coolant starts as well.

15-cutting speed of the machine should be adjusted according to the material and chip after cuttong process. For example; if the chip is burnt after the cutting that means the speed is too fast. That is not proper for the machine and the blade.

16-after cuttong process the balde will rise up and stop automatically.

17-the same should be done for the second cuttng.

18-during the time there might pile up chip infront of the sensors , this might cause working problem to the machine; to aviod that , the wheel covers should be opened regularly and chip should be cleaned.

Sensor Parts

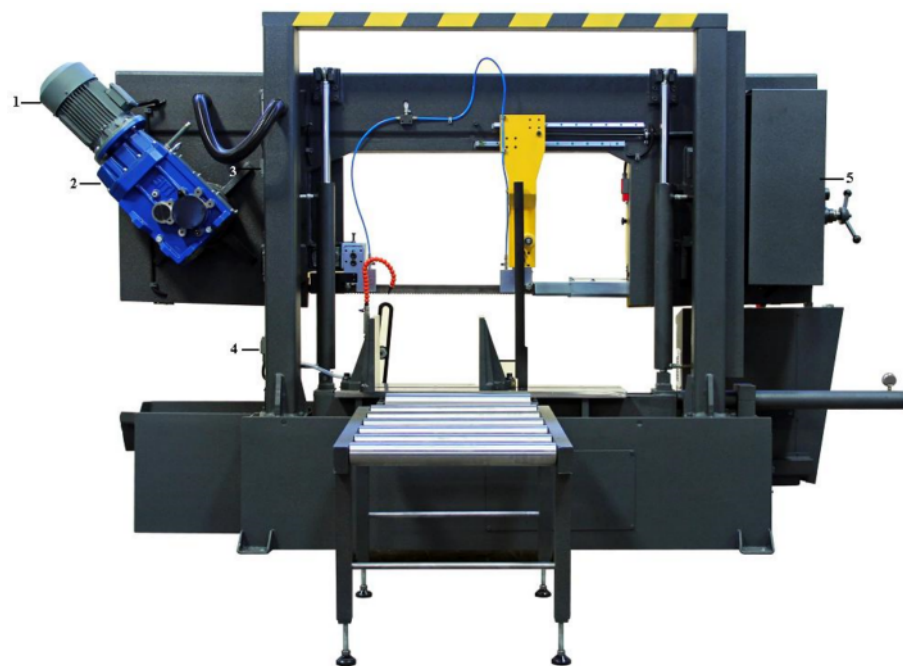
(3)**Maximum switch:** this switch sets the top point that bandsaw reaches.

(4)**Lower limit switch:** this limit switch stop the main motor and starts the bow's upwards movement.

(5)**Blade broken pressure switch:** this switch stops the main motor when the blade is broken and provides protection of the operator and the machine from the damages that a broken blade can cause..

(6)**Protection cover switches:** this switch stops the machine if any cover is open.

(7)**Fotocell:** this switch starts the main motor when the blade approaches to the material about 30 mm after the bow begins going down when start button is pressed. And in manual use, this switch stops the movement before the bow crashes to material when the bow is going down.



1- Wheel Motor

2- Wheel Reductor

3- Maximum Switch

4- Lower Limit Switch

5- Blade Broken Pressure Switch

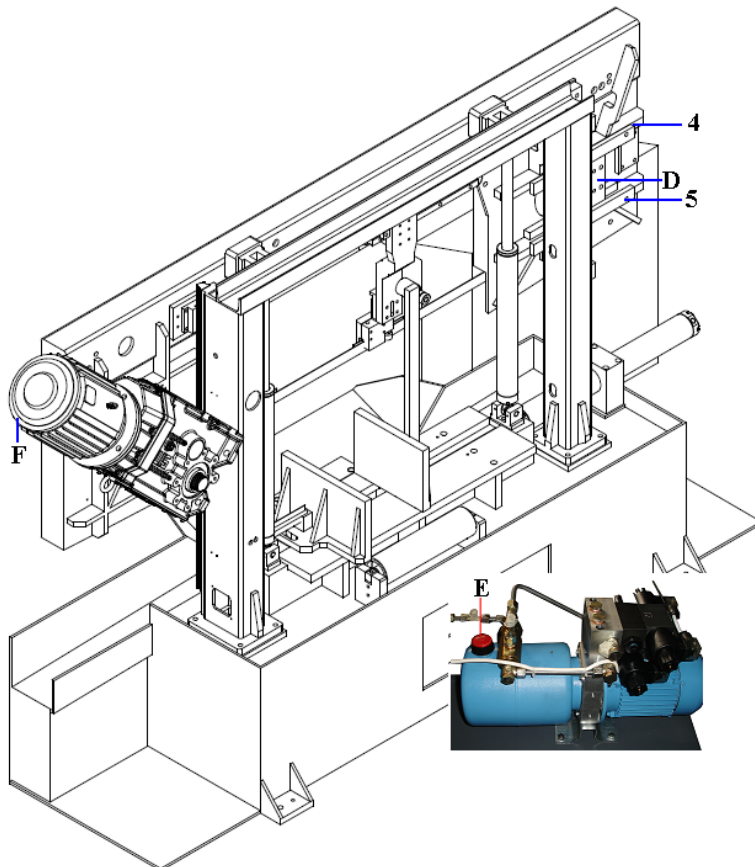
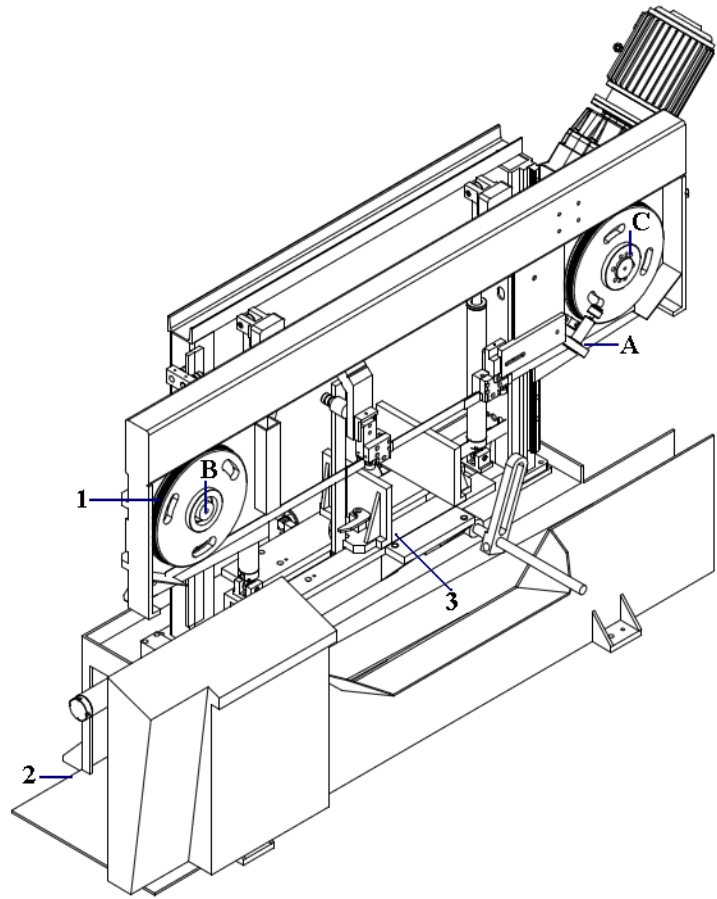
6- Protection Cover Switches

7- Fotocell



Daily Maintenance

- 1- Remove The Chips On Wheels
- 2- Clean The Chips In The Coolant Depot.
- * Pump Air To Remove The Dirth In Hoses
- 3- Remove The chips At Shaft And Flat
- 4- Manometer Should Be BetweenBar.
- 5- Clean The Tensioning Slide Flats.



Monthly Maintenance

- A-Check The Chip Brush.
- B-Fill Grease Oil From The Hole On The Shaft
- C- Check The Tightness Of Wheel Bolts.
- D- Fill Grease Oil From The Hole On The Tensioning Slide
- E- Control The Oil Level In Hydraulic Tank
- F-Check The Oil Level On Reductor From Display incase Of Decreasing Add Gear Oil (Number 90)

Changing The Hydraulic Oil

Pouring Out The Hydraulic Oil

- ✓ Lower down until it receives the cutting head.
- ✓ Remove hydraulic hose union at head lifting
- ✓ Put the removed hydraulic end of the hose into a container.
- ✓ Empty the oil by pressing head lifting button at control panel.

After emptying the oil, fix the hydraulic hose union to the same place.

Refilling The Hydraulic Oil

The hydraulic oil filling

- ✓ Remote the bolts of hydraulic drawer, then pull it out.
- ✓ Open the store cover.
- ✓ Pour 46 numbered iso hydraulic oil into tank. (8lt capacity.)
- ✓ Close the tank cover and move the drawer into the body

Fasten the screws to the body again with the help of hydraulic drawer.

Filling Of Coolant

Consisting of a mixture of liquid and water coolant liquid should be used for steel cutting. Coolant should not be used for cutting casting. Specific periods of time (at least once a month) , coolant should be drained and clean chips. If amount of coolant is not enough, add to the tank. (4 liters of tank capacity. Collant mixing ratio 1/10)

Setting New Blade

- First of all both guard flaps and the guards which are on the guide arms have to be open upwards.
- Loosen the blade by the hand level so far that the blade can be easily taken off around the pulleys
- The same way but vic averse, fit and tighten the new blade. There is also possibility to tighten the blade by torque meter.
- Always pay attention to the teeth of the blade's direction is correct. If not correct it.

Cutting Speeds

The machine has two pre-selected cutting speeds of 20 and 100 m/sec. Cutting speeds has to be selected according to the grade and dimensions of the material. If any vibration and/or noise raises from the blade, change the speed.

- All the details about the cutting of various materials and dimensions are given below

CUTTING RECOMENDATIONS							
NOTE:THE CUTTING SPEEDS GIVEN BELOW ARE GUIDELINES ONLY							
MATERIAL	MATERIAL DESIGNATION	MATERIAL NO	CUTTING SPEED		COOLANT		
			SPECIAL LG-SUPER	BI-METAL	EMULSION	CUTTING OIL	
						YES	NO
STRUCTUAL STEEL	ST 35 – ST 42	1.0308-	40 - 55	60 - 80	1:10	X	
	ST 350 – ST 70	1.0052-	30 - 45	50 - 70	1:20	X	
HARDENING STEEL	C 10 - C 16	1.0301-	45 - 65	60 - 90	1:10	X	
	14 NICR 14	1.5752	30 - 40	40 - 50	1:10	X	
	21 NICR MO 2	1.6523	30 - 45	45 - 55	1:10	X	
	16 MRCR 5	1.7131	30 - 45	50 - 65	1:10	X	
NITRICTED STEEL	34 CRAL 6	1.8504	-----	20 - 35	1:20		X
	34 CR AL NI 7	1.8550	-----	20 - 35	1:20		X
FREE CUTTING STEEL	9 S 20	1.0711	45 - 65	70 - 120	1:10	X	
HEAT TREATABLE STEEL	C 35 C 45	1.0501-	35 - 55	55 - 75	1:20		X
	41 CR 4	1.7035	35 - 35	40 - 60	1:20		X
	40 MN 4	1.5038	35 - 45	50 - 65	1:20		X
	42 CRMO 4	1.7225	30 - 40	35 - 50	1:20		X
	36 NI CR 6	1.5710	30 - 40	50 - 60	1:20		X
	24 NI CR 14	1.5754	25 - 35	40 - 60	1:20		X
BALL BEARING STEEL	100 - CR 6	1.3505	25 - 35	50 - 65	1:30		X
	105 – CR 4	1.3503	25 - 35	50 - 65	1:30		X
	100 – CRMO 6	1.3520	20 - 30	40 - 50	1:30		X
SPRING STEEL	65 SI 7	1.0906	30 - 40	40 - 60	1:30		X
UNALLOYED TOOLSTEEL	50 CRV 4	1.8159	30 - 40	40 - 60	1:30		X
	C 80 W 1	1.1525	25 - 35	50 - 60	1:30		X
	C 125 W 1	1.1560	20 - 30	20 - 35	1:30		X
	C 105 W 2	1.1645	25 - 35	40 - 50	1:30		X
ALLOYED TOOL STEEL	105 CR 5	1.2060	30 - 40	50 - 60	1:30		X
	X 210 CR 12	1. 2080	-----	20 - 35	-----		X
	X 40 CR MO V 51	1.2344	20 - 30	30 - 40	1:30		X
	X 210 CR W 12	1.2436	-----	20 - 30	-----		X
	X 165 CR MP V 12	1.2601	-----	20 - 35	1:30		X
	56 NICRMOV 7	1.2714	25 - 30	20 - 40	1:30		X
	100 CRMO 5	1.2303	20 - 30	35 - 45	1:30		X
	X 32 CRMOV 33	1.2365	20 - 30	30 - 45	1:20	X	
HIGH SPEED STEEL	S 5-6-2	1.3343	-----	25 - 40	1:30		X
	S 5-6-2-5	1.3243	-----	25 - 40	1:30		X
	S 18-0-1	1.3355	-----	25 - 40	1:30		X
	S 18-1-2-10	1.3265	-----	25 - 40	1:30		X
VALVE STEEL	X 45 CRSI 93	1.4718	-----	30 - 40	1:20	X	
	X 45 CRNIW 189	1.4873	-----	30 - 40	1:20	X	
HIGH TEMPERATURE STEEL	CRNI 2520	1.4843	-----	25 - 40	1:10	X	
	X 20 CRMOV 211	1.4922	-----	25 - 40	1:10	X	
	X5 NICRTI 2615	1.4980	-----	25 - 40	1:10	X	
HEAT RESISTING STEEL	X 10 CRAL 7	1.4713	-----	20 - 35	1:10	X	
	X 15 CRNISI 25 / 20	1.4841	-----	20 - 35	1:10	X	
	X 10 CRSI 6	1.4712	-----	20 - 35	1:10	X	
STAINLESS AND ACID RESISTING STEEL	X 5 CRNI 189	1.4301	-----	25 - 35	1:10	X	
	X 10 CRNIMPT 1810	1.4571	-----	25 - 35	1:10	X	
	X 10 CR 13	1.4006	-----	25 - 35	1:10	X	
	X 5 CRNIMO 1810	1.4401	-----	25 - 35	1:10	X	
STEEL CASTING	GS – 38		30 - 40	50 - 60	1:50		X
	GS – 60		30 - 40	50 - 60	1:50		X
CAST IRON	GG – 16		30 - 40	40 - 50	-----		X
	GG – 30		30 - 40	40 - 50	-----		X
	GTW – 40		30 - 40	40 - 50	-----		X
	GTS – 65		30 - 40	40 - 50	-----		X
HIGH TEMPERATURE NICKEL ALLOYS	NIMONIC	2.4631	-----	15 - 25	1:10	X	
	HASTELLOY	X 2.4972	-----	15 - 25	1:10	X	
	INCONEL	2.4640	-----	15 - 25	1:10	X	
ALUMINIUM ALLOYS	AL 99.5	3.0255	80 - 300	100 - 700	1:10		X
	ALMG 3	3.3535	80 - 300	100 - 700	1:10		X
BRONZE / TIN BRONZE	CUSN 6	2.1020	50 - 70	70 - 100	1:50		X
	G – CUSN 10	2.1050	50 - 70	70 - 100	1:50		X
ALUMINIUM - BRONZE	CUAL 8	2.0920	30 - 45	50 - 70	1:30		X
	CUAL 8 FE 38	2.0920.60	30 - 40	40 - 50	1:20	X	
RED BRASS	G – CUSN 10 ZN	2.1086.01	30 - 45	70 - 100	1:50		X
	G – CUSN 5 ZN PB	2.1096.01	30 - 45	70 - 100	1:50		X
BRASS	CUZN 10	2.0230	80 - 200	100 - 300	1:50		X
	CUZN 31 S	2.0490	80 - 200	100 - 300	1:50		X
ECOMMENDATION FOR TOOTH STYLEAND TOOTH PITCH SELECTIONS FOR HSS BfMETAL BANDSAWS							

