ACER

HIGH PRECISION AUTOMATIC SURFACE GRINDER

OPERATION MANUAL

MODEL：Supra 818PD～Supra 2040PD

Taiwan: Ya-Gin Machine Tool Manufacturing, Inc.
No. 101, Lane 506, Seng-Karng District, Taichung City, Taiwan
Tel: 886-4-2520-4120 Fax: 886-4-2520-4123
CA: Springwood Industrial, Inc.
1062 N. Kraemer Place, Anaheim, CA 92806 USA
Tel: 714-632-9701 Fax: 714-632-9730
NJ: Klim Industrial, Inc.
244 N. Randolphville Rd, Piscatawa, NJ 08854 USA
Tel: 732-752-9100 Fax: 732-752-9101

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CHAP. 6 MACHINE MAINTENANCE

CHAP. 1 SAFETY RULES

SAFETY FIRST !

We are pleased to give instructions of safety rules for the machine operation. Always pay attention to your safety when operating the machine. Properly save this operation manual. It is suggested to keep the operation manual at the side of machine for convenient reference.

1. GENERAL NOTICES FOR OPERATION

1.1 Before operating the machine, the operator must have a thorough understanding of operation procedures and methods.
1.2 Always keep all warning labels complete. Do not tear or blacken any warning label.
1.3 If not required, do not open any guard or door.
1.4 Do not remove or move any limit switch and safety protection switch.
1.5 Use only proper tools for adjusting and maintaining the machine. It is important to perform periodic maintenance of the machine.
1.6 When operating the machine, do not have your hands or any part of your body placed on the running part of the machine.
1.7 Be sure to turn power off before cleaning the machine. Do not use an air gun (compressed air) or your hand to clean off the dusts existed on the magnetic chuck or table.
1.8 When adjusting the coolant nozzle, make sure the power source has been turned off.
1.9 Periodically replace the slideways' lubrication oil, that ensures the machine accuracy and service life.

2. NOTICES FOR USE OF GRINDING WHEEL

2.1 The normal spindle rotating direction is clockwise.
2.2 Before using a grinding wheel, it is requested to perform balancing calibration on the grinding wheel.
2.3 Before the grinding wheel comes to a complete stop, do not allow your hand to approach the working area of grinding wheel.
2.4 Before opening the grinding wheel guard or replace the grinding wheel, be sure to turn power off and press the emergency stop switch. Always prevent anyone from pressing the spindle start switch or any other switch.
2.5 Pay attention when mounting or placing a grinding wheel. Do not bump against the grinding wheel.
2.6 Make sure the workpiece has been clamped securely before performing grinding operations.

※In order to achieve high quality and high efficiency grinding operations, it is very important to select a grinding wheel according to workpiece. (For details refer to the technical information supplied by a grinding wheel manufacturer or the instructions given on page 16~19 in this operation manual). During operating the machine, if you have any question, contact your local distributor or the machine manufacturer. Thank you !

CHAP. 2 DESCRIPTION OF MACHINE FEATURES

2.1 MACHINE FEATURES:

1. High Precision Cartridge Type Spindle:
   The spindle runs in 4 precision angular contact ball bearings in combination with roller bearings. Before assembling, all bearings are preloaded and measured. The spindle is driven by a V3 graded motor, making the machine ideal for heavy-duty and precision grinding.

2. Wear-resistant Slideways:
   The slideways between the saddle and base are designed with double “V” slideways, and one “V” and one “flat” slideways between the table and saddle. Both slideways are coated with Turcite-B, and precision scraped to ensure smooth movement and high accuracy.

3. Rigid Casting Parts:
   All structural parts of the machine are manufactured from high quality cast iron, tempered for stress relief. This combined with rib reinforcement in the casting parts to upgrade structural rigidity.

4. Oversized Column And Base:
   The oversized column and base feature increased stability and rigidity. The column interior is reinforced by honeycomb ribs, providing heavy grinding resistance capability.

5. Automatic Lubrication System:
   The lubrication system employs a pump providing circulated forced lubrication to all screws and slideways, which achieves an outstanding lubrication effect.

6. Cross And Vertical Feed Ball Screws:
   The saddle forward / backward movement (Cross feed) is driven by an AC motor in combination with ball screw transmission, providing rapid traverse forward and backward and automatic feed functions.

2.2 MACHINE SPECIFICATIONS

2.2.1 818 PD SPECIFICATIONS:

DESCRIPTIONS \ MODEL			818PD
Table area	W x L(mm)		203x460
Max. grinding length	(mm)		480
Max. grinding width	(mm)		228
Max. distance from spindle center line to table surface		(mm)	460
Standard magnetic chuck size	(mm)		200x450
Longitudinal travel of table	Max. travel-hydraulic (mm)		480
	Max. travel-manual (mm)		510
	Variable table feed speed		60HZ,5~25m/min;50HZ,5~20m/min
Cross travel of saddle	Automatic feed increment (mm)		1~10
	Automatic constant feed speed		20~230mm/min
	Max. automatic travel (mm)		235
	Max. manual travel (mm)		250
	Handwheel per revolution (mm)		1.0HPx6P
	Handwheel per graduation (mm)		0.02
Vertical feed of wheelhead	Automatic feed (mm)		0.001~0.05
	Step feed (mm)		0.001
	Rapid elevation speed (Approx.)		250mm/min
	Slow elevation speed (Approx.)		6mm/min
	Running speed		60HZ,3450 R.P.M;50HZ,2850 R.P.M
	Motor (HP)		2.0
Standard grinding wheel	Outside diameter (mm)		203
	Width (mm)		Standard 12.7mm,Max. 19mm
	Bore (mm)		31.75
Hydraulic drive	Motor horsepower		1.0HPx6P
Cross feed drive	Motor horsepower		370W
Rapid elevation drive	Motor horsepower		60W
Floor space	Total space required		1810x1285x1680mm
Weight	Net weight (Approx. kgs)		1205
	Gross weight (Approx. kgs)		1375
Total rated horsepower (Approx.)	(HP)		3.0
Packing dimensions	(mm)		1890x1430x1930

The machine manufacturer reserves the right for changing machine design, sizes and specifications without prior notice. The contents shown in this catalog are for reference only.

2.2.2 1020 PD & 1224 PD SPECIFICATIONS:

DESCRIPTIONS \ MODEL			1020PD	1224PD
Table area	W x L(mm)		254x508	300x600
Max. grinding length	(mm)		520	600
Max. grinding width	(mm)		280	300
Max. distance from spindle center line to table surface		(mm)	500	600
Standard magnetic chuck size	(mm)		250x500	300x600
Longitudinal travel of table	Max. travel-hydraulic (mm)		580	650
	Max. travel-manual (mm)		620	730
	Variable table feed speed		60HZ,5~25m/min;50HZ,5~20m/min	
Cross travel of saddle	Automatic feed increment (mm)		1~13	1~19
	Automatic constant feed speed		20~230mm/min	
	Max. automatic travel (mm)		270	310
	Max. manual travel (mm)		300	340
	Handwheel per revolution (mm)		5	
	Handwheel per graduation (mm)		0.02	
Vertical feed of wheelhead	Automatic feed (mm)		0.001~0.05	
	Step feed (mm)		0.001	
	Rapid elevation speed (Approx.)		150mm/min	
	Slow elevation speed (Approx.)		6mm/min	
	Running speed		50/60HZ,2850/3450R.P.M	50/60HZ,1450/1750R.P.M
	Motor (HP)		3.0	5.0
Standard grinding wheel	Outside diameter (mm)		203	305
	Width (mm)		Standard 12.7,Max.19	31.75
	Bore (mm)		31.75	76.2
Hydraulic drive	Motor horsepower		2.0HPx6P	
Cross feed drive	Motor horsepower		370W	
Rapid elevation drive	Motor horsepower		1/5 HP x 6P	
Floor space	Total space required		2450x1450x1750mm	2700x1600x1850mm
Weight	Net weight (Approx. kgs)		1810	1990
	Gross weight (Approx. kgs)		2160	2290
Total rated horsepower (Approx.)	(HP)		5.2	8.25
Packing dimensions	(mm)		2480x2060x2100	2480x2140x2100

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2.2.3 14/16 PD SPECIFICATIONS:

1428PD	1436PD	1632PD	1640PD
305x712	305x915	406x813	406x1020
712	915	813	1020
330		410	
Standard column: 630			
300x700	300x900	400x800	400x1000
760	960	890	1060
830	1000	930	1100
60HZ,5~25m/min;50HZ,5~20m/min			
1(mm)~~25(mm)			
350mm		430mm	
380mm		460mm	
5mm			
0.02mm			
0.001mm~~0.05mm			
0.001mm			
150mm/min			
6mm/min			
60HZ,1750R.P.M;50HZ,1450R.P.M			
Standard: 5HP; Optional: 7.5HP,10HP			
355mm			
50mm			
127mm			
3.0HPx6P			
370W			
1/4 HP x 6P			
2950x1970x2050	3550x1970x2050	3290x2200x2050	4020x2200x2050
3020	3330	3400	4000
3520	3700	4000	4500
9HP(Spindle motor 5HP),11.5HP(Spindle motor 7.5HP),14HP(Spindle motor 10HP)			
2500x2290x2220	2780x2290x2220	2780x2290x2220	3250x2290x2220

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2.2.4 2040 PD SPECIFICATIONS:

DESCRIPTIONS \ MODEL			2040PD
Table area	W x L (mm)		406x1020
Max. grinding length	(mm)		1020
Max. grinding width	(mm)		500
Max. distance from spindle center line to table surface		(mm)	Standard column: 630 Optional high column: 720
Standard magnetic chuck size	(mm)		500x1000
Longitudinal travel of table	Max. travel-hydraulic (mm)		1060
	Max. travel-manual (mm)		1100
	Variable table feed speed		60HZ,5~25m/min;50HZ,5~20m/min
Cross travel of saddle	Automatic feed increment (mm)		1(mm)~~25(mm)
	Automatic constant feed speed		510mm
	Max. automatic travel (mm)		520mm
	Max. manual travel (mm)		5mm
	Handwheel per revolution (mm)		0.02mm
Vertical feed of wheelhead	Handwheel per graduation (mm)		0.001~0.005mm
	Automatic feed (mm)		150mm/min
	Step feed (mm)		6mm/min
	Rapid elevation speed (Approx.)		1mm
	Slow elevation speed (Approx.)		0.005mm
Spindle motor	Running speed		60HZ,1750rpm;50HZ,1450rpm
	Motor (HP)		Standard: 7.5HP
Standard grinding wheel	Outside diameter (mm)		355mm
	Width (mm)		50mm
	Bore (mm)		127mm
Hydraulic drive	Motor horsepower		3.0HPx6P
Cross feed drive	Motor horsepower		1KW
Rapid elevation drive	Motor horsepower		1/4 HP x 6P
Floor space	Total space required		3500x2290x2220
Weight	Net weight (Approx. kgs)		4800
	Gross weight (Approx. kgs)		5200
Total rated horsepower (Approx.)	(HP)		11HP
Packing dimensions	(mm)		4500x2200x2100