Recommendation for Tooth Style and Tooth Pitch Selections for HSS BI-Metal Bandsaws

Standard Tooth		Combi Tooth	
Material Diameter	Tooth Pitch Tooth Shape	Material Diameter	Tooth Pitch Tooth Shape
< 12mm	14 tpi N	< 25 mm	10/14 tpi 0°
12-30 mm	10 tpi N	2-40 mm	8/12 tpi 0°
30-50 mm	8 tpi N	25-70 mm	6/10 tpi 0°
50-80 mm	6 tpi N	35-90 mm	5/8 tpi 0°
80-100	4 tpi KL	50-100 mm	4/6 tpi pos
110-200	3 tpi KL	80-200 mm	¾ tpi pos
200-400	2 tpi KL	> 200 mm	2/3 tpi pos
>400 mm	1,25 tpi KL		

Tooth Style Selection

Economies of cutting can be achieved by choosing the tooth style or shape correct style suited to the being cut. Saving can be made by selecting the best tooth style because of: Faster sawing, more accurate sawing, longer blade life and less breakage of teeth. The following four (4) tooth styles are available.



Standard Tooth (N)

0° rake angle, fully rounded gullet, general purpose



Skip Tooth (L)

0° rake angle, low tooth height, flat gullet to be used for brittle materials of larger diameters, i.e. bronze, brass, zinc, aluminum, gages & risers, plastics.



Hook Tooth (KL)

10° positive rake angle with wide spacing between tips, deep gullet - suitable for NF-metals, low carbon steel, large diameters

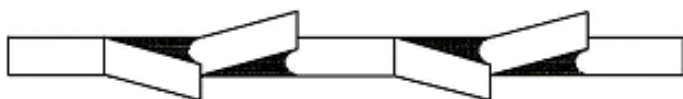


For cutting pipes and shapes

S (mm)	O (mm)	Tooth Pitch					
		<40	80	100	150	200	300
3	5	8/12	8/12	8/12	8/12	6/10	6/10
8	5	8/12	6/10	6/10	5/8	4/6	4/6
12	5	6/10	5/8	5/8	4/6	4/6	4/6
15	5	5/8	4/6	4/6	4/6	3/4	3/4
20	5		4/6	4/6	3/4	3/4	3/4
30	5		3/4	3/4	3/4	2/3	2/3
50	5				3/4	2/3	2/3

Tooth Set Selection

The purpose of 'set' in a bandsaw blade is to provide clearance and to allow the body of the blade to pass freely through the material being cut. The set depends on stock diameter, shape and material to be cut.



Regular or Raker Set

Is the most widely used setting. It consists of a repetitive pattern with one tooth set the right, the next to the left and the third (the raker) without set. This type of set is best where the material being cut is uniform size; also used in contour sawing.

Right-Left Set



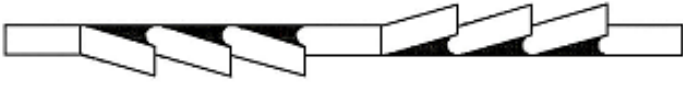
For softer materials, i.e. NF-metals, plastic & wood.



Group Set

For vibration free sawing of smaller diameters such as pipe tubing and shapes - faster cutting speeds and smoother surfaces.

Wavy Set



MATERIAL	CUTTING SPEED m/min.		BANDSAW / TPI				COOLANT	
	SPECIAL	BI-METAL	25mm	25-50	50-100	100-250	YES	NO
Structural Steel	30-50	50-85	14 R	8 R	4-6 R	3-4 R/H	X	
Carbon Steel	30-50	50-70	10 R	8 R	4-6 R	3-4 H	X	
Cementation Steel	30-70	50-85	10 R	8 R	4-6 R	3-4 H	X	
Heat Treatable Steel	30-50	50-70	14 R	8 R	4-6 R	3-4 H	X	
Cast Steel	30-50	50-70	14 R	8 R	4-6 R/H	3-4 H	X	
Cast Iron	30-50	50-70	14 R	8 R	4-6 R/H	3-4 H		X
Cr-Ni Alloys	20-30	30-50	10 R	8 R	4-6 R/H	3-4 H	X	
Stainless Steel	20	20-30	10 R	8 R	4-6 R/H	3-4 H	X	
Cr-Vanadium	20-30	30-50	10 R	8 R	4-6 R/H	3-4 H	X	
Speed Steel	20-30	30-50	10 R	8 R	4-6 R/H	3-4 H	X	
Bronze (Hard)	20-50	50-70	14 R	10 R	6-8 R	4-3 S		X
Bronze (Mild)	70-85	85	10 R	8 R	6 R	3-6 H	X	
Cooper	70-85	85	10 R	8 R	6 R	3-6 H	X	
Brass	85	85	10 R	8 R	6 R	3-6 H		X
Aluminium	85	85	8 S	6-8 S	4-6 S	3 S	X	
Bronze Alloys	50-70	85	10 R	6 H	3-4 H/S	2 H/S	X	
Al-Bronze Alloys	20-50	20-85	10 R	8 R	4-6 H	2-3 H/S	X	
Plastic	85	85	8 S	6-8 S	4-6 H	3 S		X