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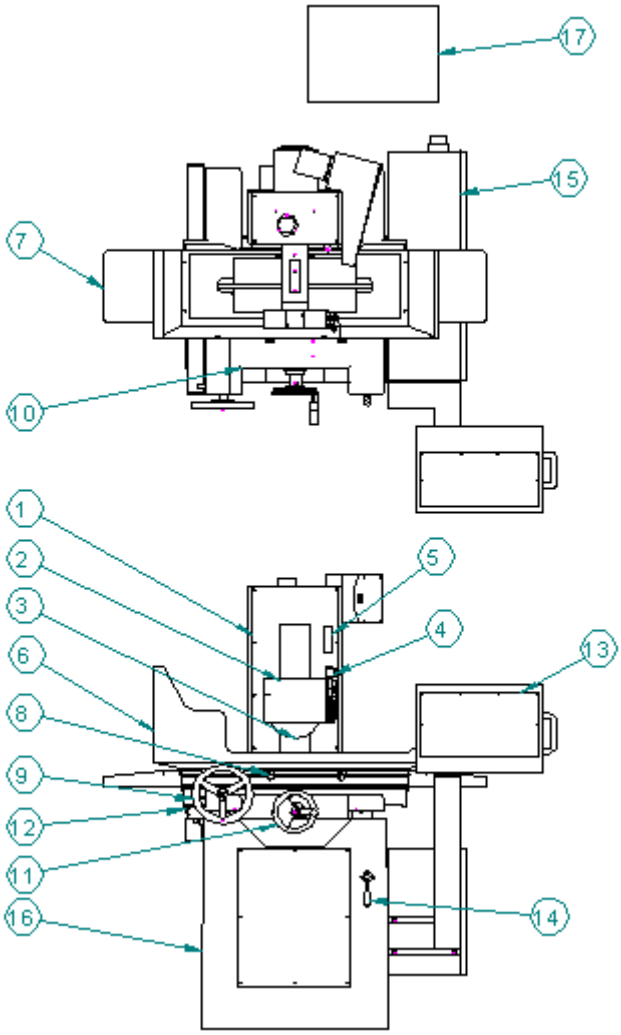
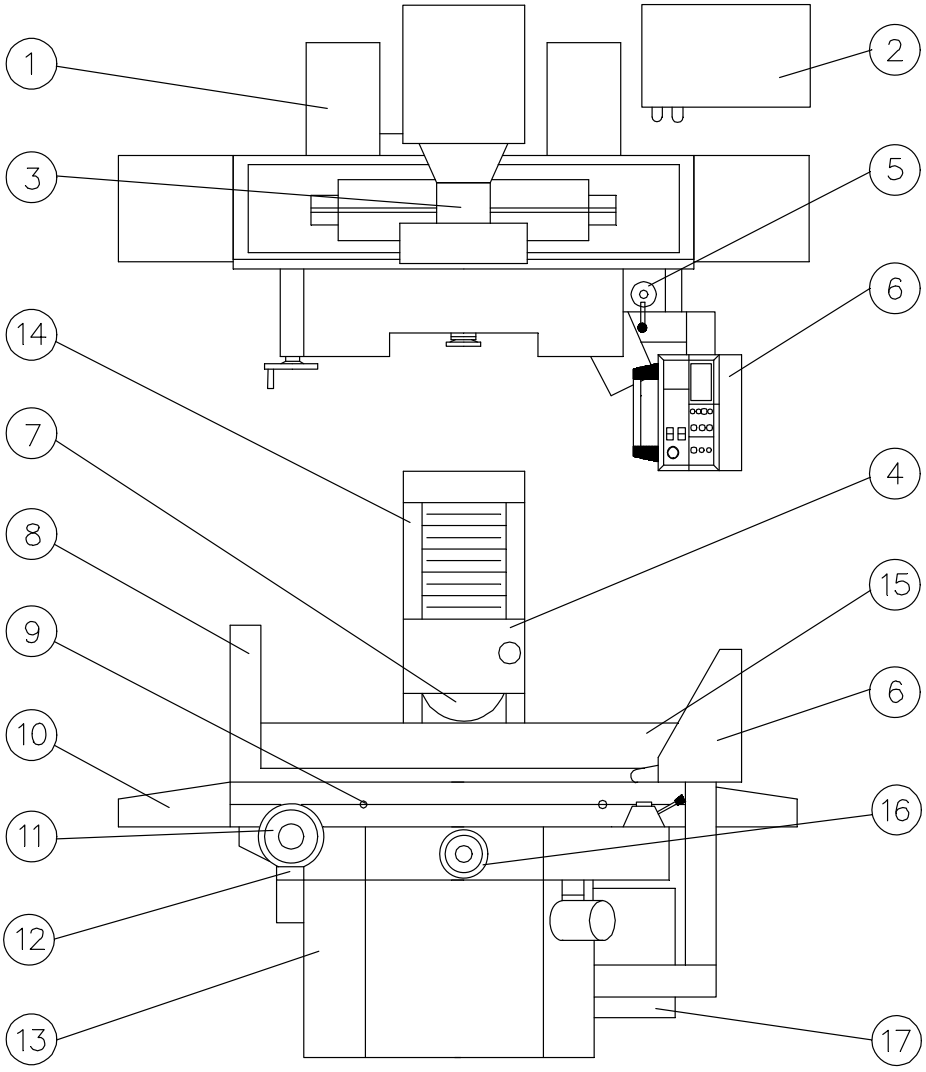
2.3 LEGEND OF THE MACHINE

2.3.1 MODEL 818PD



NO.	DESCRIPTION	NO.	DESCRIPTION
1	Column	10	Saddle
2	Grinding wheel guard	11	Cross movement handwheel (Z-axis)
3	Grinding wheel	12	Cross travel regulation knob
4	Coolant nozzle	13	Operation panel
5	Column lubrication	14	Longitudinal speed control handle
6	Splash guard (optional)	15	Electrical cabinet
7	Table	16	Base
8	Longitudinal travel adjustment	17	Hydraulic power unit
9	Longitudinal movement handwheel		

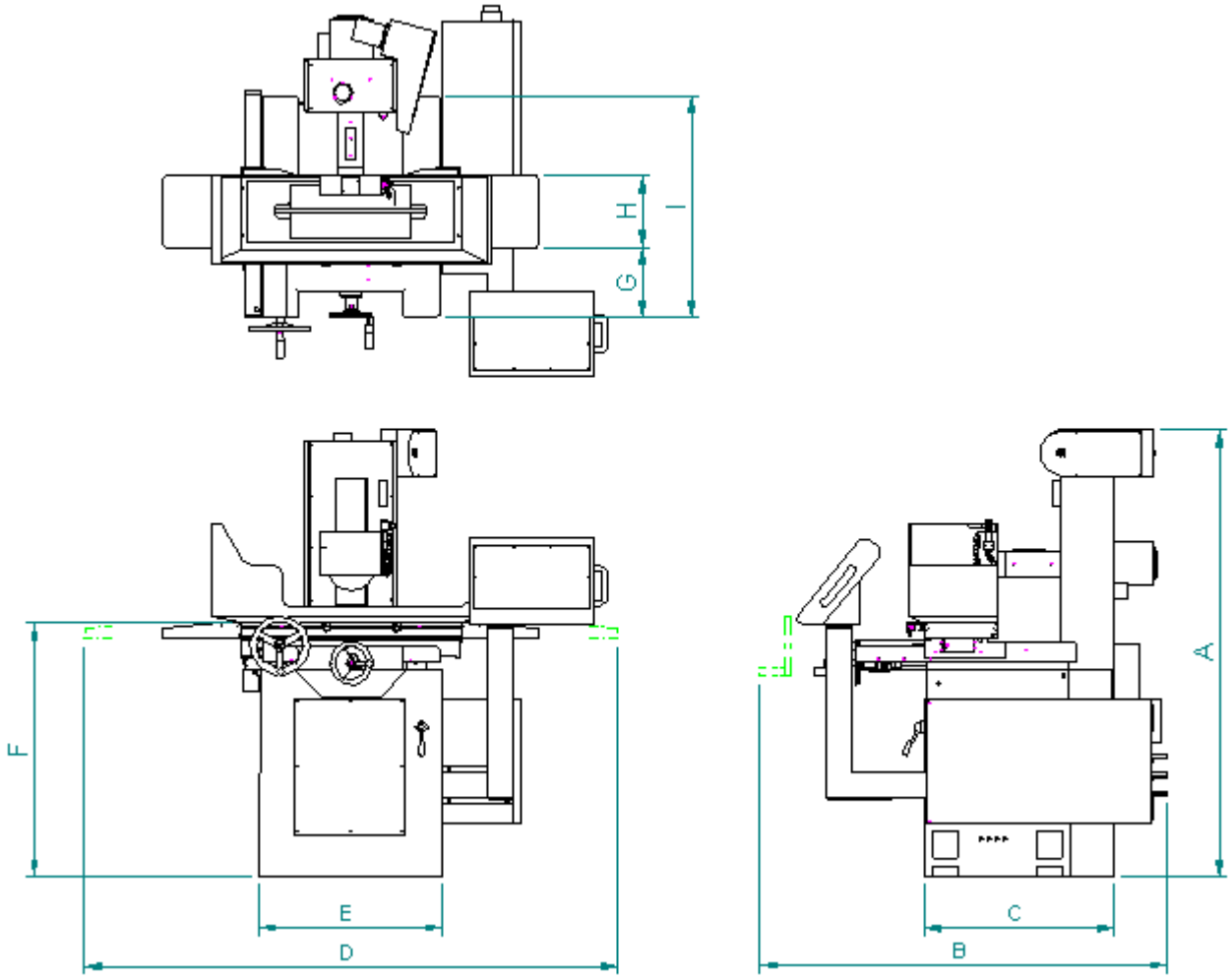
2.3.2 MODEL 1020 & 1224 & 14/16 & 2040 PD



NO.	DESCRIPTION	NO.	DESCRIPTION
1	Saddle	10	Table
2	Hydraulic power unit	11	Longitudinal movement handwheel
3	Spindle head	12	Cross movement regulation knob
4	Grinding wheel guard	13	Base
5	Longitudinal travel speed regulation valve	14	Column
6	Operation panel	15	Movable splash guard
7	Grinding wheel	16	Gross movement handwheel
8	Splash guard	17	Electrical cabinet
9	Longitudinal movement regulation knob		

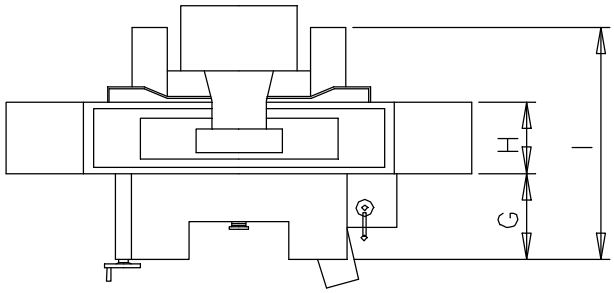
2.4 SPACE OCCUPATION OF MACHINE

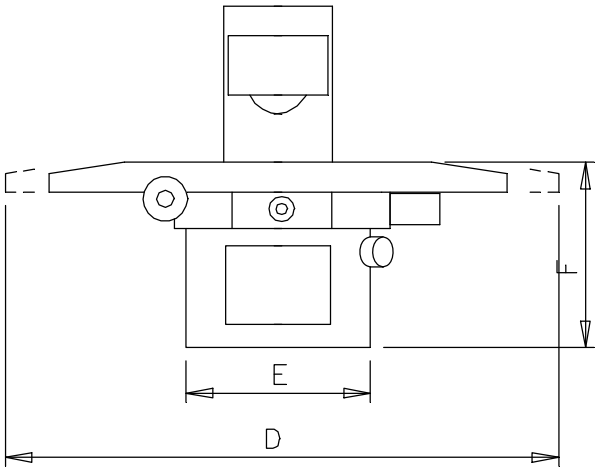
2.4.1 MODEL 818PD

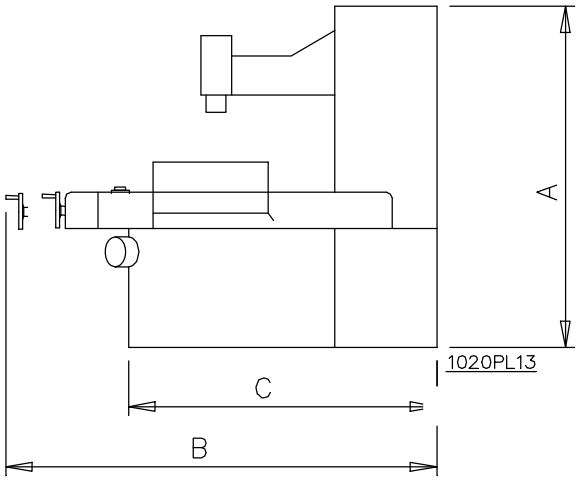


MODEL	A	B	C	D	E	F	G	H	I
818PD	1730	1355	720	1960	700	1020	270	280	860

2.4.2 MODEL 1020 & 1224 & 14/16 & 2040 PD







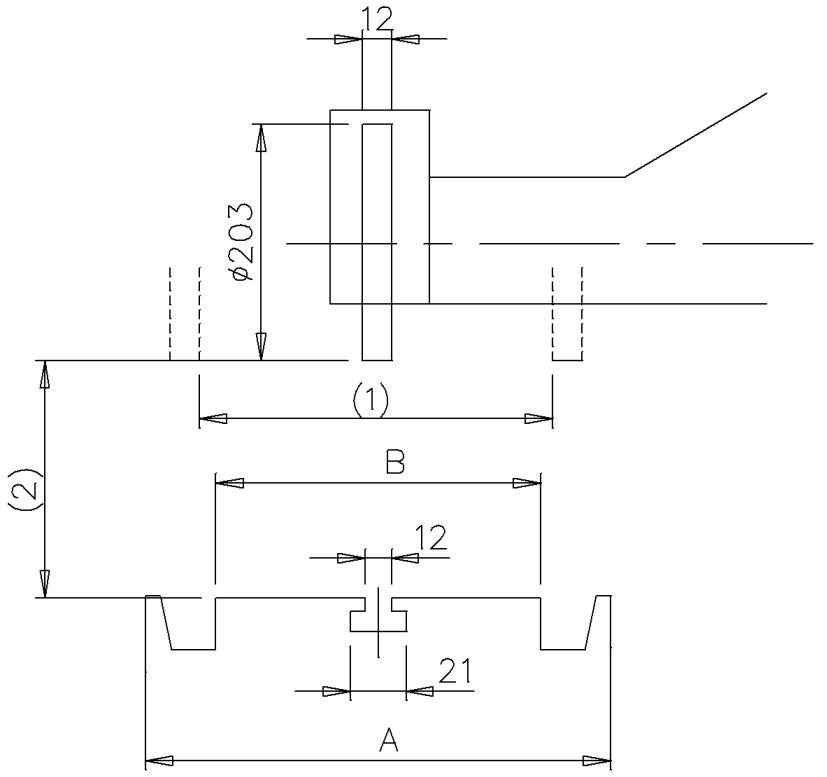
It is requested to leave sufficient spaces, which should be bigger than the values shown on the table below.