REGULAR

HOOK

SKIP

2013

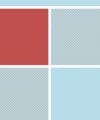
BEKAMAK
bandsawing machines

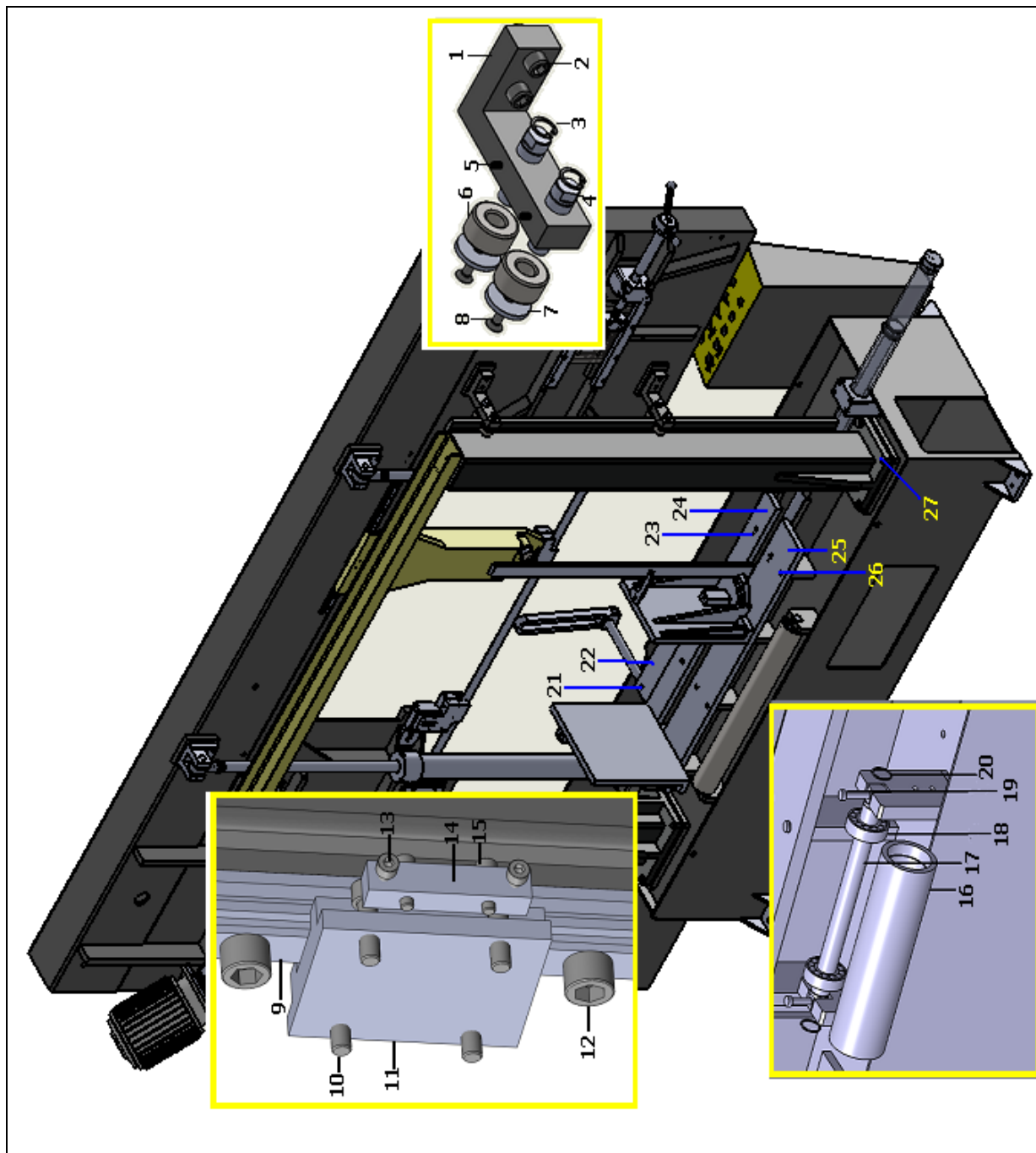
**SEMI AUTOMATIC
TWIN PILLAR
BANDSAWING
MACHINES**

BMSY 810C



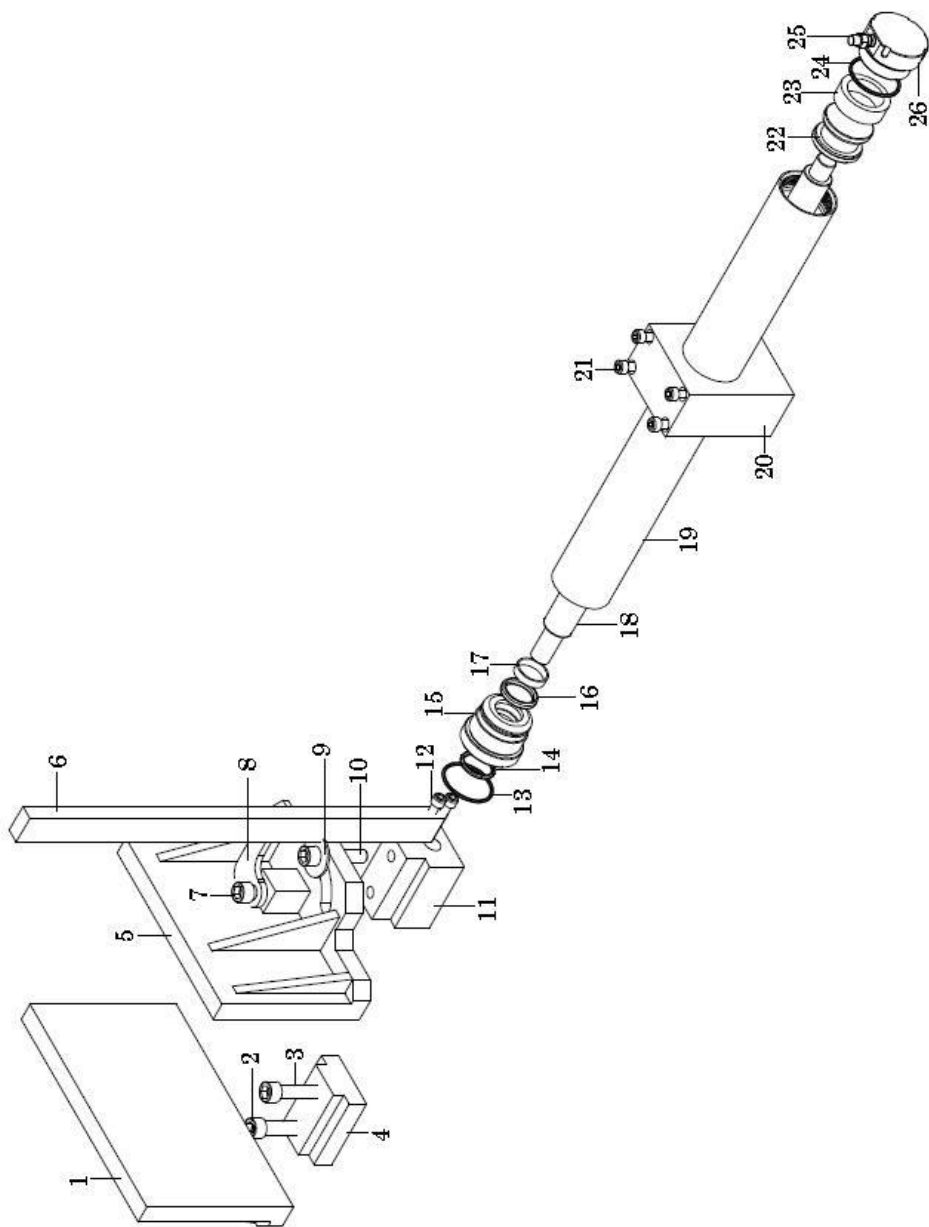
SPARE PART TABLES





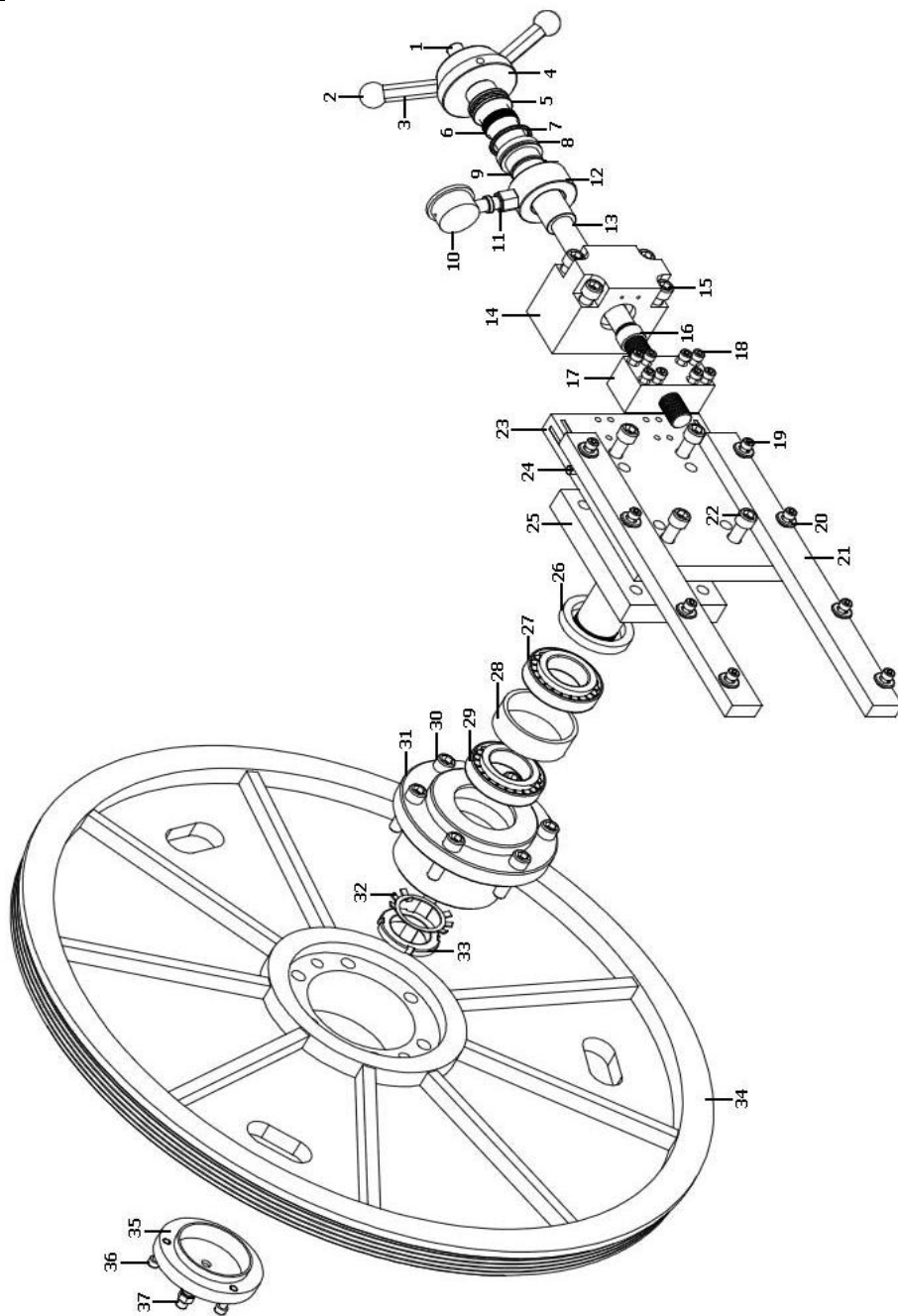
SLIDEWAY AXIS PLATES ASSEMBLY

PART NMR	PART CODE	PART NAME
001	BMSY 810C.01.01	AXIS PLATE
002	BMSY 810C.01.02	M14x50 IMBUS
003	BMSY 810C.01.03	SEGMAN 471/25
004	BMSY 810C.01.04	CAMSHAFT BEARING
005	BMSY 810C.01.05	M8x10 SESTKUR
006	BMSY 810C.01.06	BEARING NATR 20PP
007	BMSY 810C.01.07	COVER
008	BMSY 810C.01.08	M8x10
009	BMSY 810C.01.09	LINEAR SLEDGE 45
010	BMSY 810C.01.10	M14x70 INBUS
011	BMSY 810C.01.11	SLEDGE
012	BMSY 810C.01.12	M14x50 INBUS
013	BMSY 810C.01.13	M10x35 INBUS
014	BMSY 810C.01.14	ADJUST BLOCK
015	BMSY 810C.01.15	M10x40 SESTKUR
016	BMSY 810C.01.16	CYLINDER PIPE
017	BMSY 810C.01.17	CYLINDER SHAFT
018	BMSY 810C.01.18	BEARING 6306
019	BMSY 810C.01.19	M10*50 INBUS
020	BMSY 810C.01.20	RING 471/30
021	BMSY 810C.01.21	M10*30 INBUS
022	BMSY 810C.01.22	BODY CUTTING FLAT
023	BMSY 810C.01.23	Ø6 PIM
024	BMSY 810C.01.24	FRONT BODY PLATE
025	BMSY 810C.01.25	BACK BODY PLATE
026	BMSY 810C.01.26	M10*30 INBUS
027	BMSY 810C.01.27	M20x60 INBUS



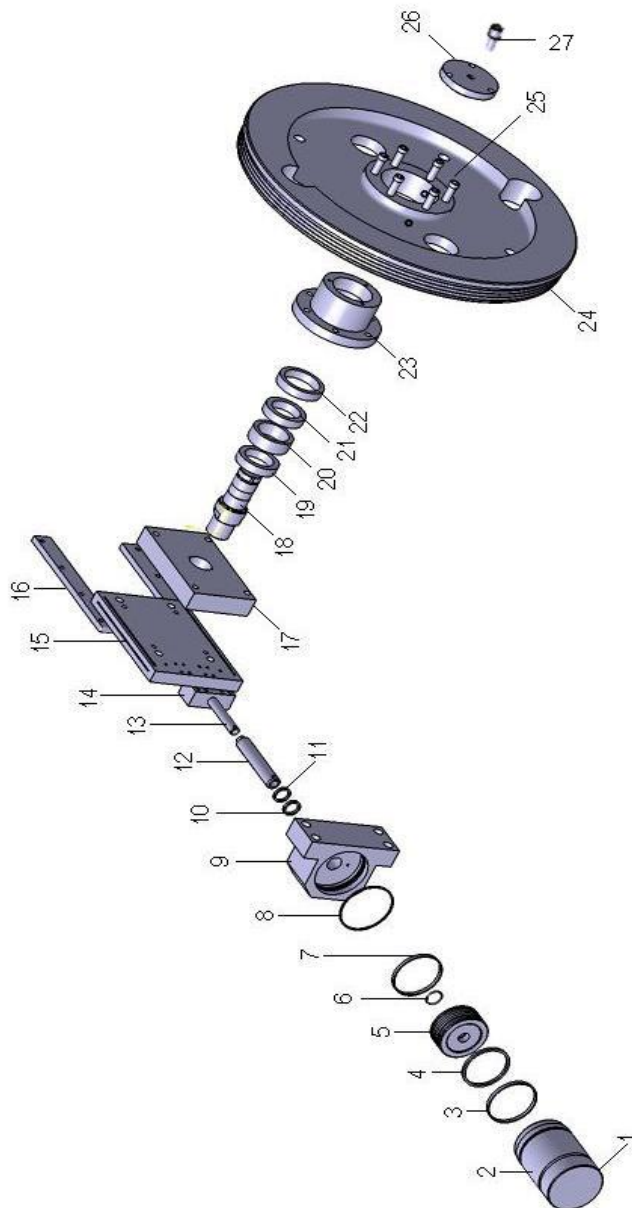
HYDRAULICS VICE GROUP

PART NMR	PART CODE	PART NAME
001	BMSY 810C.02.01	FIXED VICE
002	BMSY 810C.02.02	M16*50 INBUS
003	BMSY 810C.02.03	M16*90 INBUS
004	BMSY 810C.02.04	FIXED VICE NUT
005	BMSY 810C.02.05	MOVING VICE
006	BMSY 810C.02.06	ARM MOVEMENT PLATE
007	BMSY 810C.02.07	M16*90 INBUS
008	BMSY 810C.02.08	FIXING PART
009	BMSY 810C.02.09	WASHER
010	BMSY 810C.02.10	M16*50 INBUS
011	BMSY 810C.02.11	MOVING VICE NUT
012	BMSY 810C.02.12	M8 INBUS
013	BMSY 810C.02.13	ORING 59*65*3
014	BMSY 810C.02.14	DUST SEALS 36*44
015	BMSY 810C.02.15	PISTON BACK COVER
016	BMSY 810C.02.16	OIL SEAL 36*46*8
017	BMSY 810C.02.17	BAND 2*10
018	BMSY 810C.02.18	PISTON SHAFT
019	BMSY 810C.02.19	PISTON PIPE
020	BMSY 810C.02.20	HYDRAULICS CONNECTION BLOCK
021	BMSY 810C.02.21	M10*70 INBUS
022	BMSY 810C.02.22	PISTON SHFT HEADING
023	BMSY 810C.02.23	SEAL SET 63*47*20,5
024	BMSY 810C.02.24	ORING 59*65*3
025	BMSY 810C.02.25	JOINT
026	BMSY 810C.02.26	PISTON FRONT COVER