MODEL	A	B	C	D	E	F	G	H	I
1020PD	1700	1500	1065	2340	760	950	350	345	1037
1224PD	1800	1555	1065	2665	760	950	365	385	1087
1428PD	1940	1920	1315	2950	1050	950	410	430	1240
1436PD	1940	1920	1315	3600	1050	950	410	430	1240
1632PD	1940	2185	1500	3290	1050	950	490	535	1520
1640PD	1940	2185	1500	3980	1450	950	490	535	1520
2040PD	2120	2185	1500	4210	1580	990	435	640	1670

Unit：mm

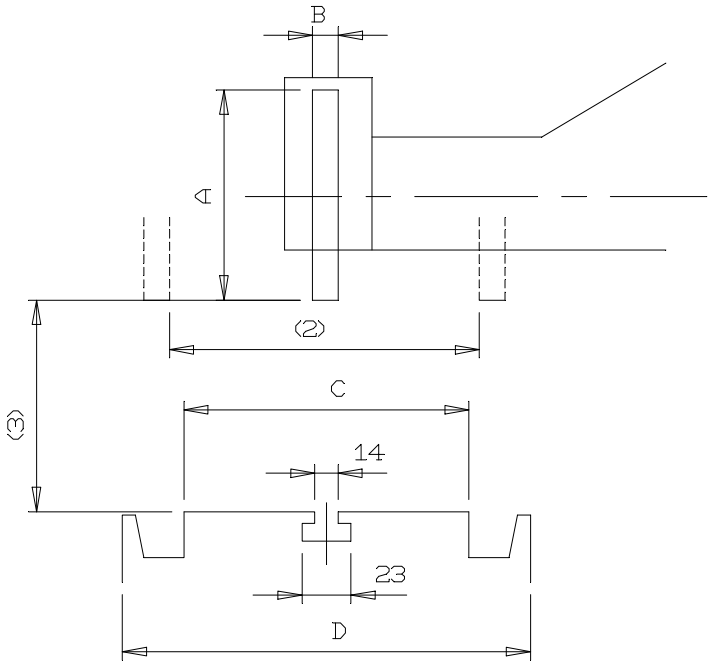
2.5 GRINDING CAPACITY:

2.5.1 818 PD



PD MODEL	818
(1) Max. width of grinding	228mm
(2) Max. height of grinding	358mm
(3) Max. table travel	515mm
(4) Max. table load	202Kg
(5) Magnetic chuck sizes (mm)	200x450
(A) Outside width of table	275mm
(B) Width of table	212mm

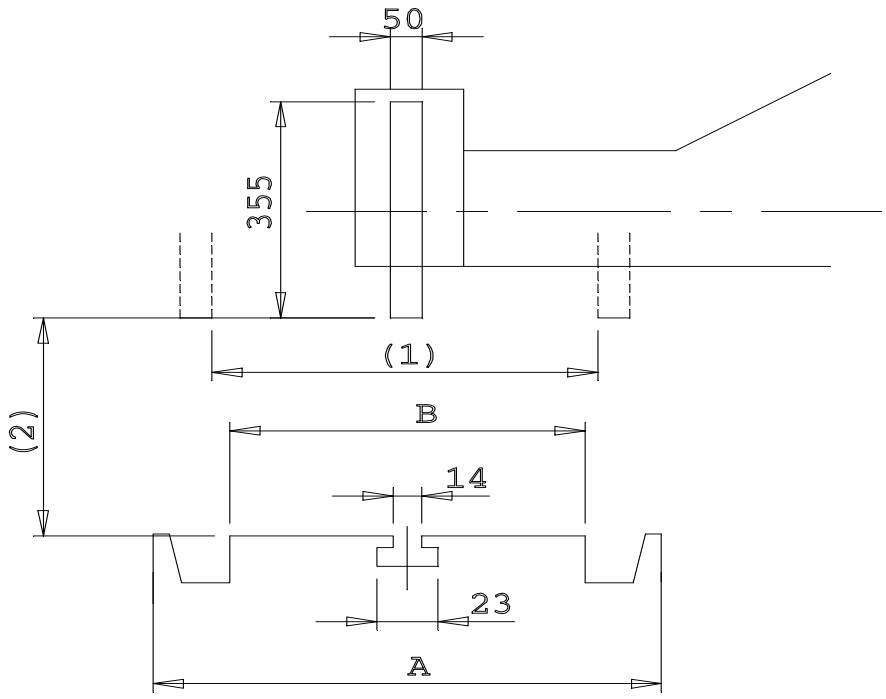
2.5.1 1020 PD & 1224 PD



PD MODEL	1020	1224
(A) Grinding wheel size	205mm(8”)	305mm(12”)
(1) Max. width of grinding	281mm	308mm
(2) Max. height of grinding	397mm	427.5mm
(3) Max. manual travel of table	620mm	730mm
(4) Max. table load	280Kg	310Kg
(5) Magnetic chuck sizes (mm)	250mm X 500mm	300mm X 600mm
(B) Grinding wheel thickness	19mm	34mm
(C) Width of table surface	250mm	300mm
(D) Outside width of table	345mm	385mm

NOTE: The maximum table load does not include the magnetic chuck weight.

2.5.2 14/16 PD & 2040 PD



PD MODEL	1428	1436	1632	1640	2040
(1) Max. width of grinding	330mm	330mm	410mm	410mm	530mm
(2) Max. height of grinding	450mm	450mm	450mm	450mm	552.5mm
(3) Max. table travel	830mm	1000mm	930mm	1100mm	1100mm
(4) Max. table load	346Kg	379Kg	420Kg	428Kg	465Kg
(5) Magnetic chuck sizes (mm)	300x700	300x900	400x800	400x1000	500x1000
(A) Outside width of table	430mm	430mm	535mm	535mm	640mm
(B) Width of table surface	305mm	305mm	406mm	406mm	508mm

NOTE: The maximum table load does not include the magnetic chuck weight.

Table 2-7

2.6 ACCESSORIES:

STANDARD ACCESSORIES:

1. Tool box with tools ---------- 1set
2. Wheel extracting nut ---------- 1set
3. Balancing bar ---------- 1pc
4. Grinding wheel ---------- 1pc
5. Wheel flange ---------- 1set
6. Small paint can ---------- One can each
7. Diamond dresser ---------- 1pc
8. Automatic lubrication system ---------- 1set
9. Coolant wiper ---------- 1pc

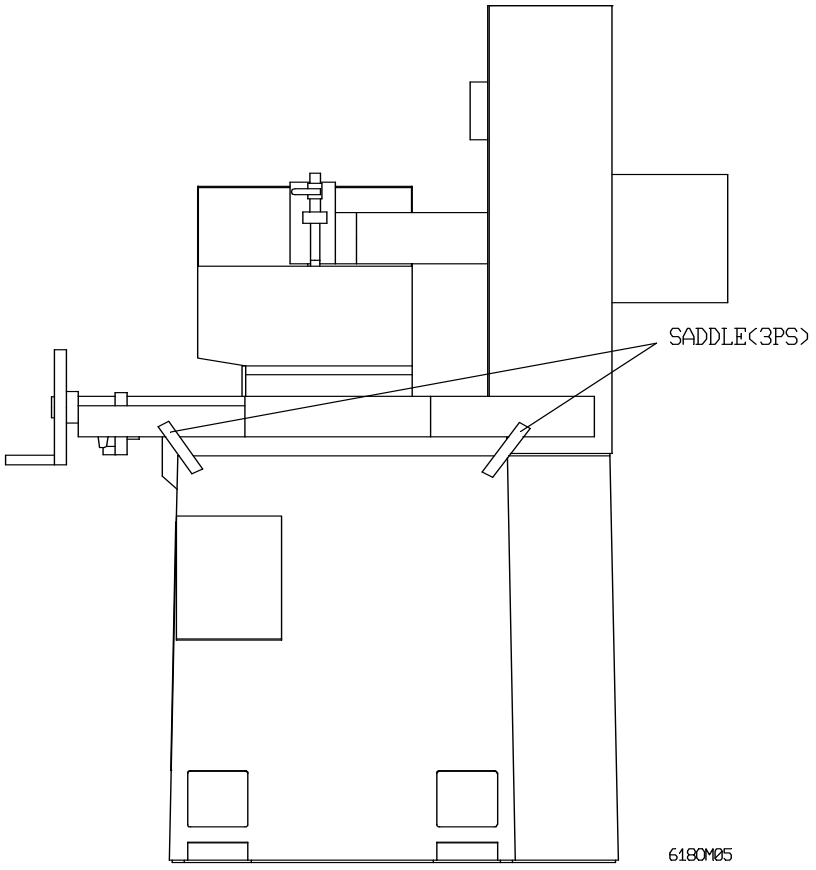
CHAP. 3 MOVING THE MACHINE

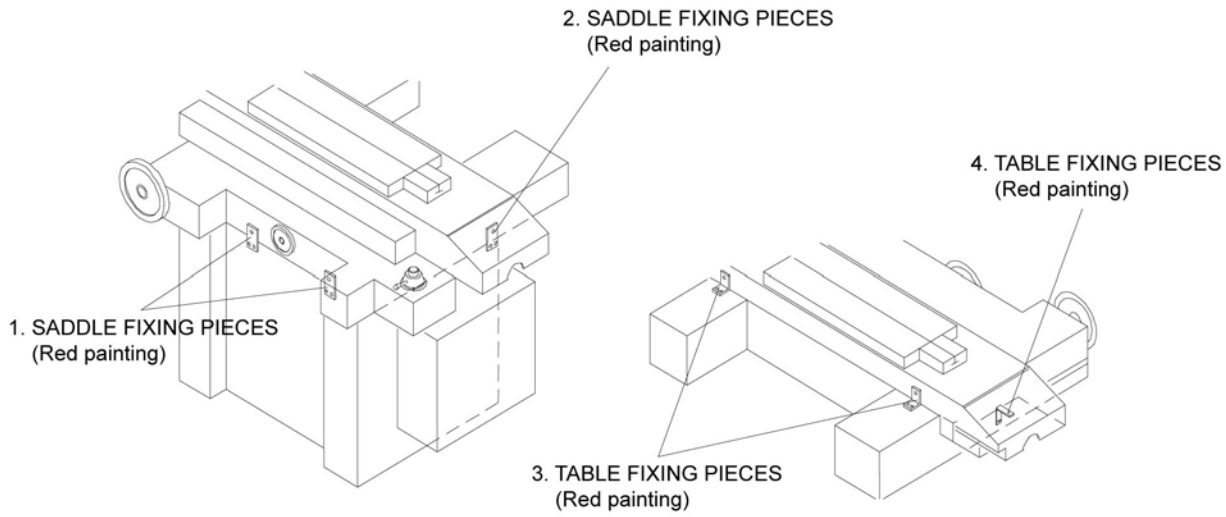
3.1 FIXING THE MACHINE:

Before shipping or moving the machine, all moving parts of the machine are completely fixed.

1. The “L” shaped pieces are applied for fixing between the table and saddle. The saddle is also fixed to base by using the fixing pieces. Fixing method is illustrated on the below figure.
2. Once the machine is moved to a proper location, you need to remove all fixing blocks. Store these fixing pieces at a proper location for use in the future.

MODEL 818PD





3.2 LIFTING MACHINE BY HOIST:

3.2.1 MACHINE PACKED BY CRATE:

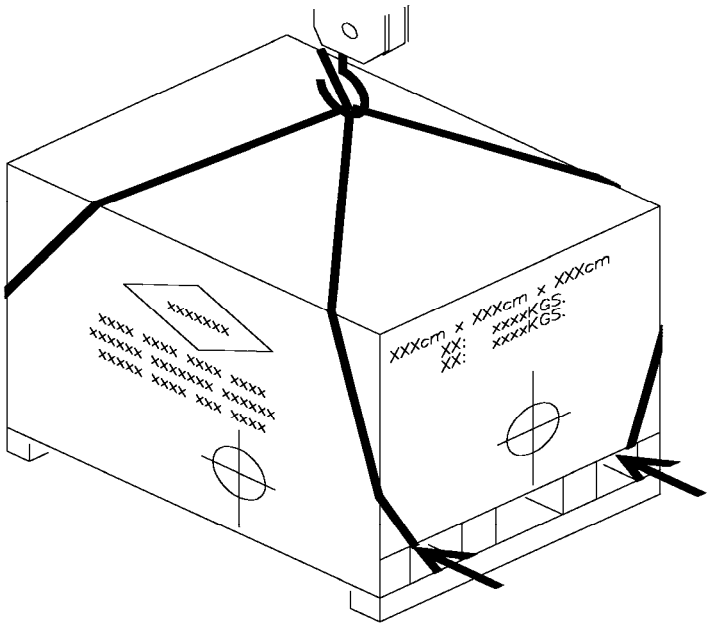
1. The packed machine weight (gross weight) is marked on the crate. Below table also shows the weight of machine for reference:

MODEL	818 SERIES	1020 SERIES	1224 SERIES	1428 SERIES
WEIGHT (kgs)	3520	3600	3700	3520
MODEL	1436 SERIES	1632 SERIES	1640 SERIES	2040 SERIES
WEIGHT (kgs)	3700	4000	4500	5200

2. When applying a hoist for lifting the machine, make sure its loading capacity must exceed the weight shown on above table.

3. The loading capacity of the steel wires to be used for lifting must exceed the weight shown on above table. Also, checking if the steel wires are damaged or not.

4. Shown as figure below, you need to wrap the steel wires under the bottom of crate, and fit another ends the steel wires in the hook of hoist.