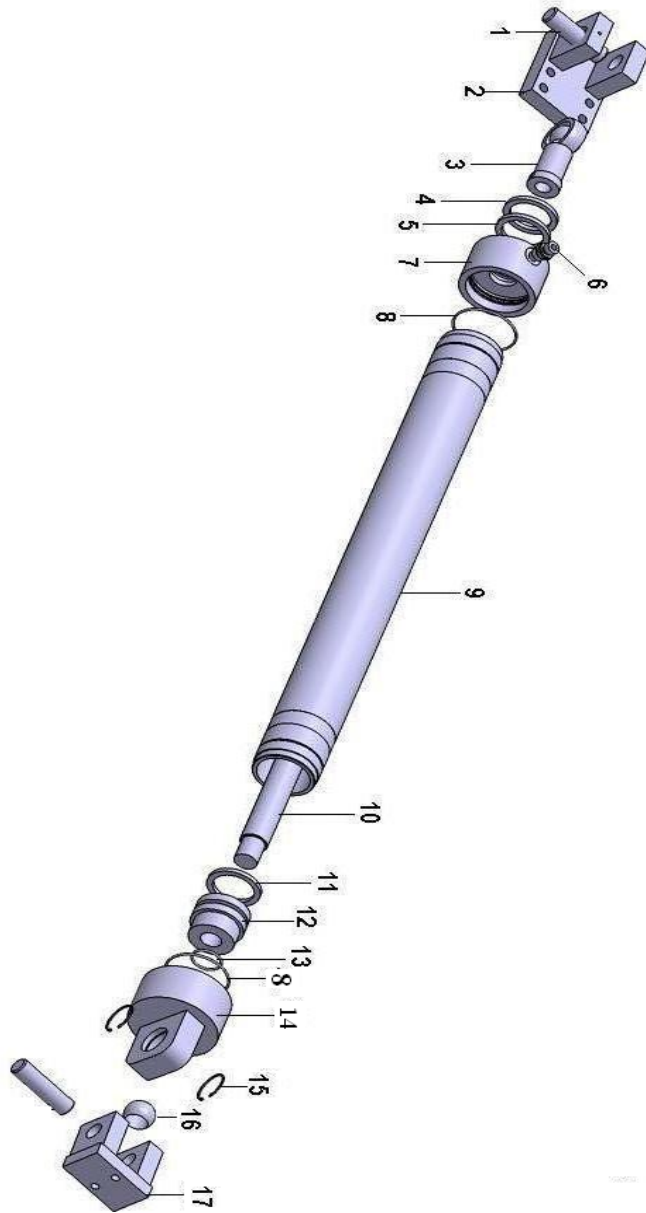
MECHANIC TENSIOING GROUP

PART NMR	PART CODE	PART NAME
001	BMSY 810C.03.01	M12*30 INBUS
002	BMSY 810C.03.02	
003	BMSY 810C.03.03	HANDLE SHAFT
004	BMSY 810C.03.04	HANDLE
005	BMSY 810C.03.05	BEARING 51205
006	BMSY 810C.03.06	WASHER
007	BMSY 810C.03.07	42,86*3,53 O-RING
008	BMSY 810C.03.08	LEAN PART (INNER)
009	BMSY 810C.03.09	34,59*2,62 O-RING
010	BMSY 810C.03.10	MANOMETER
011	BMSY 810C.03.11	1/8 REKOR
012	BMSY 810C.03.12	LEAN PART (OUTHER)
013	BMSY 810C.03.13	TESONINING SHAFT
014	BMSY 810C.03.14	TENSIONIN CONNECTION BLOCK
015	BMSY 810C.03.15	M12*100 INBUS
016	BMSY 810C.03.16	BED
017	BMSY 810C.03.17	TENSIONING SLEDGE BLOCK
018	BMSY 810C.03.18	M8x60INBUS
019	BMSY 810C.03.19	M12x45 INBUS
020	BMSY 810C.03.20	WASHER
021	BMSY 810C.03.21	SLEDGE PLATES
022	BMSY 810C.03.22	M16x60 INBUS
023	BMSY 810C.03.23	TENSIONING SLEDGE
024	BMSY 810C.03.24	GREASE UNION
025	BMSY 810C.03.25	WHEEL SHAFT
026	BMSY 810C.03.26	OIL SEAL
027	BMSY 810C.03.27	BEARING 32210
028	BMSY 810C.03.28	METAL RING
029	BMSY 810C.03.29	BEARING 32210
030	BMSY 810C.03.30	M16x80 INBUS
031	BMSY 810C.03.31	WHEEL FLANGE
032	BMSY 810C.03.32	MB10 SAFETY WASHER
033	BMSY 810C.03.33	KM10 NUT
034	BMSY 810C.03.34	FRONT WHEEL
035	BMSY 810C.03.35	WHEEL COVER
036	BMSY 810C.03.36	M8x15 INBUS
037	BMSY 810C.03.37	M10x1 GREASE UNION



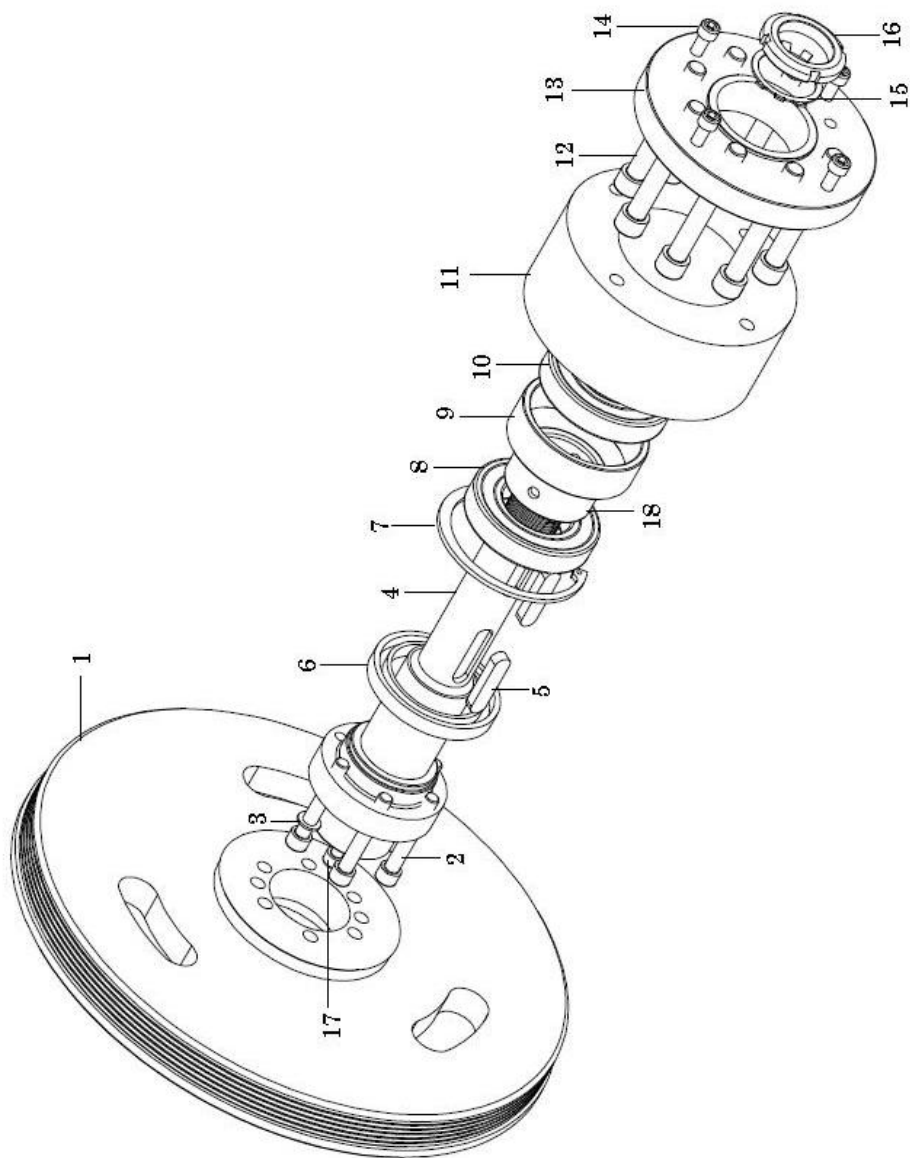
HYDRAULIC TENSIOING GROUP (OPTIONAL)		
PART NMR	PART CODE	PART NAME
001	BMSY 810C.04.01	PISTON COVER
002	BMSY 810C.04.02	TENSIONING PISTON
003	BMSY 810C.04.03	BRONZE BAND Ø110x8x2,5
004	BMSY 810C.04.04	PISTON SEAL
005	BMSY 810C.04.05	PISTON HEAD
006	BMSY 810C.04.06	O-RING K17-095
007	BMSY 810C.04.07	TEFLON BANT Ø110x8x2,5
008	BMSY 810C.04.08	O-RING
009	BMSY 810C.04.09	CONNECTION BLOCK
010	BMSY 810C.04.10	OIL SEAL
011	BMSY 810C.04.11	DUST SEAL
012	BMSY 810C.04.12	TENSIONING SHAFT
013	BMSY 810C.04.13	M20x2,5 CONNECTION BOLT
014	BMSY 810C.04.14	TENSIONING SLEDGE BLOCK
015	BMSY 810C.04.15	TENSIONING FLAT
016	BMSY 810C.04.16	FIXING FLAT
017	BMSY 810C.04.17	WHEEL FLAT
018	BMSY 810C.04.18	WHEEL SHAFT
019	BMSY 810C.04.19	OIL SEAL Ø85x65x12
020	BMSY 810C.04.20	BEARING 32210
021	BMSY 810C.04.21	METAL RING
022	BMSY 810C.04.22	BEARING 32210
023	BMSY 810C.04.23	WHEEL FLANGE
024	BMSY 810C.04.24	FRONT WHEEL
025	BMSY 810C.04.25	M16x80 INBUS
026	BMSY 810C.04.26	WHEEL COVER
027	BMSY 810C.04.27	M10x1 GREASE UNION

OPTIONAL



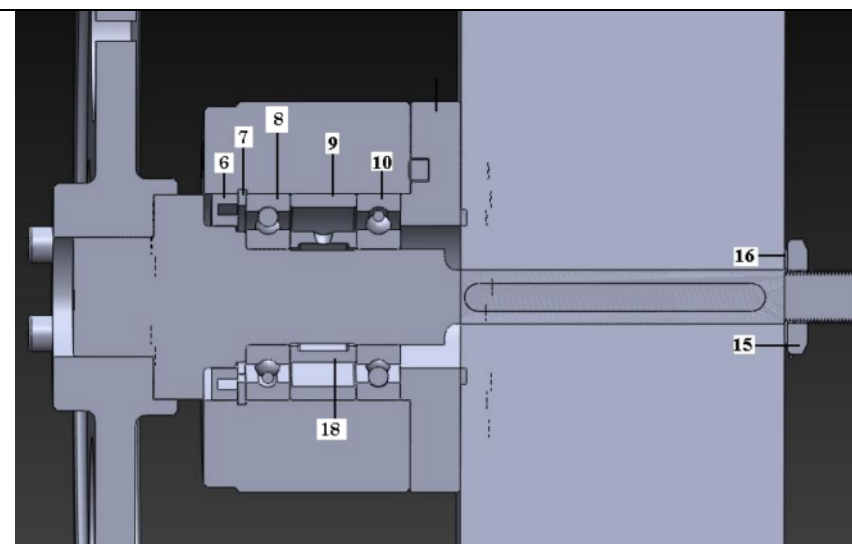
UPPER PISTON ASSEMBLY

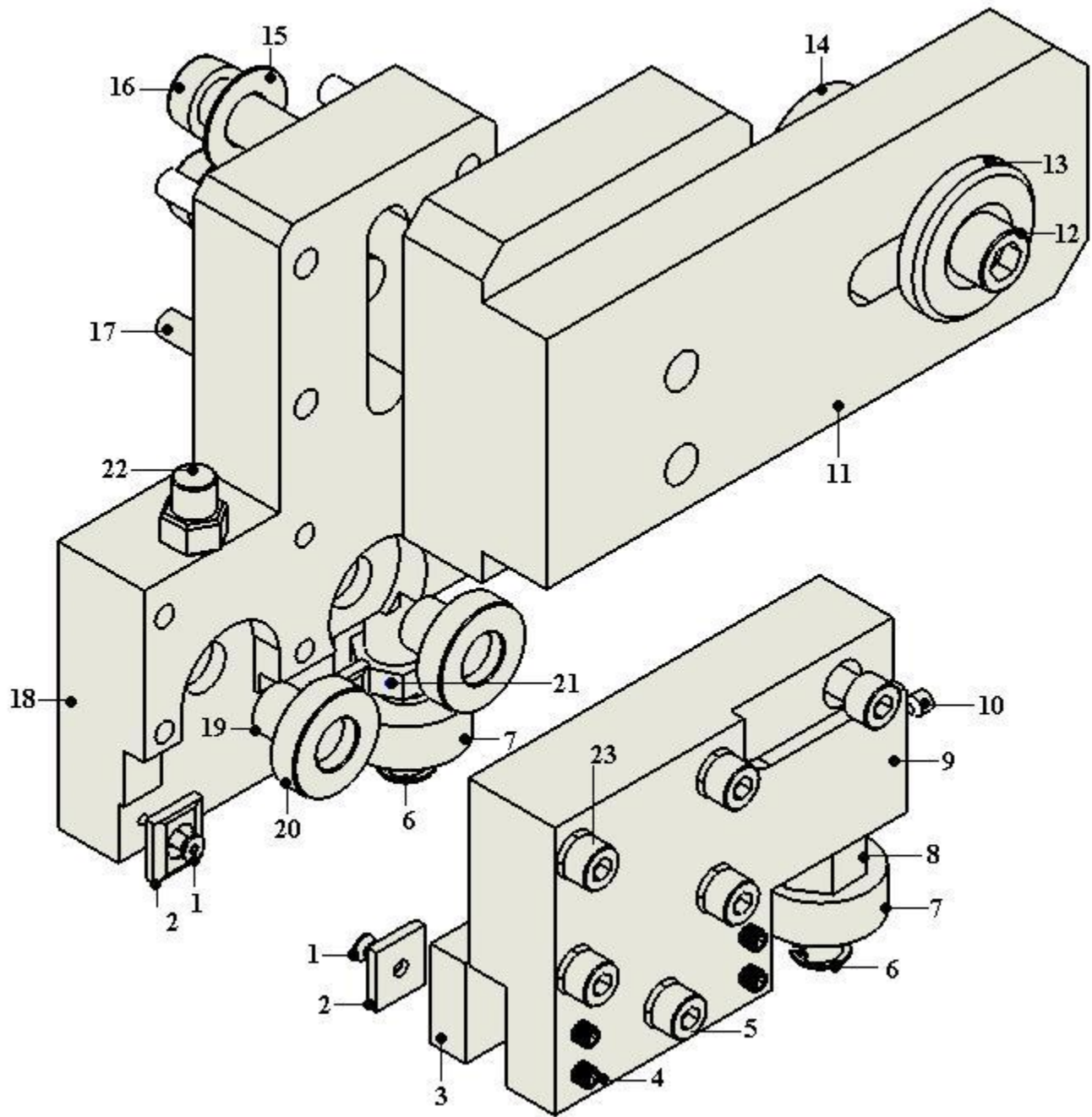
P.N	PART CODE	PART NAME
001	BMSY 810C.05.01	Ø25x95 PIN
002	BMSY 810C.05.02	BODY UP CONNECTION BLOCK
003	BMSY 810C.05.03	HELGES
004	BMSY 810C.05.04	DUST SEAL Ø36x44x4,8
005	BMSY 810C.05.05	OIL SEAL 36x46x8
006	BMSY 810C.05.06	ELBOW 3/8"
007	BMSY 810C.05.07	UP COVER
008	BMSY 810C.05.08	O-RING 58x3
009	BMSY 810C.05.09	PISTON PIPE
010	BMSY 810C.05.10	PISTON SHAFT
011	BMSY 810C.05.11	SEAL 70x54,5x6,3
012	BMSY 810C.05.12	PISTON HEAD
013	BMSY 810C.05.13	O-RING 58x3
014	BMSY 810C.05.14	LOWER COVER
015	BMSY 810C.05.15	SEGMAN
016	BMSY 810C.05.16	GE25ES JOINT
017	BMSY 810C.05.17	LOWER CONNECTION BLOCK



REDUCTOR GROUP

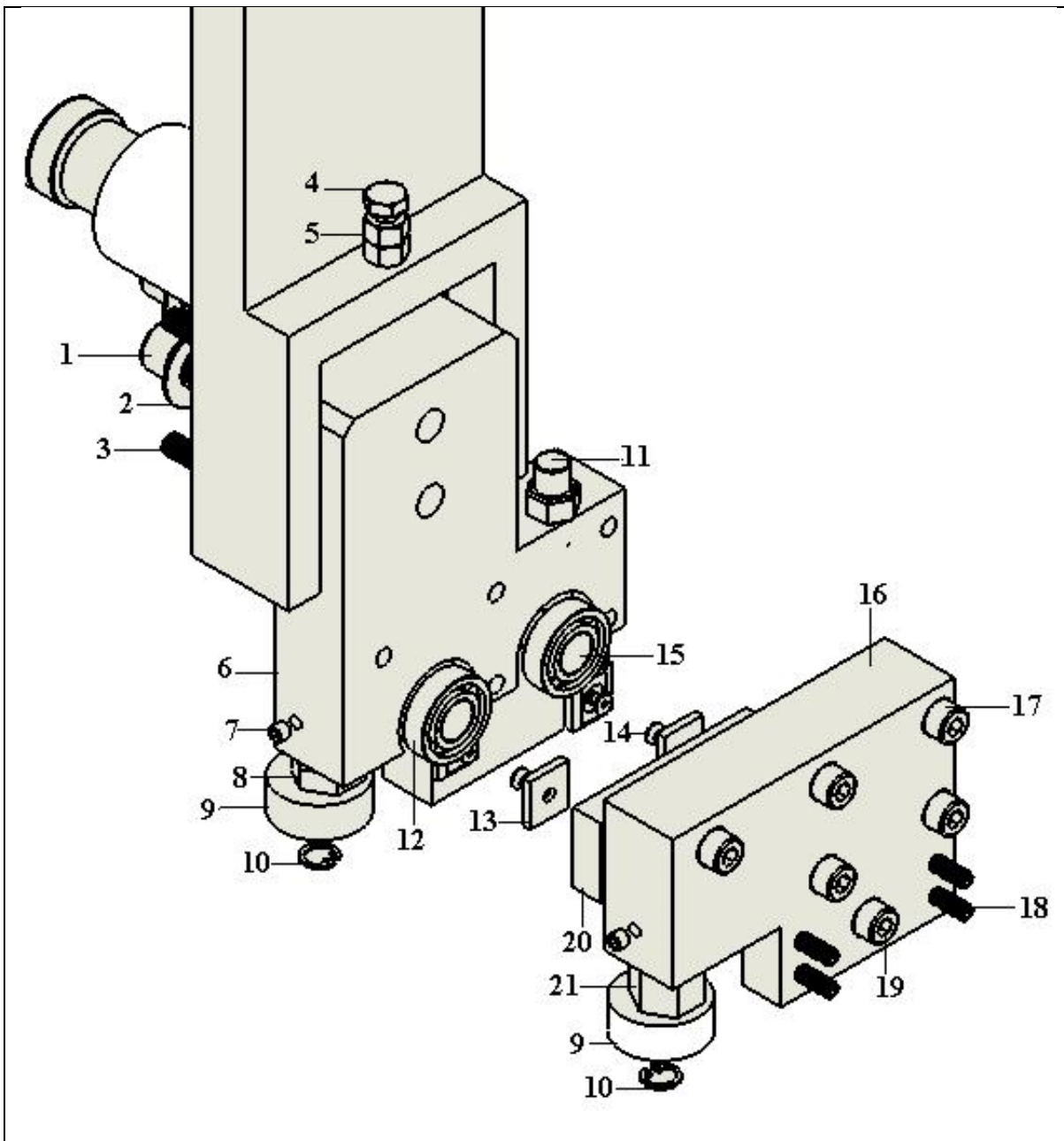
P.N	PART CODE	PART NAME
001	BMSY 810C.06.01	DRIVE WHEEL
002	BMSY 810C.06.02	M12X80 INBUS
003	BMSY 810C.06.03	SPRONG WASHER M12
004	BMSY 810C.06.04	REDUCER SHAFT
005	BMSY 810C.06.05	KEY
006	BMSY 810C.06.06	SEAL 90*150*13
007	BMSY 810C.06.07	RING DIN472/150
008	BMSY 810C.06.08	BEARING NJ 314
009	BMSY 810C.06.09	OUTER RING
010	BMSY 810C.06.10	BEARING RS 6314
011	BMSY 810C.06.11	BODY
012	BMSY 810C.06.12	M16X110 INBUS
013	BMSY 810C.06.13	FLANGE
014	BMSY 810C.06.14	M10X30 INBUS
015	BMSY 810C.06.15	MB 10 WASHER
016	BMSY 810C.06.16	KM 10 NUT
017	BMSY 810C.06.17	M10X1 GREASE UNION
018	BMSY 810C.06.18	INNER RING





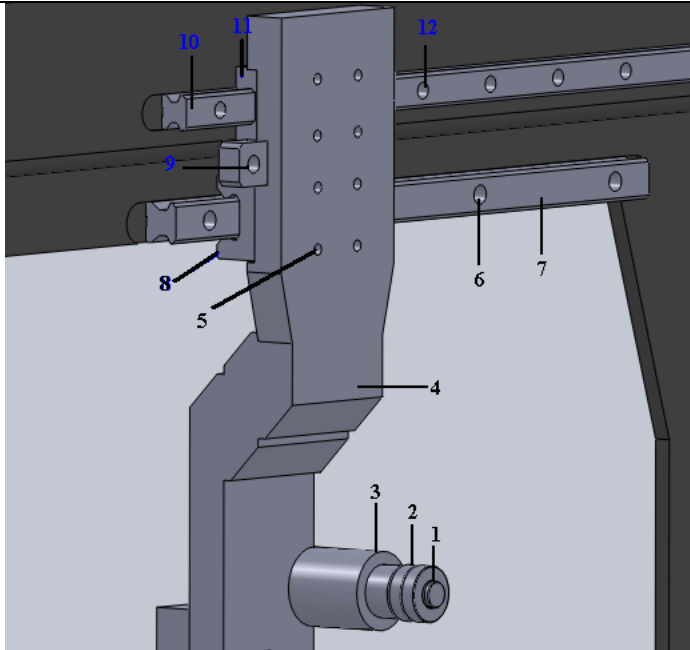
FIXED CARBIDE GUIDE ASSEMBLY

P.N	PART CODE	PART NAME
001	BMSY 810C.07.01	M4X8 BOLT
002	BMSY 810C.07.02	CARBIDE BSM-8785
003	BMSY 810C.07.03	CARBIDE PLATE
004	BMSY 810C.07.04	M6X40 SESTKUR
005	BMSY 810C.07.05	M8X35 INBUS
006	BMSY 810C.07.06	RING
007	BMSY 810C.07.07	62202 BEARING
008	BMSY 810C.07.08	ECCENTRIC SHORT PIN
009	BMSY 810C.07.09	FIXED CARBIDE BLOCK UPPER
010	BMSY 810C.07.10	M6 X6 SESTKUR
011	BMSY 810C.07.11	FIXED CARBIDE BLOCK BASE
012	BMSY 810C.07.12	M12X50 INBUS
013	BMSY 810C.07.13	WASHER
014	BMSY 810C.07.14	FIXING NUT
015	BMSY 810C.07.15	WASHER
016	BMSY 810C.07.16	M14X50 INBUS
017	BMSY 810C.07.17	M8X40 SESTKUR
018	BMSY 810C.07.18	CARBIDE PLATE
019	BMSY 810C.07.19	BEARING INNER SHAFT
020	BMSY 810C.07.20	6002 BEARING
021	BMSY 810C.07.21	ECCENTRIC LONG PIN
022	BMSY 810C.07.22	JOINT
023	BMSY 810C.07.23	M8X20 INBUS



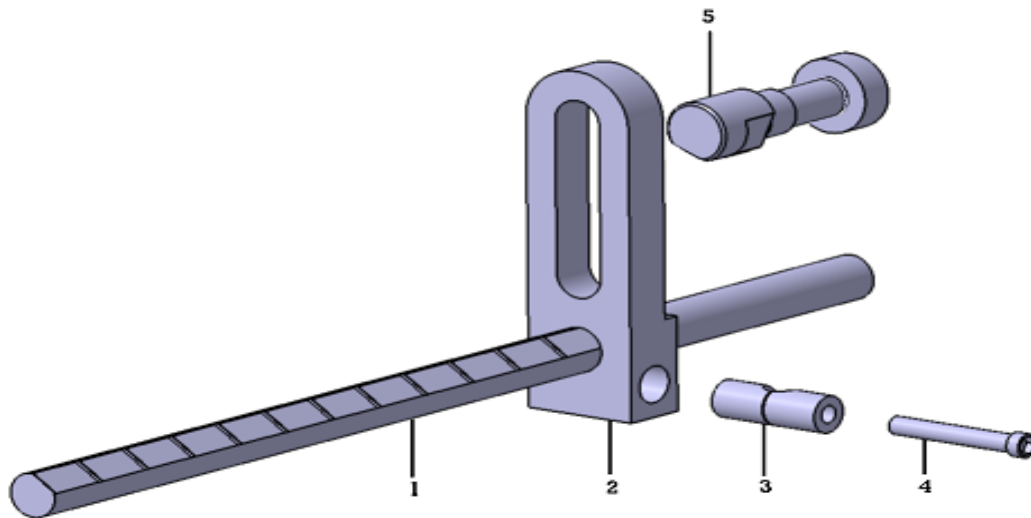
ARM CARBIDE BLOCK ASSEMBLY

PART	PART CODE	PART NAME
001	BMSY 810C.08.01	M14X50 INBUS
002	BMSY 810C.08.02	WASHER
003	BMSY 810C.08.03	M8X20 SESTKUR
004	BMSY 810C.08.04	M8X35 BOLT
005	BMSY 810C.08.05	M8 NUT
006	BMSY 810C.08.06	MOVING CARBIDE BLOCK LOWER
007	BMSY 810C.08.07	M6X6 SESTKUR
008	BMSY 810C.08.08	ECCENTRIC LONG PIN
009	BMSY 810C.08.09	62202 BEARING
010	BMSY 810C.08.10	RING 471/12
011	BMSY 810C.08.11	JOINT
012	BMSY 810C.08.12	6002 BEARING
013	BMSY 810C.08.13	CARBIDE BSM-8785
014	BMSY 810C.08.14	M4X8 BOLT
015	BMSY 810C.08.15	BEARING INNER SHAFT
016	BMSY 810C.08.16	MOVING CARBIDE BLOCK UPPER
017	BMSY 810C.08.17	M8X25 INBUS
018	BMSY 810C.08.18	M6X40 SESTKUR
019	BMSY 810C.08.19	M8X15 INBUS
020	BMSY 810C.08.20	CARBIDE PLATE
021	BMSY 810C.08.21	ECCENTRIC SHORT PIN