5. When lifting the packed machine, pay attention to machine leveling and balance.

6. <u>※During lifting, please always take care of safety ! ※</u>

3.2.2 LIFTING UNPACKED MACHINE:

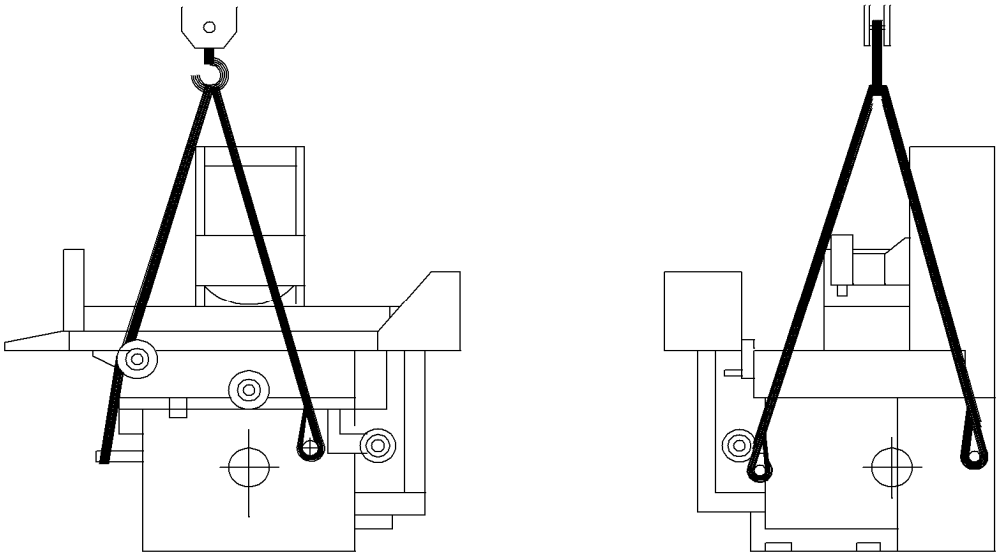
1. When applying a hoist for lifting the machine, make sure its loading capacity must exceed the weight shown on above table.

2. The loading capacity of the steel wires to be used for lifting must exceed the weight shown on above table. Also, checking if the steel wires are damaged or not.

3. Below table also shows the weight of the machines for reference:

MODEL	818 SERIES	1020 SERIES	1224 SERIES	1428 SERIES
WEIGHT (kgs)	1205	1810	1990	3020
MODEL	1436 SERIES	1632 SERIES	1640 SERIES	2040 SERIES
WEIGHT (kgs)	3330	3400	4000	4800

4. Shown as figure below, insert the two ends of steel wires through the lifting bolts. Then place the middle of steel wires at the hook of the hoist (Two steel wires are required).



5. When lifting the machine, using cloth or paper board to isolate at the positions where the steel wires contact the painted surfaces of the machine.

6. When lifting the packed machine, pay attention to machine leveling and balance.

7. **※During lifting, please always take care of safety!※**

3.3 MOVING MACHINE BY FORKLIFT:

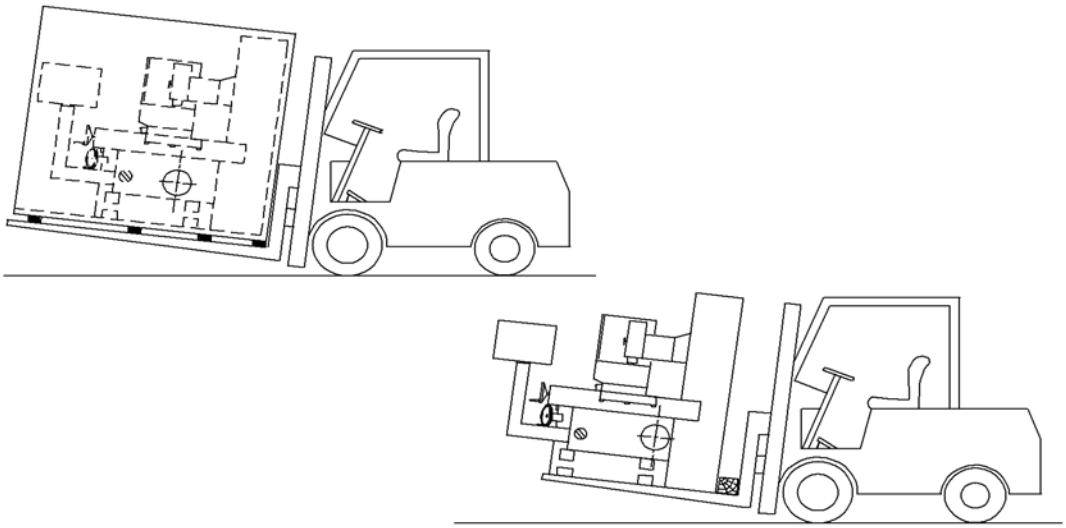
3.3.1 MACHINE PACKED BY CRATE:

1. The gravity of the machine is marked on the crate. When lifting the packed machine by using a forklift, make sure the gravity is located at the center. If you move the machine from the side, make sure the forks must exceed the gravity by 50cm.

2. The packed machine weight (gross weight) is marked on the crate. Or refer to page 3-2 for machine weight.

3. The loading capacity of the lifting equipment must exceed the weight marked on the crate. It is suggested to keep lifting height not exceed 12cm from the floor.

4. When moving the machine, it should be properly positioned on a forklift as shown on figures below. Also, pay attention to the machine stability and its gravity-balance.



3.3.2 LIFTING UNPACKED MACHINE:

1. The loading capacity of the lifting equipment must exceed the machine weight. It is suggested to keep lifting height not exceed 12cm from the floor.

2. The machine should be properly positioned on a forklift, shown as above figure. Make sure the machine base must be well supported by the forks, and is stable enough.

3. For machine weight, refer to page 3.3

CHAP.4 INSTALLING MACHINE

4.1 PLACING THE MACHINE

4.1.1 MACHINE SPACE REQUIRED:

Machine space required for each model is shown on below table:

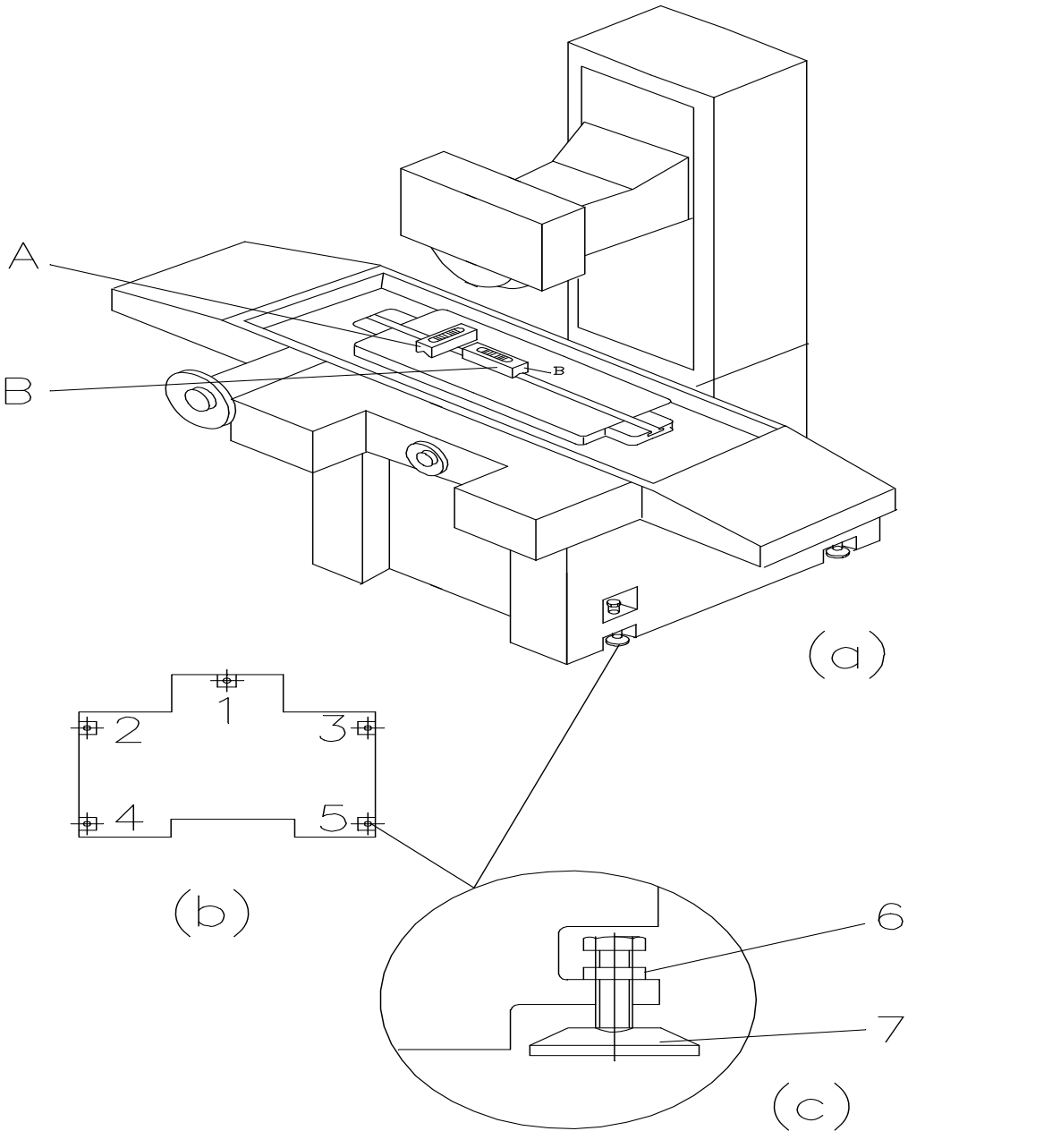
MODEL	818 SERIES	1020 SERIES	1224 SERIES	1428 SERIES
Length (mm)	1960	2340	2670	2950
Width (mm)	1360	1500	1560	1970
Height (mm)	1730	1700	1800	1940
MODEL	1436 SERIES	1632 SERIES	1640 SERIES	2040 SERIES
Length (mm)	3600	3290	3980	4210
Width (mm)	1970	2200	2200	2200
Height (mm)	1940	1940	1940	2120

4.1.2 REMOVE FIXING BLOCKS ON MACHINE:

Once the machine is moved to the work site, it is requested to remove all fixing blocks. Store these fixing blocks at a proper location for future use when moving the machine is required.

4.2 ADJUSTING MACHINE LEVELING

1. Thoroughly clean the table, then place two precision level gauges (A,B) on the table, shown on below figure (a).
2. Adjust the leveling screws (4, 5) under the machine base until the leveling condition reaches within 0.02/1000mm indicated on the level gauge (B). See below figure (b).
3. Adjust the leveling screw (1) until the leveling condition reaches within 0.02/1000mm indicated on the level gauge (A). See below figure (a).
4. Check again if the leveling condition indicated on the level gauges (A, B) are within 0.02/1000mm. See below figure (a).
5. Tighten the nut (6) on the leveling screws (1, 4, 5), as shown on below figure (c).
6. Tighten the two auxiliary screws for the leveling screws (2, 3) (Fig. b) until they touch the leveling block (7) (Fig. c). Then tighten the nut (6). Now leveling job is accomplished.



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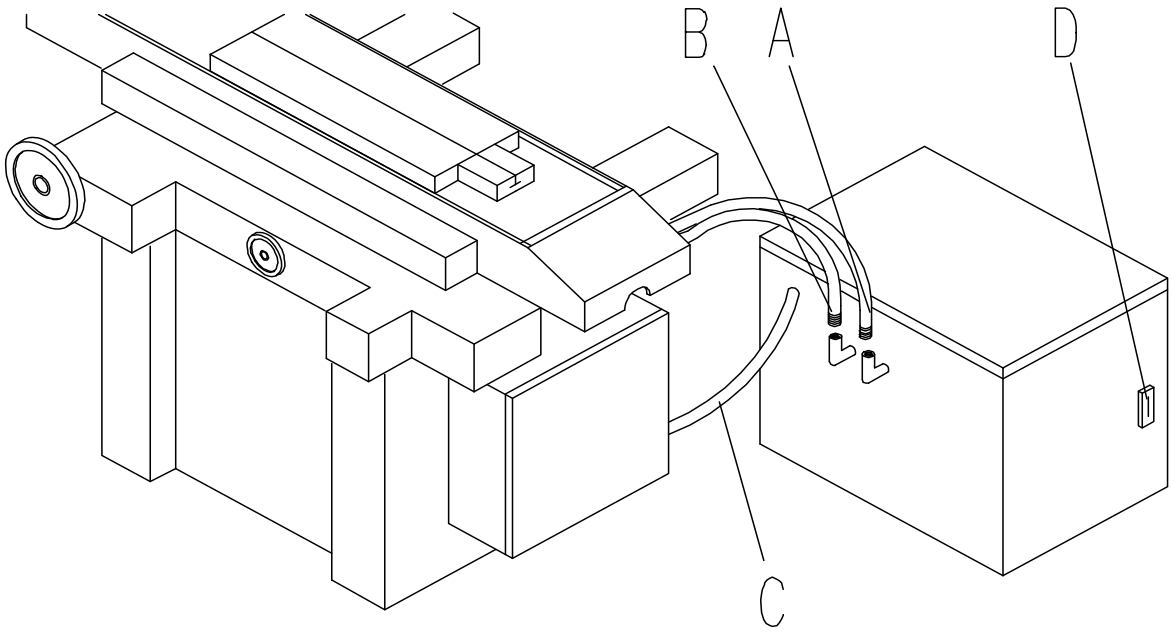
4.3 INSTALLING HYDRAULIC SYSTEM FOR LONGITUDINAL FEED

1. Place the hydraulic oil tank at the right side of the machine, shown as figure below.
2. Connect oil hoses (A, B) to the hydraulic oil tank.
3. Connect the power wire (C) of the hydraulic system to the electrical cabinet.
   Fill oil into the hydraulic oil tank, until oil amount reaches 80~85% of the oil tank capacity (Oil level reaches to 3/8~4/5 position of "D").