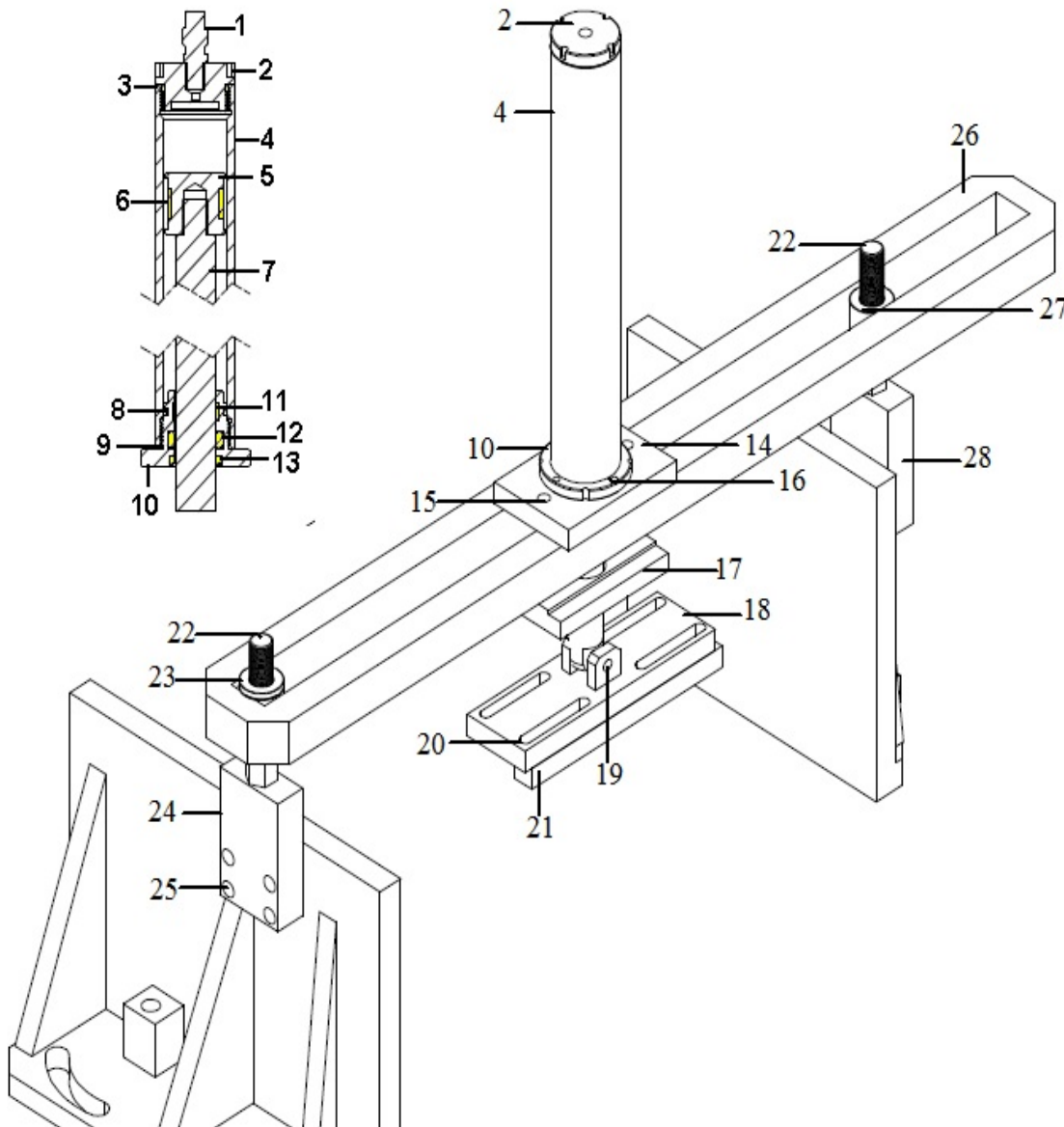
ARM ASSEMBLY

PART NMR	PART CODE	PART NAME
001	BMSY 810C.09.01	SEGMAN
002	BMSY 810C.09.02	BEARING 62202
003	BMSY 810C.09.03	BEARING CONNECTION PIM
004	BMSY 810C.09.04	MOVING ARM
005	BMSY 810C.09.05	M6X25 INBUS
006	BMSY 810C.09.06	M6X25 INBUS
007	BMSY 810C.09.07	FIXED LINEER SLEDGE
008	BMSY 810C.09.08	MOVING LINEER SLEDGE
009	BMSY 810C.09.09	M12 INBUS
010	BMSY 810C.09.10	FIXED LINEER SLEDGE
011	BMSY 810C.09.11	MOVING LINEER SLEDGE
012	BMSY 810C.09.12	M6X25 INBUS



WITCH LEAN GROUP

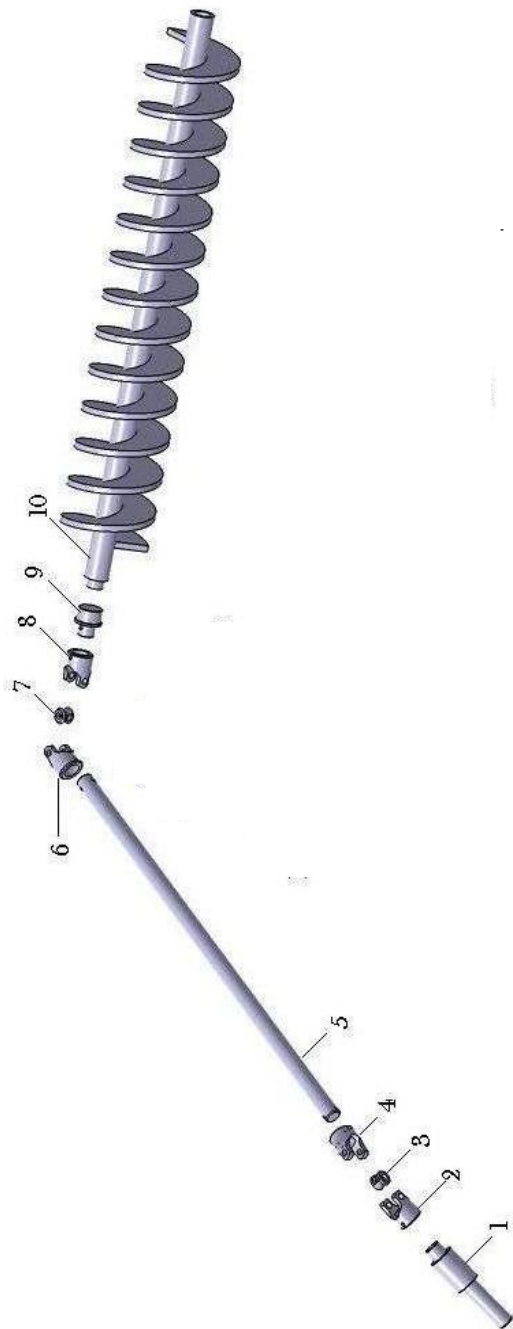
PART NMR	PART CODE	PART NAME
001	BMSY 810C.10.01	SHAFT
002	BMSY 810C.10.02	LEAN PART
003	BMSY 810C.10.03	INNER SHAFT
004	BMSY 810C.10.04	M8*60 INBUS
005	BMSY 810C.10.05	PIN



HYDRAULIC TOP CLAMP ASSEMBLY (OPTIONAL)

PART NMR	PART CODE	PART NAME
001	BMSY 810C.11.01	REKOR 1/4"
002	BMSY 810C.11.02	PISTON COVER (BACK)
003	BMSY 810C.11.03	ORING 42,86X3,53
004	BMSY 810C.11.04	PISTON PIPE
005	BMSY 810C.11.05	PISTON HEAD
006	BMSY 810C.11.06	KOMPACT SET 50X34X20,5
007	BMSY 810C.11.07	PISTON SHAFT
008	BMSY 810C.11.08	O-RING
009	BMSY 810C.11.09	O-RING
010	BMSY 810C.11.10	LOWER COVER
011	BMSY 810C.11.11	BAND 2X10
012	BMSY 810C.11.12	OIL SEAL 30X40X8
013	BMSY 810C.11.13	DUST SEAL 30X38
014	BMSY 810C.11.14	LOWER FIXING PLATE
015	BMSY 810C.11.15	INBUS M10X25
016	BMSY 810C.11.16	INBUS M6X25
017	BMSY 810C.11.17	MOUNTING PLATE
018	BMSY 810C.11.18	VICE PLATE
019	BMSY 810C.11.19	PIN Ø10
020	BMSY 810C.11.20	INBUS M10X30
021	BMSY 810C.11.21	VICE PLATE (LOWER)
022	BMSY 810C.11.22	SHAFT SET
023	BMSY 810C.11.23	WASHER
024	BMSY 810C.11.24	CONNECTION BLOCK
025	BMSY 810C.11.25	M8 INBUS
026	BMSY 810C.11.26	TOP CLAMP PLATE
027	BMSY 810C.11.27	ARA PUL
028	BMSY 810C.11.28	CONNECTION BLOCK

OPTIONAL



CONVEYOR ASSEMBLY (OPTIONAL)

PART NMR	PART CODE	PART NAME
001	BMSY 810C.12.01	REDUCTOR SHAFT
002	BMSY 810C.12.02	FRONT MOVEMENT SHAFT
003	BMSY 810C.12.03	FRONT MOVEMENT PIM
004	BMSY 810C.12.04	FRONT SHAFT
005	BMSY 810C.12.05	CONNECTION SHAFT
006	BMSY 810C.12.06	BACK MOVEMENT SHAFT
007	BMSY 810C.12.07	BACK MOVEMENT PIM
008	BMSY 810C.12.08	BACK SHAFT
009	BMSY 810C.12.09	CONVEYOR CONNECTION PIM
010	BMSY 810C.12.10	CONVEYOR SHAFT

OPTIONAL

BEKA-mak

Makina Sanayi
ve Ticaret A.Ş.

COMPANY :
MACHINE TYPE : BMSY 810 C
SERIAL NR :

COUNTRY :
OPTIONS : INVERTER
DATE :

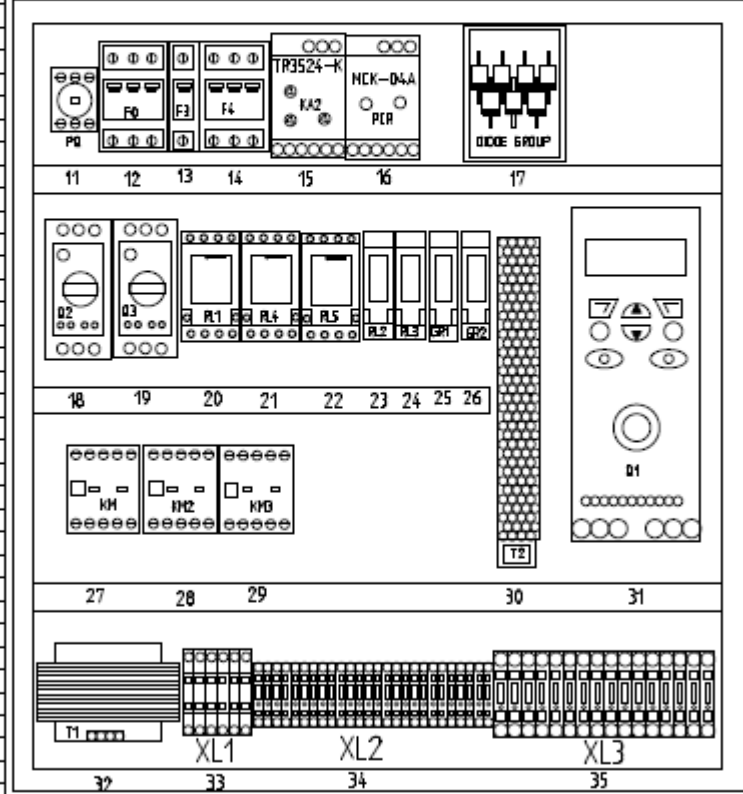
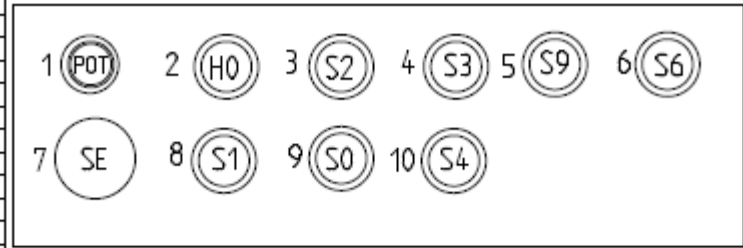


BEKA-MAK MAKİNA SANAYİ VE TİCARET A.Ş.
İZMİR YOLU 25. KM MARMARABİRLİK YANI 16370 BAŞKÖY / BURSA
TEL: (+90) (224) 449 03 61 FAX: (+90) (224) 449 03 60
<http://www.bekamak.com> E-mail: info@bekamak.com