4.3.2 NOTICES:

1. The hydraulic oil tank capacity is 66 liters (818PD) and 135 liters (1020~2040PD).
2. Once the machine is used (8 hours running time per day), replace oil after the first 3 months. Afterwards, replace oil every half year.
3. Periodically check the pump pressure on the hydraulic power unit. Normal pressure should be kept in the range of 11~14kg/cm^2.
4. Clean the filter screen in the hydraulic oil tank every half year.

4.3.3 RECOMMENDED HYDRAULIC OIL:

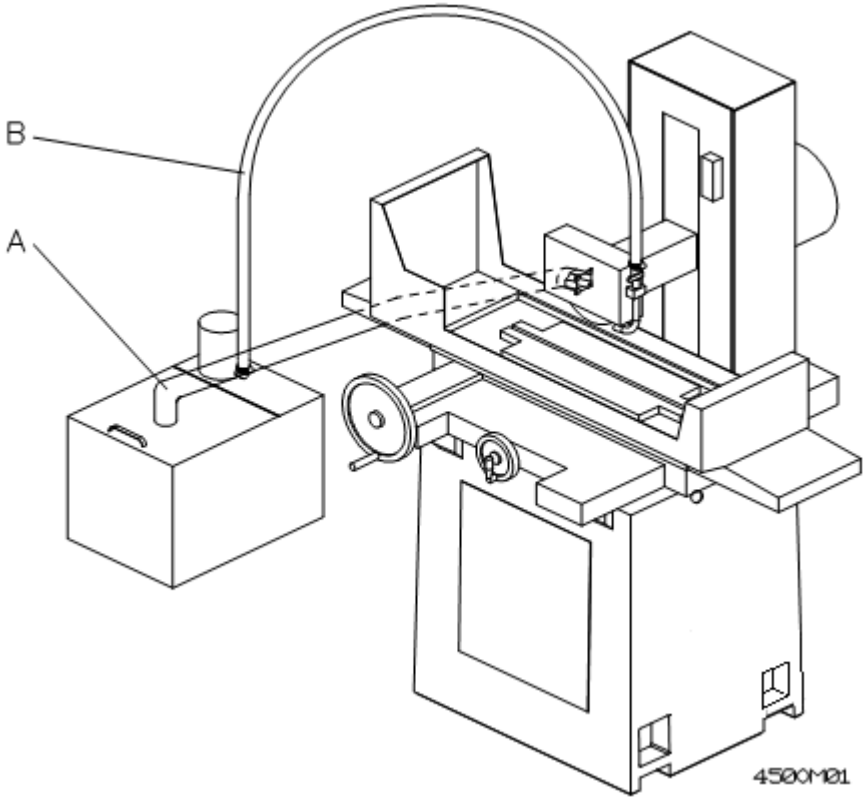
BRAND	GRADE	BRAND	GRADE
SUN	SUNVIS 916	SHELL	TELUS 32
SHOWA	A-R32	MOBIL	D.T.E 24
ESSO	NUTO H32	TEXACO	LUBE TAC #2
BP	EVERGOL HLP 32	ARAL	VITAM GF 32

4.4 INSTALLING COOLANT SYSTEM:

4.4.1-1 PLACING AND INSTALLING COOLANT SYSTEM ON 818PD SERIES: (See Fig below)

1: Install the coolant tank at the left lower side of the machine. Fit the coolant hose (A) to the coolant return hole on the coolant tank.

2: Connect one end of the coolant inlet hose (B) to the coolant tank, and hold another end of the hose through the back side of the machine, then connect it to the coolant nozzle on the grinding wheel guard.

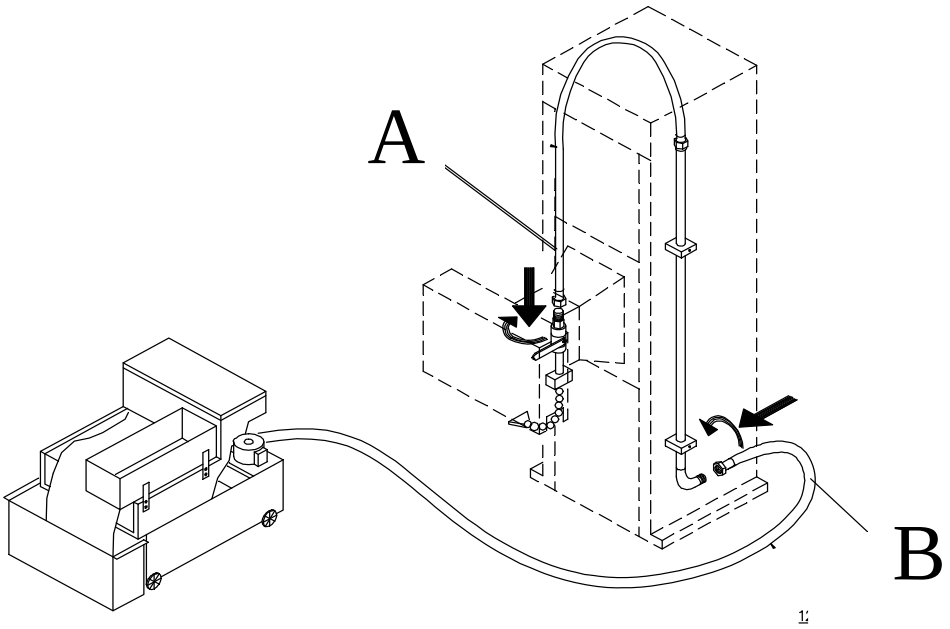


4.4.1-2 PLACING AND INSTALLING COOLANT SYSTEM ON 1020~2040 PD SERIES:

Install the coolant tank at the left side of the machine before connecting coolant hoses (A, B). The guide bushing of coolant tank must align with the coolant return tank, shown as figure below:

HOSE A: The movable hose should be fastened to the ball valve of nozzle and the connector on the machine column.

HOSE B: The coolant guide hose should be fastened to the connector, located at he bottom of machine column, and fastened to the coolant pump outlet port.



4.4.2 NOTICES FOR USE OF COOLANT:

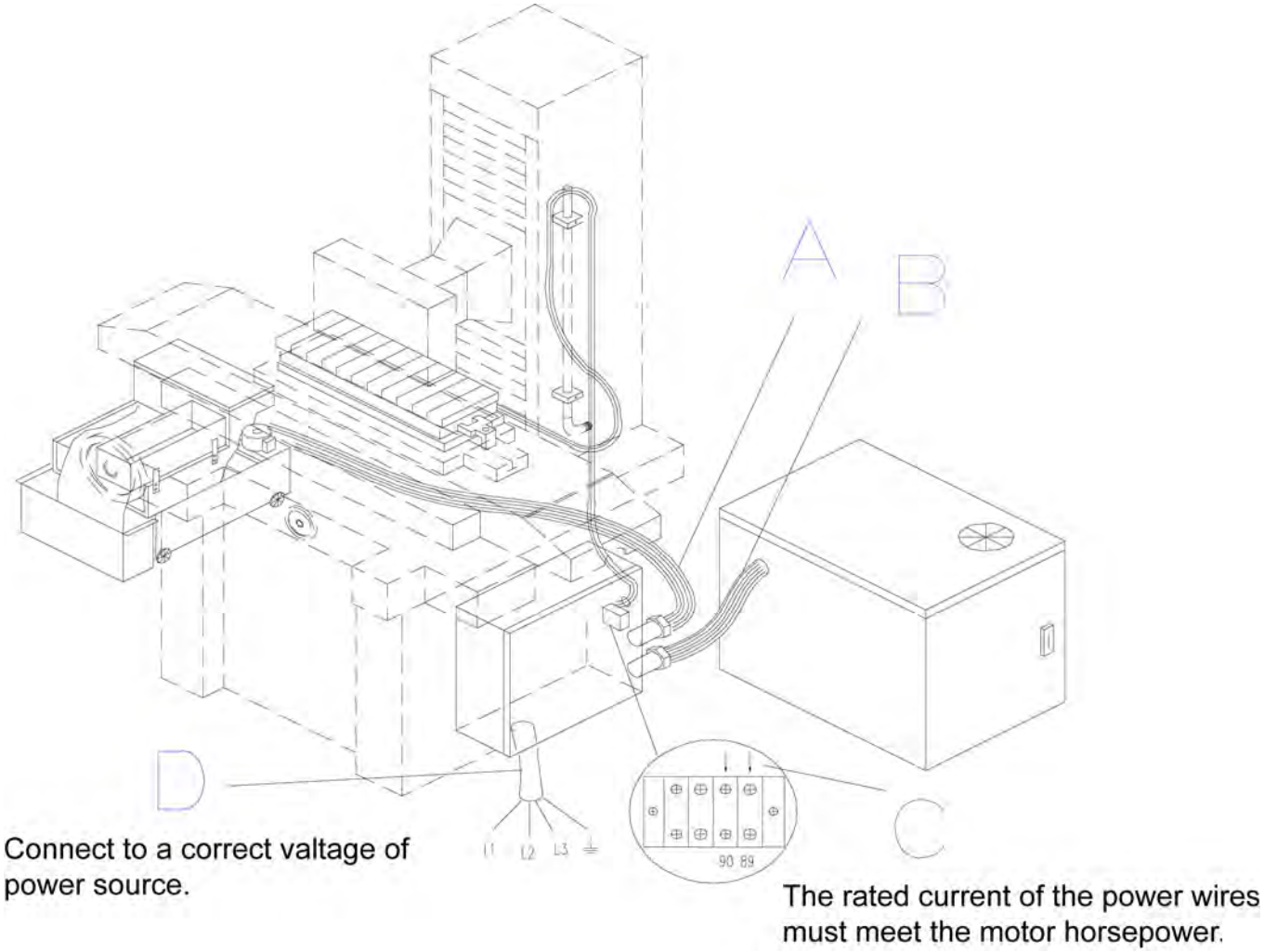
a. The grinding fluid to be used must comply with the conditions of sanitation, safety and without harm to personnel health.
b. Select correct grinding fluid depending on workpiece material and grinding wheel type to achieve the best grinding effect. (Consult your local oil supplier).
c. Mixing ratio of grinding oil and water may vary with different suppliers. Such information can be obtained from oil supplier. (Normally the mixing ratio of grinding oil to water is 1: 25~40).
d. Fill the well mixed grinding fluid into the tank.
e. Periodically replace grinding fluid. The replacement interval should follow the instruction from the oil supplier. Always keep the grinding fluid clean to ensure excellent grinding quality.
f. Grinding fluid is available from your local oil supplier, agent or machine oil supplier, such as: SUN, SHOWA, ESSO, BP, SHELL, MOBIL, TEXHCO and ARAL, etc.

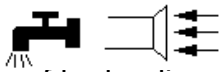
4.4.3 COOLANT TANK CAPACITY:

a. Coolant system with manual paper feeding: 95 liters

b. Coolant system with automatic paper feeding: 110/150 liters

4.5 ELECTRIC WIRING:



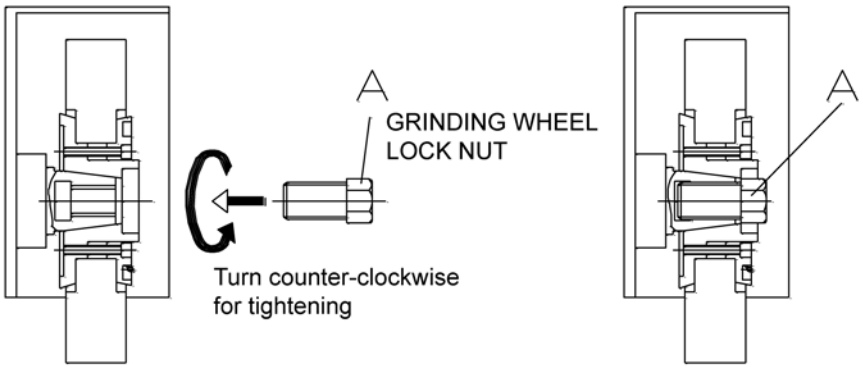
a. It's a power wire for coolant with dust collector unit, which should be connected to a socket marked with  , located at the back side of the electrical cabinet.
b. The power wire of hydraulic system should be connected to a socket marked with  , located at the back side of the electrical cabinet.
c. It's a power wire for magnetic chuck.
d. These are main power wires of the machine, which should be connected to correct voltage of power source. It is requested to check if the power wires are connected to the correct terminals.
e. After power wires have been connected, turn power switch on for checking if motor runs clockwise or not. If not, you need to change any two of the three-phase power wires (L1, L2, L3).