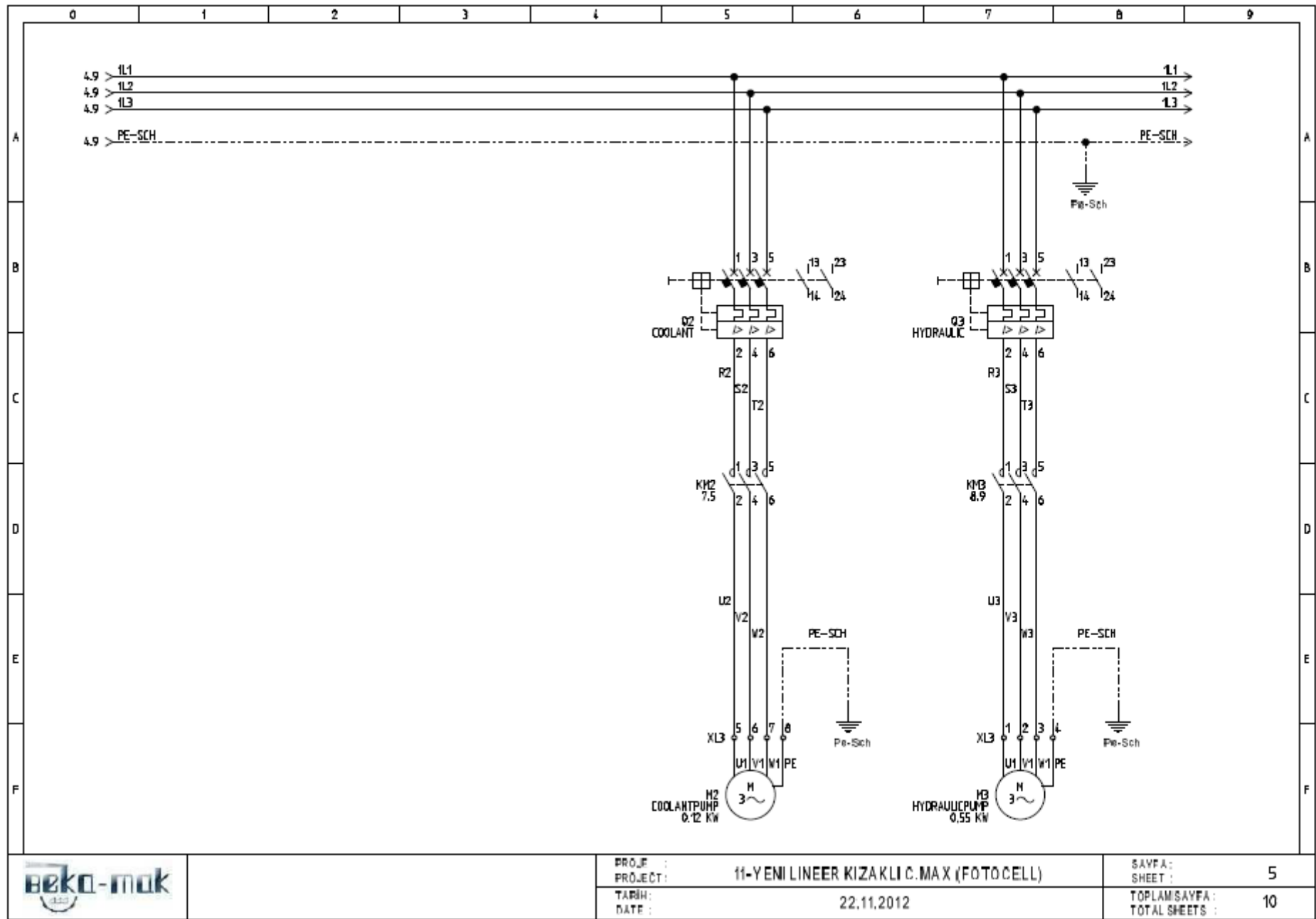


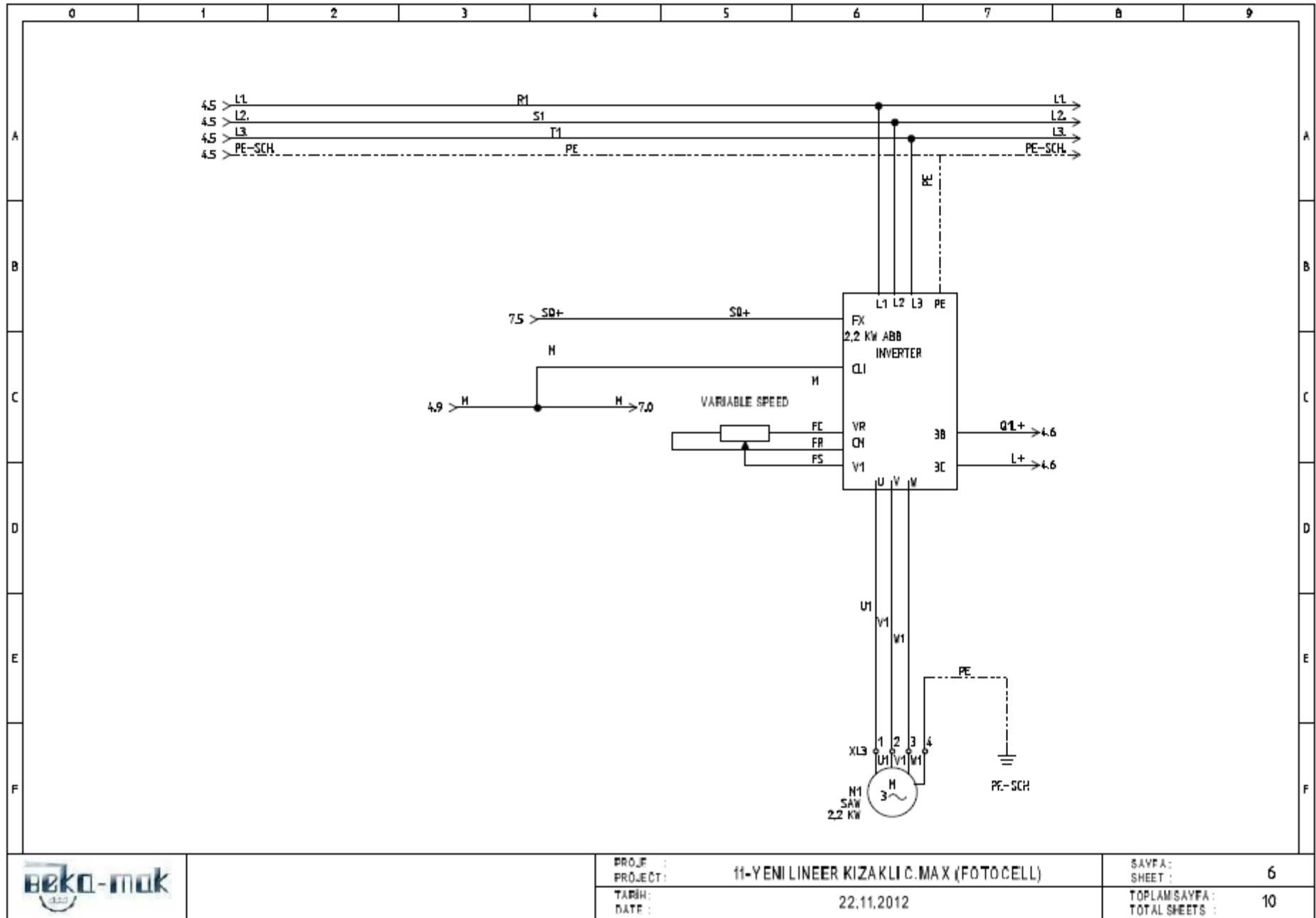
0	1	2	3	4	5	6	7	8	9
A									A
B									B
C									C
D									D
E									E
F									F
<u>INDEX</u>									
1_	COVER								
2_	INDEX								
3_	SETTLEMENT								
4_	POWER SUPPLY								
5_	POWER DIAGRAM								
6_	INVERTER PLAN								
7_	CIRCUIT DIAGRAM								
8_	CIRCUIT DIAGRAM								
9_	TERMINAL PLAN								
				PROJE :	11-YENI LINEER KIZAKLI C.MAX (FOTOCELL)			SAYFA :	2
				PROJEKT :				SHEET :	
				TARİH :	22.11.2012			TOPLAM SAYFA :	10
				DATE :				TOTAL SHEETS :	

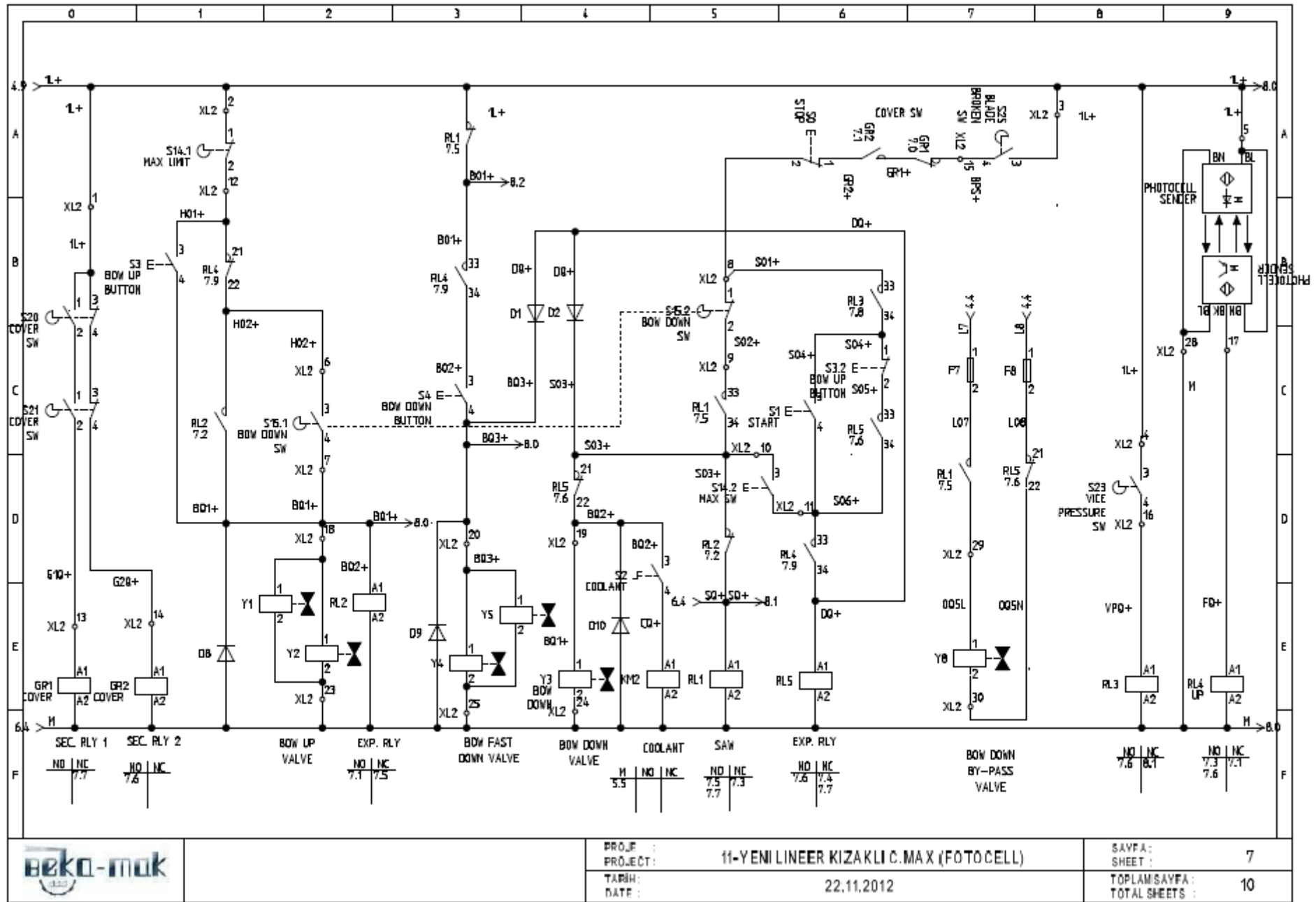
	0	1	2	3	4	5	6	7	8	9
	NO	NAME	DESCRIPTION	BRAND						
A	1	POT	POTENTIOMETER	MOMENTUM						
	2	H0	ENERGY LAMP	ABB						
	3	S2	COOLANT PUMP BUTTON	ABB						
	4	S3	BOW UP BUTTON	ABB						
	5	S0	VICE OPEN/CLOSE BUTTON	ABB						
	6	S6	MACHINE READY BUTTON	ABB						
	7	SE	EMERGENCY STOP BUTTON	ABB						
	8	S1	START BUTTON	ABB						
	9	S0	STOP BUTTON	ABB						
	10	S4	BOW DOWN BUTTON	ABB						
B	11	P0	MAIN SWITCH	ABB						
	12	F0	MAIN FUSE	ABB						
	13	F2	24 VDC FUSE	ABB						
	14	F4	INVERTER FUSE	ABB						
	15	KA2	MULTI FUNCTION TIME RELAY	KLEMAN						
	16	PCR	PHASE CONTROL RELAY	ENTES						
	17	DIODE GROUP	DIODE GROUP	NATIONEL						
	18	D2	CIRCUIT BREAKER FOR COOLANTPUMP	ABB						
	19	D3	CIRCUIT BREAKER FOR HYD.PUMP	ABB						
	20	RL1	SAW START CONTROL RELAY	ABB						
C	21	RL4	BOW UPPER POINT CONTROL RELAY	ABB						
	22	RL5	BOW FAST DOWN CONTROL RELAY	ABB						
	23	RL2	BOW UP CONTROL RELAY	ABB						
	24	RL3	VICE CLOSE CONTROL RELAY	ABB						
	25	CR1	COVER OPEN CONTROL RELAY 1	ABB						
	26	CR2	COVER OPEN CONTROL RELAY 2	ABB						
	27	KM	MAIN CONTACTOR	ABB						
	28	KM2	COOLANT PUMP CONTACTOR	ABB						
	29	KM3	HYDRAULIC PUMP CONTACTOR	ABB						
	30	T2	24 VDC POWER SUPPLY	ISOSD						
D	31	Q4	MAIN MOTOR INVERTER	ABB						
	32	T1	TRANSFORMATOR	GUNDUZ						
	33	XL1	GLASS FUSE CONNECTOR	WEDMULLER						
	34	XL2	CONTROL CABLES CONNECTOR	WEDMULLER						
	35	XL3	POWER CABLES CONNECTOR	WEDMULLER						
	36									
	37									
	38									
	39									
	40									
E	41									
	42									
	43									
	44									
	45									
	46									
	47									
	48									
F										

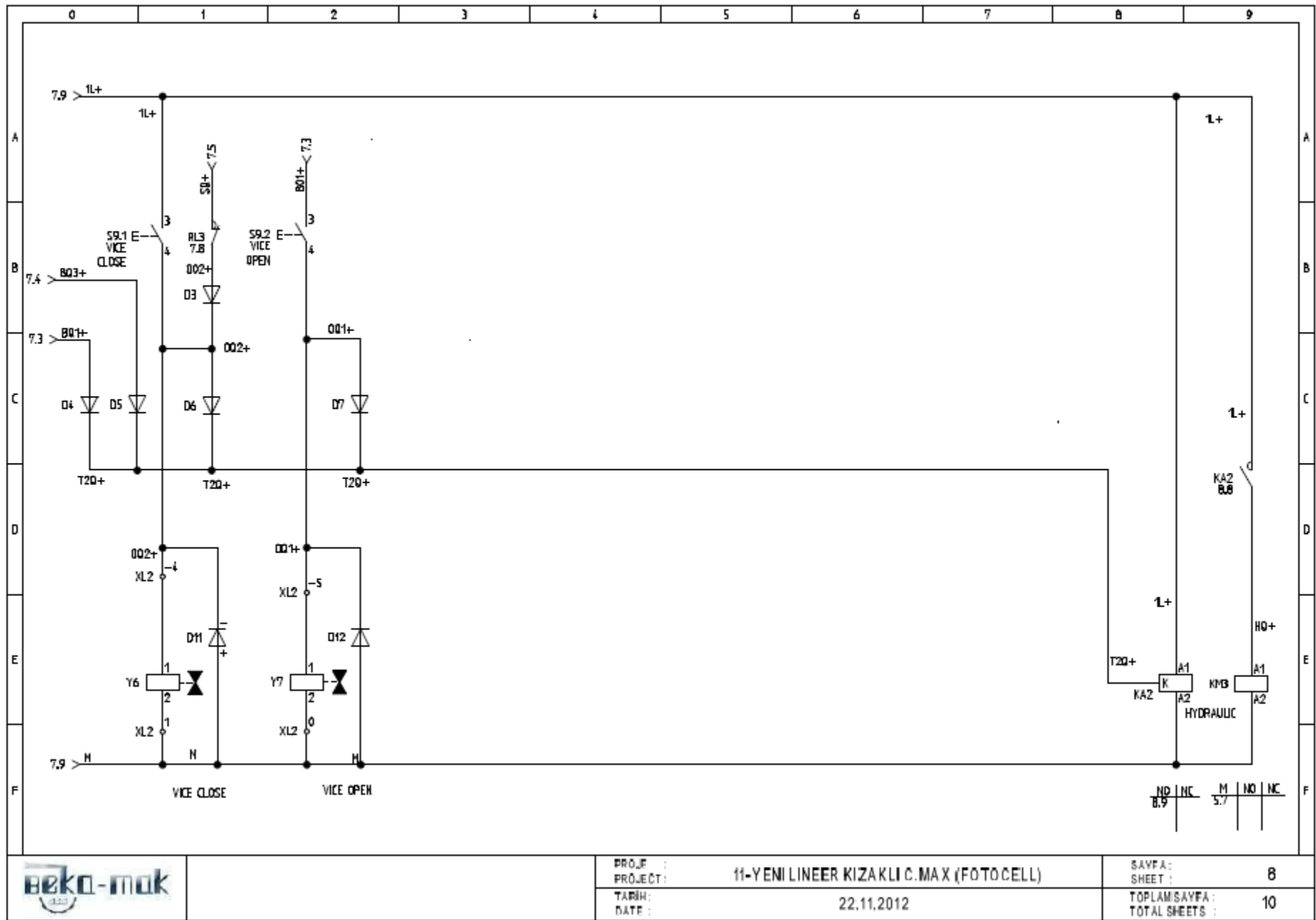


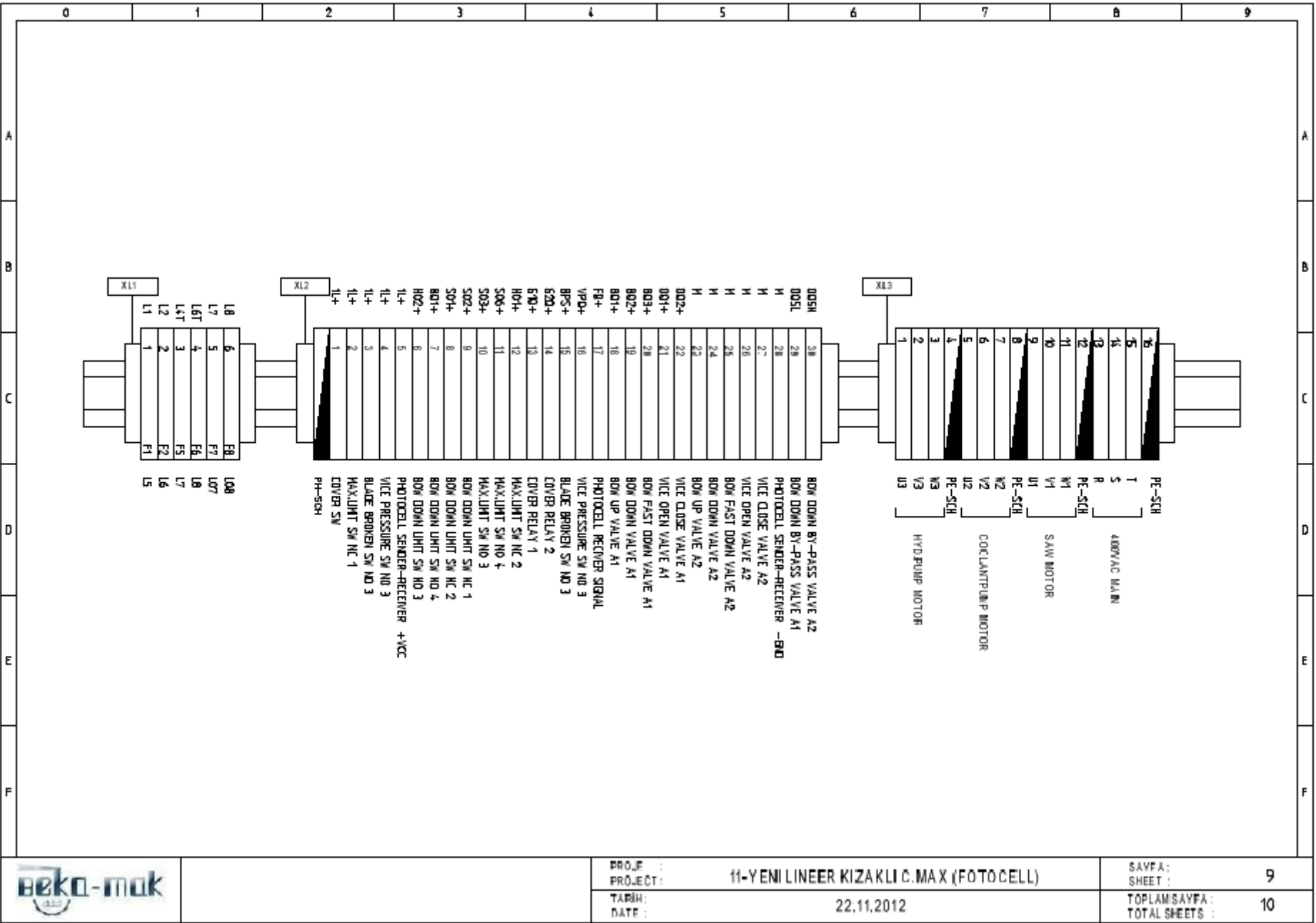


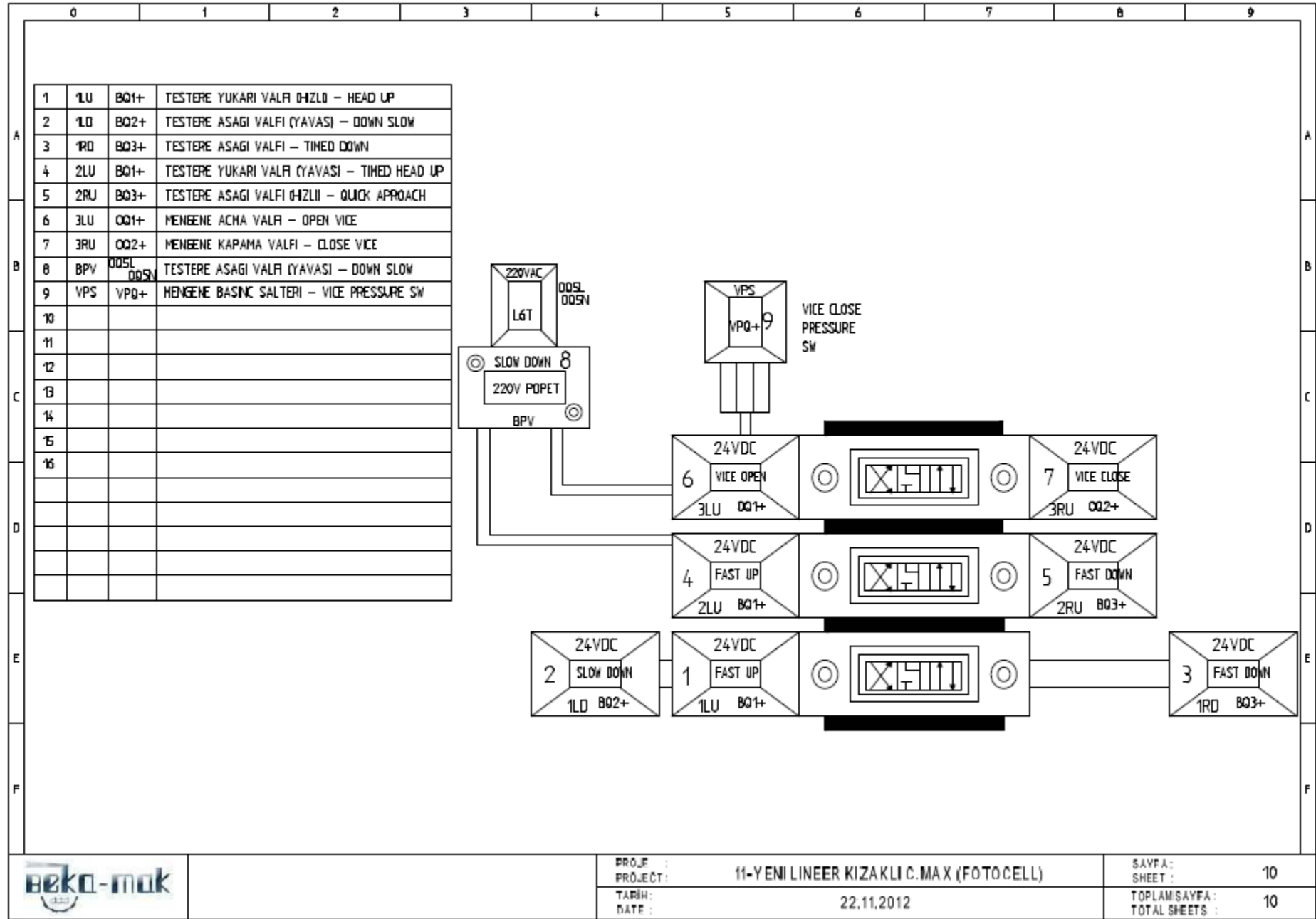


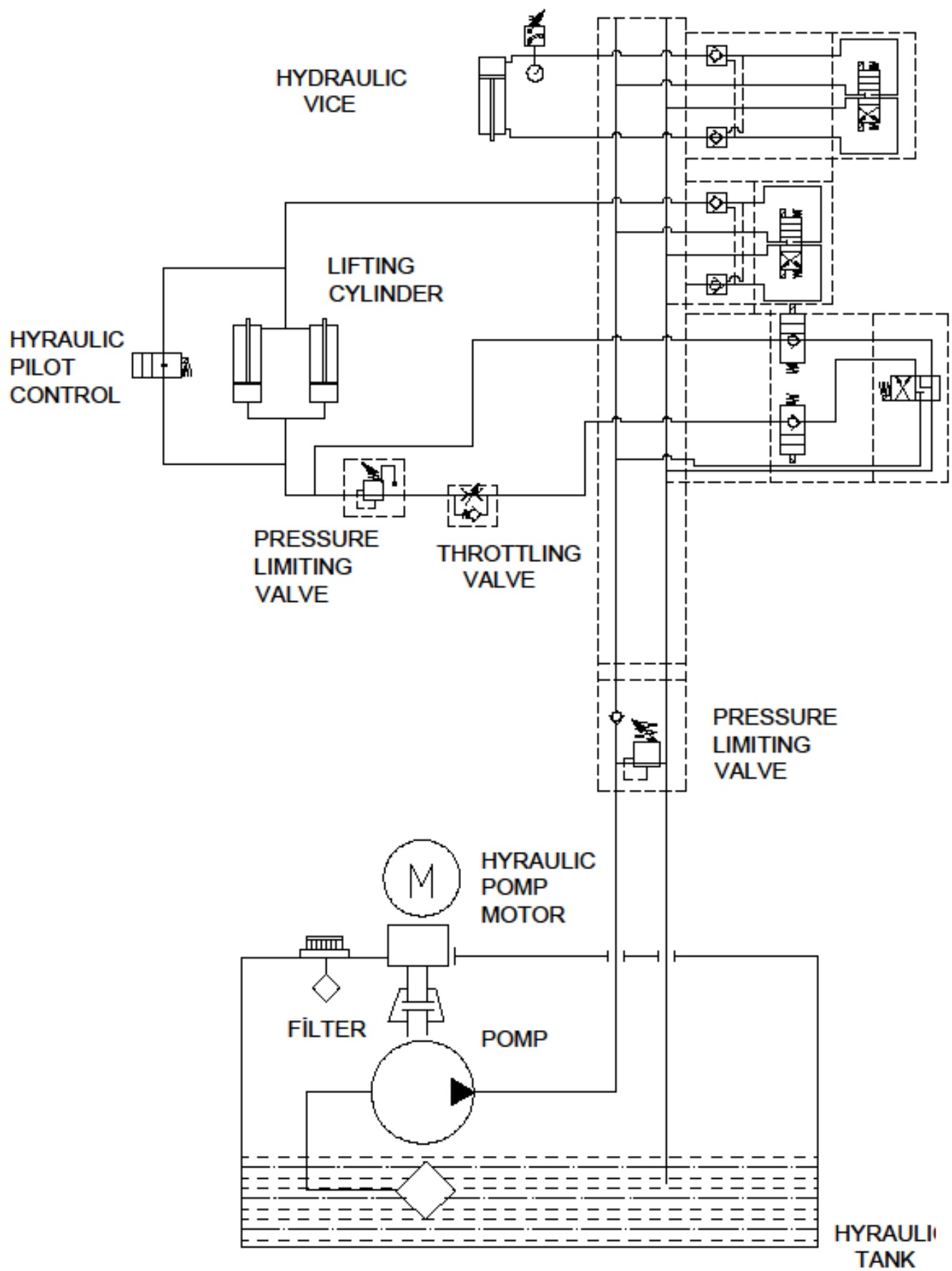












325/360C/460C/560C/810C HYDRAULIC PILOT PLAN