CHAP. 5 GRINDING OPERATION

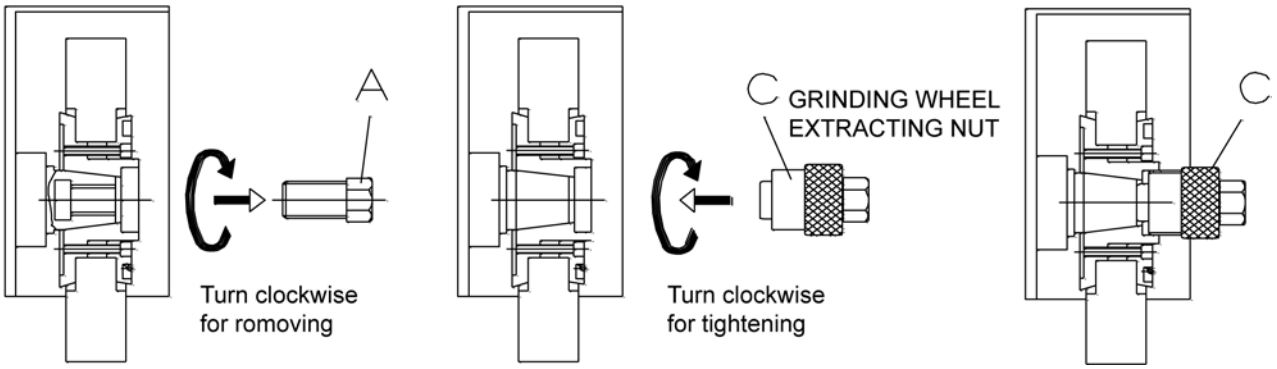
5.1 MOUNTING, DISMANTLING AND BALANCING GRINDING WHEEL

5.1.1 MOUNTING AND REMOVING THE GRINDING WHEEL:

MOUNTING:



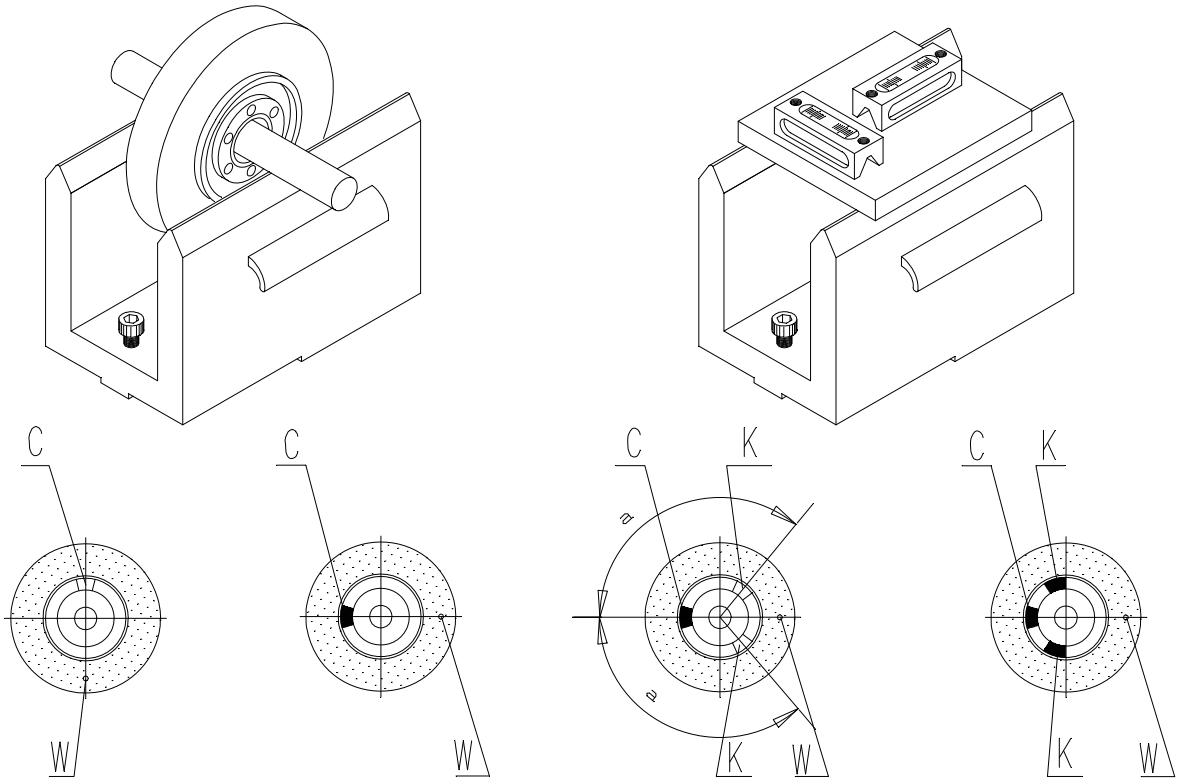
REMOVING:



1. When mounting or removing the grinding wheel, an extracting nut shall be applied for removing or mounting the grinding wheel with flange.
2. Before mounting the grinding wheel, it is necessary to check the grinding wheel condition, and clean the spindle taper surface and the tapered hole of the flange. Fit the grinding wheel to the spindle, then tighten the grinding wheel lock nut (A) by turning it counter-clockwise (Use an wrench for slight tightening without need of forced tightening, because the grinding wheel lock nut (A) will tighten further when the spindle is running clockwise).
3. Before removing the grinding wheel with flange, you need to remove the grinding wheel lock nut (A). Turn the grinding wheel extracting nut (C) into the flange until it touches the spindle, then apply an wrench for turning it clockwise which enables the flange to separate from the spindle. Now you can take out the grinding wheel.

5.1.2 BALANCING THE GRINDING WHEEL

GRINDING WHEEL BALANCING METHOD



1. Place the balancing stand on a stable plane. Use the precision level gauges to calibrate the leveling of the slideways on the balancing stand.
2. Place the grinding wheel on the balancing stand and allow it roll freely along the slideways. At this time, try to find its gravity "W" , then mark it with a chalk.
3. Fit a balancing piece (C) at the opposite direction of "W". Turn the grinding wheel 90º and check again which position of "W" and "C" is heavier.
4. Fit two balancing pieces (K) at the equiangular positions (a) with same circumference as "C".
5. Turn the grinding wheel until the "C" and "W" points are in a leveling condition, then check which position is heavier. If position "W" is heavier, adjust the two balancing pieces (K) with equiangular method toward "C" position (lighter position) until "C" and "W" are properly balanced.

NOTE:

(1) To achieve fine finish on workpiece surface, it is important to frequently check grinding wheel and balance grinding wheel periodically.

(2) Select a correct grinding wheel according to workpiece material, and perform grinding wheel balancing.

5.1.3 DRESSING THE GRINDING WHEEL

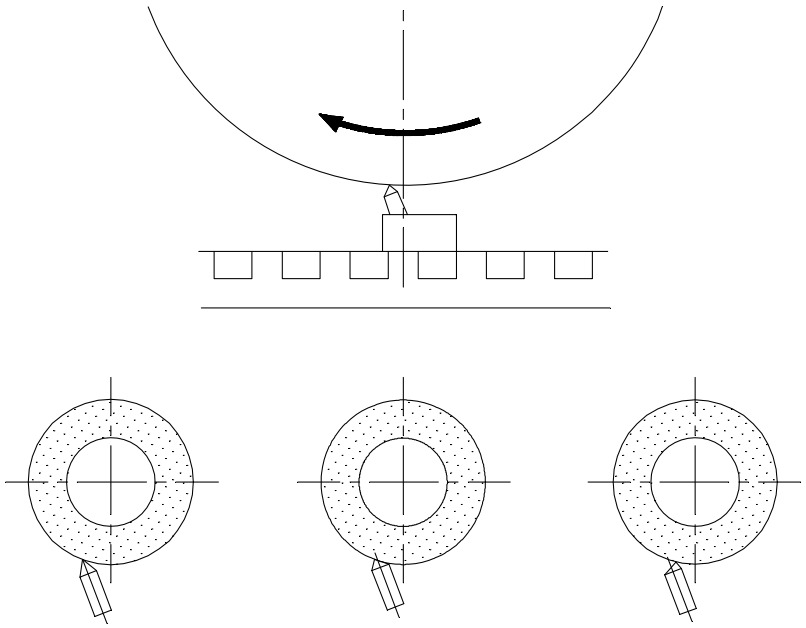
1. In case too much dusts exist on the grinding wheel surface or its surface is not smooth, then you should apply a diamond dresser to dress the grinding wheel.
2. The diamond dresser should be mounted to align with the spindle center with a 5~10° tilting angle. If the diamond dresser become dull, you can turn the diamond dresser 90° for use. If it becomes dull again, you can turn it 90° for use, shown as figure below.
3. Do not dress the grinding wheel too much at a time. The correct dressing method is starting dressing from the center of grinding wheel.
4. Suggested dressing speed:

$$F=\frac{2.5x1000}{dxN}$$

F：Cross feed speed (mm/min)

d：Grinding diameter (*μm*)

N：Grinding wheel running speed (R.P.M)



5.1.4 CORRESPONING TABLE FOR VARIOUS BRANDS OF GRINDING WHEELS

WORKPIECE MATERIAL		BRAND		
		CARBO	KINIK	TAIROULY
Cast iron	Dry grinding	C46H8V1A	Same as left	Same as left
	Wet grinding	C46HI8V1A	Same as left	Same as left
General iron	Dry grinding	RA46I8V40W1A	WA40I8VA	88A46J8AV217
	Wet grinding	RA46J8V40W1A	WA40K8VA	88A46K8AV217
General steel (Soft)	Dry grinding	RA46I8V40W1A	WA46I8VA	88A46J8AV217
	Wet grinding	RA46J8V40W1A	WA46K8VA	88A46K8AV217
General steel (Hard)	Dry grinding	RA46H8V40W1A	WA46J8VA	89A46H8AV217
	Wet grinding	RA46HI8V40W1A	WA46I8VA	89A46I8AV217
Special steel (Soft)	Dry grinding	32A46I8V40W1A	WA46I8VA	93A46I8AV217
	Wet grinding	32A46IJ8V40W1A	WA46I8VA	93A46J8AV217
Special steel (Hard)	Dry grinding	32A46H8V40W1A	WA46H8VA	93A46H8AV217
	Wet grinding	32A40HI8V40W1A	WA46H8VA	93A46I8AV217
Remark		Above table only shows partial brands for reference.		

GRINDING WHEEL SELECTION CONDITIONS:

1. The abrasive type should meet workpiece material.
2. The workpiece surface roughness is determined by grain size. (For example: grain sizes 46, 60, 80, 100, 120, 150 and 200, etc). The bigger grain size, the finer surface finish with smoother effect.
3. For grinding hard workpiece, a soft grade of bond type is suggested. For example, “H”: A soft material requires hard grade bond type “K” of a grinding wheel: Popular bond types are “H, I, J, K”.
4. SELECT GRINDING WHEEL FOR DRY AND WET GRINDING:
   The bond type of grinding wheel for dry grinding should be soft with great porosity.
   The bond type of grinding wheel for wet grinding can be increased by one grade in hardness, while porosity can be reduced by one grade.
5. For forming grinding, the grinding wheel hardness should be higher, grain size should be fine, and porosity is small.

※Selection of grinding wheel for other applications, contact the grinding wheel manufacturer for further instructions.

5.2 MOUNTNG WORKPIECE

To achieve high accuracy of grinding, one of the important requirements is to mount the workpiece correctly and stably. The correct workpiece holding methods depend on the workpiece size, shape and material. Basically workpiece types can be classified as four types, including flat workpiece such as plate or block, thin workpiece, short with small workpiece and non-magnetic workpiece.

Mounting instructions for various workpieces are shown as below:

5.2.1 FLAT WORKPIECE – PLATE OR BLOCK

Mounting instructions for flat workpiece:

In general, this type of workpiece has enough sectional area to be hold by a magnetic chuck, which requires no further accessory for assistance. Below gives the mounting instructions:

1. Remove all burrs on a parallel workpiece surfaces.
2. Apply a fine oil stone to remove any burrs or nicks existed on the magnetic chuck surfaces.
3. Use a clean cotton cloth to clean the chuck surface and finger marking. Also, remove any fine dirts or powder dusts.
4. Place a thin paper on the chuck, which size should be bigger than the workpiece.
5. Place the workpece on the paper, and keep it placed on the insert of the chuck.
6. If the workpiece slightly moves on the chuck surface, it is suggested to fit a thin pad under the workpiece to avoid movement. If it is difficult to add a pad, the workpiece will be straightened when the magnetic chuck increase magnetism. However, when the chuck demagnetized, the workpiece will return to the wrapped condition.
7. Shift the handle to the connect position for increasing magnetism.
8. Try to manually move the workpiece held by the chuck to check if it is held on the chuck securely.

5.2.2 THIN WORKPIECE

A. Use of the connecting plate:

The thin workpiece is normally hold by a magnetic conductive block. As a thin workpiece may be distorted by the powerful magnetic flux of the magnetic chuck, the fine polarity on the connecting plate may allow lots of weak magnetic flux to enter into the workpiece. This enables the thin workpiece to be held securely for grinding. In addition, it may reduce workpiece distortion caused by powerful magnetic flux.

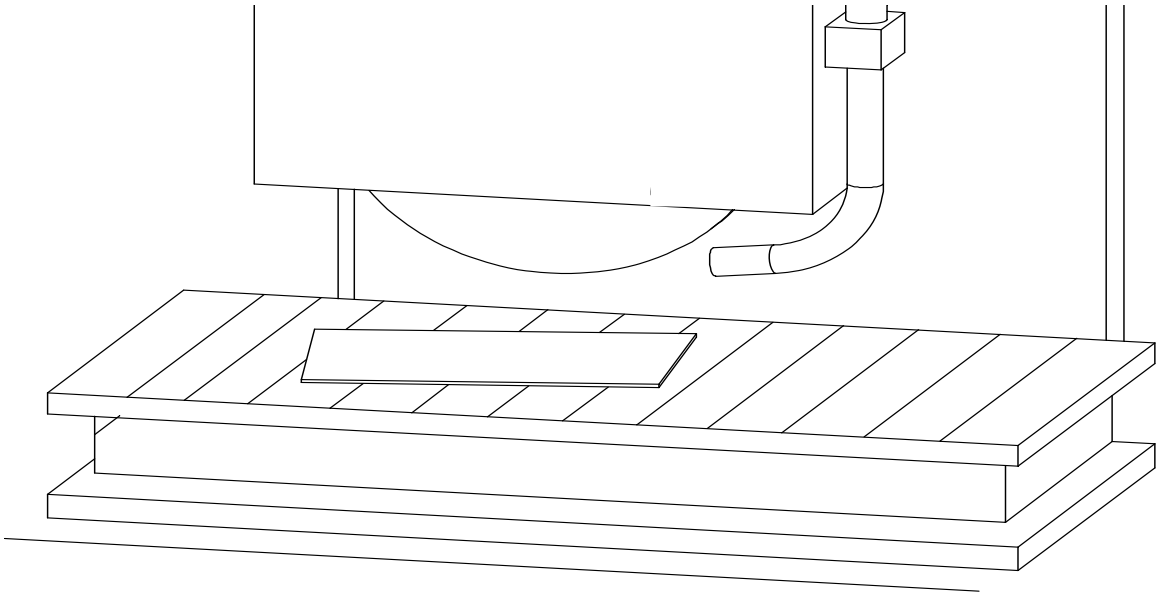
B. Instruction for using connecting plate to hold workpiece:

1. Thoroughly check burrs on the magnetic chuck surfaces, then apply an oil stone for removing burrs.
2. Thoroughly clean the magnetic chuck surface.
3. Select a proper magnetic conductive block that suits to the size of magnetic chuck.
4. Clean the top and bottom surfaces of the magnetic conductive block.
5. Place a thin paper on the center of magnetic chuck, which size should be bigger than the magnetic conductive block.
6. Place the paper on the magnetic conductive block, which position should be same as that of the chuck polarity. Note that incorrect position may reduce holding capability.
7. Place the workpiece on the magnetic conductive block, and check its leveling condition. If the workpiece may move, place a thin paper under the workpiece. Never try to use a non-magnetic pad, because the magnetic flux cannot enter into the workpiece.
8. Shift the handle to the connect position for increasing magnetism.
9. Check if the workpiece is held securely or not.

5.2.3 THIN WITH SMALL WORKPIECE

A. Mounting thin with small workpiece:
This type of workpiece should be mounted on the magnetic conductive plate that may prevent workpiece distortion due to powerful magnetic flux. Mounting workpiece according to following procedures:
   1. Refer to thin workpiece mounting steps from “a” to “g”.
   2. Place the small workpiece on the magnetic conductive plate with about 15°~30° angle, shown as figure below. This will reduce the contact time between the grinding wheel and the workpiece. Also, this may reduce thermal growth on the grinding wheel at each feed to avoid workpiece distortion.
   3. Shift the handle to the connect position for increasing magnetism.
   4. Check if the workpiece is held securely of not.

B. MOUNTING SHORT WITH SMALL WORKPIECE:
If a short with small workpiece can’t rest on three magnetic inserts of the magnetic chuck, it may result in insufficient holding. In this case, it is necessary to place a steel parallel strip or parallel block with thinner than the workpiece against the workpiece side for support. It prevents workpiece from slipping during grinding.



A thin workpiece is silently placed on the connecting plate.

5.2.4 NON-MAGNETIC WORKPIECE

As the non-magnetic workpiece can’t be held by the magnetic flux of the magnetic chuck, another clamping method shown as below shall be applied.

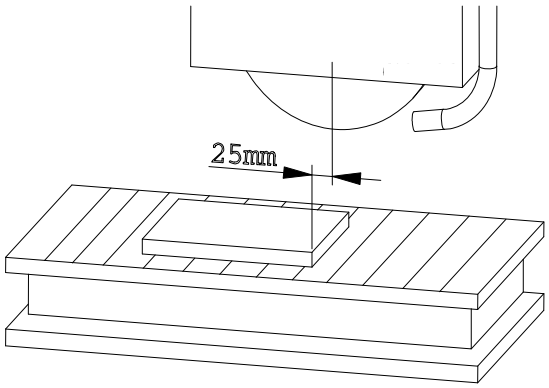
1. This type of workpiece should be clamped by the vise of a magnetic chuck or directly fastened to the table.
2. Depending on the workpiece shape, it may be clamped on a magnetic vise or double-side glue.
3. Workpiece can be clamped in the thin metallic parallel strip fitted on a magnetic chuck.

5.3 SURFACE GRINDING

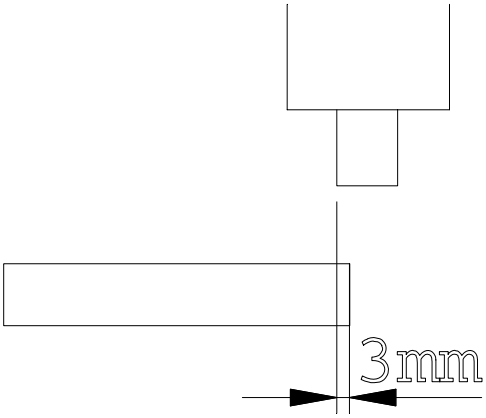
5.3.1 SURFACE GRINDING PROCEDURES

The most common operation for a surface grinder is the flat surface grinding. The operation is to grind a surface to the desired finish, then grind it to the desired size. Therefore the correct selection of a grinding wheel and workpiece mounting are the two most important factors in surface grinding. Surface grinding procedures are shown as below:

A. Select a correct grinding wheel depending on workpiece type, and then mount it on the spindle.
B. If necessary, perform balancing, truing and sharpening the grinding wheel.
C. Inspect burrs on the magnetic chuck, and remove them by using an oil stone. If the chuck is seriously scratched, polish it by using a grinding wheel.
D. Remove all burrs on the workpiece.
E. Place a thin paper at the center of magnetic chuck, which size should be bigger than the workpiece.
F. Mount workpiece and increase magnetism of the magnetic chuck.
G. Check if workpiece is held securely.
H. Adjust the table reverse movement dog position, so that the center of grinding wheel exceeds 25mm to each end of workpiece. See left figure shown below.
I. Adjust cross feed amount. Normal grinding amount is 0.075mm~1.25mm.
J. Manually adjust table until there is a 3mm overlap between the workpiece side and the grinding wheel edge, shown as left figure below.



Grinding wheel moves 25mm over workpiece at each end.



Grinding wheel overlap with workpiece side about 3mm

K. Start the grinding machine running. Carefully lower the wheel head until it just touches the workpiece, and sparks occur. Raise the grinding wheel about 0.125mm, so that it leaves from any high point of workpiece. Or you may start the grinding machine, and then adjust the power control lever for starting table reciprocating motions. Carefully lower the grinding wheel head until the grinding wheel just touches a high point on the workpiece and sparks occur.
L. Perform rapid cross feed of workpiece across the grinding wheel face, and check the high point on the workpiece.
M. Lower the wheel head 0.05mm~0.125mm to perform coarse grinding. If grinding depth is too much, it is suggested to reduce table feed speed.
N. Make sure the coolant supply is sufficient to clean the grinding wheel surfaces and cool workpiece.
O. Set cross feed to perform coarse grinding on the workpiece.
P. Make sure the grinding wheel completely moves away the workpiece side. This setting should be made before setting the grinding depth to avoid damage to the grinding wheel surfaces.

Q. Perform several times of coarse grinding as desired. Grind out complete cutting marking until size approaches to your desired value.
R. Fine sharpening on the grinding wheel.
S. Apply a dressing strip to slightly chamfer both sides of the grinding wheel, that reduces grinding wheel feed lines on the workpiece.
T. Lower the grinding wheel until it just touches the workpiece surface and slight sparks occur. Then lower the grinding wheel again by 0.0125~0.025mm to perform fine grinding.
U. Properly adjust the table cross feed speed to obtain the finish as you desired.
V. Perform fine grinding.
W. Under the condition of without adjustment of downfeed, perform final cross feed grinding by reversing the cross feed direction until sparks disappear. Also, make sure the grinding wheel leaves away the workpiece.
X. Close coolant, and then stop table movement.
Y. Keep grinding wheel running about half minute to completely remove coolant from the grinding wheel. Then stop the machine.
Z. If only one surface grinding is required, release the magnetic chuck. Raise one side of the workpiece to release magnetism, then remove the workpiece to avoid damage to the chuck surface. If you need to grind the opposite side of workpiece, perform parallel surface grinding to your desired size, according to following procedures.

5.3.2 PARALLEL SURFACE GRINDING ON A WORKPIECE

After the first surface grinding has been finished, you may use this surface as a reference plane for grinding the parallel surface. If the grinding machine condition is unchanged, the parallel surface can be fast and accurately ground to your desired size. Grinding procedures are shown as below:

A. After the first surface of workpiece grinding has been finished, turn the cross feed handwheel to move the table away from the grinding wheel. Do not change the positions of the wheel head and the table reversing dog.
B. Apply a pencil to mark each side position of the morkpiece on the side of the magnetic chuck.
C. Lift the workpiece on the magnetic chuck for removing all burrs.
D. Thoroughly clean the magnetic chuck and workpiece.
E. Measure the workpiece thickness, and determine the material removal amount.
F. Place a thin paper on the magnetic chuck, and make sure the paper thickness is same as that for the first surface grinding. .
G. Place the workpiece on the magnetic chuck between the lines marked by the pencil, then increase magnetic force.
H. When the first surface has been ground and the wheel head position is unchanged, then the grinding wheel can perform coarse grinding.
I. Perform coarse grinding until the workpiece size approaches a tolerance of 0.025mm or 0.05mm to the final size.
J. Sharpen the grinding wheel.
K. Perform slight grinding on the workpiece.
L. Remove workpiece from the chuck, and then measure its thickness.
M. Clean the chuck and workpiece. Mount the workpiece on the chuck again.
N. Lower the wheel head to perform grinding until your desired size is obtained.

5.4 WORKPIECE SIDE SURFACE GRINDING

5.4.1PURPOSE OF WORKPIECE SIDES GRINDING

The top / bottom sides, right / left and front / back sides of flat and rectangular workpieces must be ground to accurate squareness and parallelism. This means when grinding a big surface to desired size, its four sides and top / bottom sides must also be ground to be square and parallel. These surfaces will be used as reference for line marking and boring.

5.4.2 GRINDING ALLOWANCE

Any surface to be ground requires a proper grinding allowance for grinding out marks of planning and milling and for grinding to an accurate size. The surface finish and accuracy may vary with different machining methods, therefore grinding allowance required is different for various machining method. In general, grinding allowance for each surface should be added by at least 0.25mm, that ensures cutting marks can be ground out and achieves accurate squareness, parallelism and reference.

5.4.3 PRIORITY OF GRINDING SURFACE

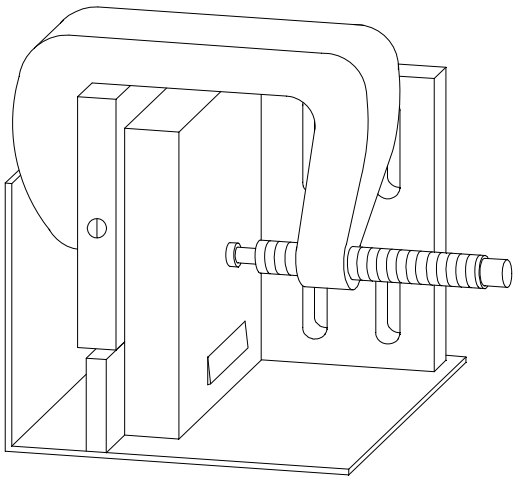
If all surface of a rectangular workpiece need to be ground, performing grinding according to correct procedures. Normally a large surface should be ground at first, then grinding its parallel surface. These ground surfaces will be used as reference when grinding side surfaces.

5.4.4 MOUNTING WORKPIECE

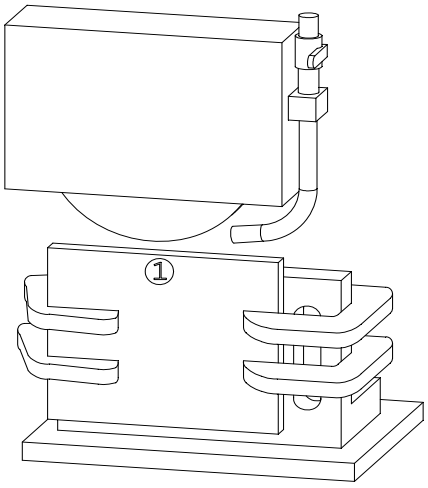
A. Application of angle plate: when grinding workpiece side surfaces and end surfaces, the fastest and the most convenient mounting method is to apply angle plate for clamping the ground surfaces for performing grinding operations. This may ensure accurate squareness. If the workpiece is not so big, two adjacent surfaces can be ground with one setup.

B. Clamping workpiece by angle plate:

1. Remove all burrs on the workpiece.
2. Thoroughly clean the magnetic chuck and the angle plate.
3. Place a thin paper on the magnetic chuck, which size is slightly bigger than the angle plate.
4. Place one end of the angle plate on the magnetic chuck, as shown on the left figure on page 5~10. The number marked on the workpiece is the grinding step.
5. Place workpiece against angle plate
   - Place the ground surface against the angle plate, and have one side surface or end surface of workpiece supported by the magnetic chuck.
   - Adjust the top side and one side of wrokpiece so that they protrude over the angle plate at least 12.5mm. If the side surface can’t protrude over the top of angle plate, you can insert a parallel block between the magnetic chuck and the bottom of wrokpiece, as shown on the left figure on page 5~10.
6. Hold the workpiece against the angle plate, then increase magnetic force of the chuck.
7. Use a clamp for clamping the workpiece on the angle plate. Make sure the clamp position does not interfere against grinding motion. Fit a soft aluminum or bronze between the clamp and workpiece, which will avoid damage to the ground surface when clamping.
8. Disconnect magnetic force of the chuck. Without change of mounting condition, place the base of angle plate on the magnetic chuck, shown as left figure below.
9. Increase magnetic force, and have the clamping plate located at the chuck position.
10. If necessary, use two additional clamps at the other side of workpiece to avoid displacement during grinding.



A workpiece is clamped on the angle plate



Grind the first side surface

5.4.5 GRINDING SIDE OR END SURFACE OF WORKPIECE

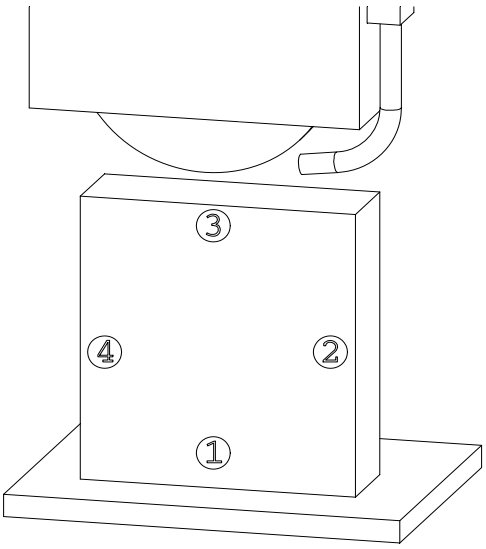
Adjacent surfaces grinding procedures: Once the workpiece is clamped on the angle plate, you can perform grinding on the first side surface and its adjacent surface. Grinding procedures are shown as below:

A. Raise the wheel head until it positions at 12.5mm above the workpiece top.
B. If automatic table cross feed device is used, properly adjust the table reversing dog position, so that the grinding wheel center may leave away workpiece about 25mm at each end.
C. Turn the cross feed handwheel, so that the grinding wheel side overlaps with workpiece side about 3mm.
D. Start the machine running. Lower the wheel head until it just touches the workpiece and a small amount of sparks occur.
E. Turn the cross feed handwheel to move the workpiece from the grinding wheel.
F. To prevent the grinding wheel from touching the lowest point on the workpiece surface, it is suggested to raise the grinding wheel about 0.125mm.
G. Manually feed table until the workpiece completely feed through the rotating grinding wheel. Try to find the highest point on the workpiece. Once the highest point is found, raising the grinding wheel again about 0.125mm.
H. Grind the side surface of workpiece until all cutting marks have been completely ground out. Suggested coarse grinding depth each time is 0.075mm~0.175mm, and fine grinding depth is 0.0125mm~0.025mm.
I. Once the first side surface grinding is finished, stop the machine shown as above right figure. Remove the clamp at the right side of workpiece.
J. Disconnect magnetic force of the chuck. Remove the angle plate and workpiece assembly. Note that do not change the workpiece mounting condition.
K. Thoroughly clean the magnetic chuck and the angle plate.
L. Place the clamped workpiece and the angle plate end surface on the magnetic chuck. Keep the adjacent surfaces to be ground at top shown as above right figure.
M. Use two clamps to clamp the workpiece and the angle plate, shown as above right figure.
N. Remove the two clamps located at the top of workpiece.
O. If necessary, use two additional clamps, however make sure they do not interfere against grinding operations.
P. Repeat steps 1~8 for grinding the second side surface until they achieve accurate squareness.
Q. Remove the angle plate and workpiece assembly from the magnetic chuck. Then remove workpiece from the angle plate.

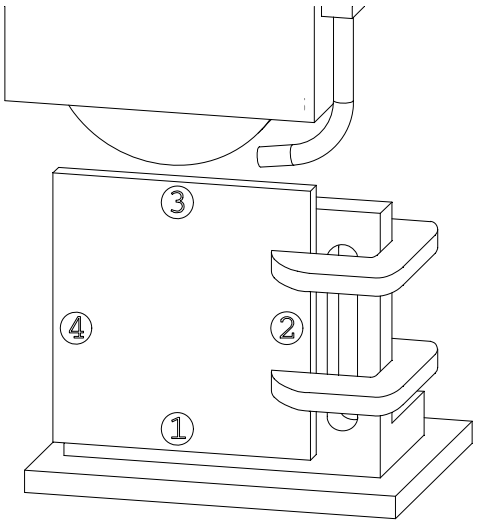
5.4.6 GRINDING 3RD AND 4TH SIDE SURFACES

Use the first and the second ground surfaces as reference, then performing grinding on the third and the fourth side surfaces. Place the ground surface on the magnetic chuck, and grind the adjacent surfaces for accurate squareness. Grinding procedures are shown as below:

A. Thoroughly clean the magnetic chuck, workpiece and angle plate.
B. Place a sheet of clean thin paper on the magnetic chuck.
C. Place the ground side surface of workpiece on the magnetic chuck.
   a、 If the workpiece thickness is over 25mm, its length can rest on 3 polarities, then the workpiece can be held on the magnetic chuck securely for grinding, shown as below left figure.
   b、 If the workpiece thickness is less than 25mm, its length cannot rest on 3 polarities. It requires additional support to prevent workpiece displacement during grinding, shown as below right figure.
   - Place the ground side surface on the magnetic chuck.
   - Place an angle plate on the chuck with height lower than the workpiece. If the angle plate is too high, place a square block or parallel strip under the workpiece, so that the workpiece is higher than the angle plate.
   - Hold the workpiece against the angle plate with your hand. Increase magnetic force by using another hand.
   - Use a clamp to clamp the workpiece to the angle plate. Make sure it will not interfere against grinding operations.
D. Grind the third side surface of workpiece until your desired size is obtained.
E. Repeat steps A~D for grinding the fourth surface.



The workpiece is held on the magnetic chuck for grinding the end surfaces (3, 4)



A thin small workpiece is clamped by the angle plate for grinding the end surfaces (3, 4)

5.5 VERTICAL SURFACE GRINDING

5.5.1 IMPORTANCE OF VERTICAL SURFACE GRINDING

In some cases, there is a need to grind a vertical surface without need to change the workpiece position.

5.5.2 MOUNTING WORKPIECE

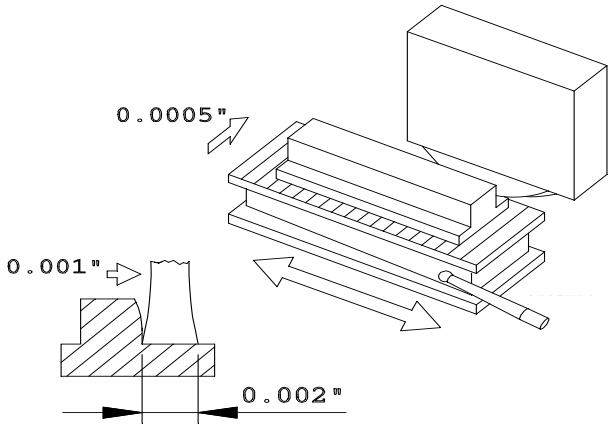
In grinding a vertical surface, it is requested to mount the workpiece carefully. Make sure the vertical surface to be ground is parallel with the table travel direction.

5.5.3 UNDERCUT ON STRAIGHT GRINDING WHEEL

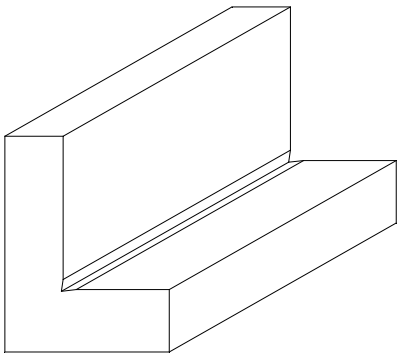
In order to have proper clearance in vertical surface grinding when a straight grinding wheel is employed, the side of grinding wheel should be cut to concave shape from its circumference to the flange. This is so called as “undercut”, which provides clearance in vertical surface grinding, shown as below left figure. With the undercut, the workpiece may feed to the grinding wheel side without binding and no displacement of workpiece on the magnetic chuck.

5.5.4 RELIEVE AT WORKPIECE CORNER

Before performing vertical surface grinding, it is necessary to relieve the angle between the vertical and horizontal surfaces. This will ensure a proper clearance between the grinding wheel edge angle and the workpiece. See left figure as below.



The grinding wheel side is cut to a concave shape.



A clearance produced between the workpiece corner.

5.5.5 VERTICAL SURFACE GRINDING PROCEDURES

A. Install a grinding wheel especially suitable for vertical surface grinding. You also need to balance, shape and sharpen the grinding wheel.
B. Mount a diamond dresser on the magnetic chuck. Cut the grinding wheel side at 1.5mm position from the circumference toward the flange into a concave shape. Its height should be over the surface to be ground.
C. Remove all burrs on the workpiece.
D. Clean the magnetic chuck, and then mount the workpiece. Place a sheet of thin paper between the workpiece and chuck.
E. Calibrate parallelism between the workpiece surface and table.
   a. Apply a dial gauge for calibration. If workpiece is too small, place metallic pieces or parallel plates around the workpiece to fix, which may avoid workpiece displacement when grinding.
   b. Calibrate stop bar on the magnetic chuck, and hold the workpiece against the stop bar or parallel plate.
F. Increase magnetic force. Check if the workpiece is held securely, then check if parallelism calibration made with above procedure is proper or not.
G. Adjust the table reversing dog position, so that the workpiece travel is over 25mm at each end.
H. Start the grinding wheel running. Move workpiece to approach the concave side of the grinding wheel.
I. Lower the grinding wheel to a 0.075mm position above the surface.
J. Move table slowly. Feed workpiece to just touches the grinding wheel and sparks occur.
K. Perform coarse grinding on the vertical surface until a 0.05mm allowance before the final size is obtained. Perform cross feed of table with 0.0125mm at each pass.
L. If required, use a strip dresser to slightly dress the side of grinding wheel.
M. Perform fine grinding until your desired size is achieved. The table feed amount per pass is about 0.0025~0.0075mm.
N. Before removing workpiece from the chuck, you should check the grinding size again.

5.6 ANGULAR SURFACE GRINDING

5.6.1 ANGULAR SURFACE GRINDING METHODS

There are two grinding methods usually applied for angular surface grinding:

- Install the workpiece at an angular position as your desired angle. Apply the straight face of a straight grinding wheel for grinding.
- Install the workpiece in a flat condition. Dress a grinding wheel to the desired angle for angular surface grinding.

5.6.2 MOUNTING WORKPIECE TO A DESIRED ANGLE

Workpiece can be mounted according to its shape and your desired angle, which can be clamped by various devices, such as angle plate, sine chuck, adjustable angle plate and adjustable angular vise, etc.

A. Apply a sine bar and block for mounting workpiece on an angle plate: This method allows workpiece to be quickly adjusted to your desired angle on the angle plate.
   a. CONSTRUCTION OF SINE BAR: The sine bar consists of strip block and two rollers with same diameter on the base. The two rollers are manufactured from hardened steel, precision ground and polished. The distance between two rollers is normally 125mm. The strip block is manufactured from tool steel, hardened, precision ground and polished for high accuracy. Any angle can be adjusted by placing a block under the roller at one end of strip block. The sine bar and block must be used on a flat enough plate.
   b. PRINCIPLE OF SINE BAR: The strip block of the sine bar represents the hypotemus of a right triangle. The block forms the opposite side of the desired angle. The plate serves as the base of a

triangle.

The corresponding height of opposite side (The composite height of block) between 0° and 90° can be calculated by triangular principle. Below contents give calculation of composite block height:
Sine of desired angle = Opposite side / hypotemus = Composite block height / Sine bar length. For example: if a 125mm long of sine bar is employed, then the sine angle = Composite block height / 125. Composite block height = 125 * Sine height.
EXAMPLE: Suppose a 125mm long sine bar is used with 150° angle adjustment, find the composite block height. Composite block height = 125 * Sin 15° = 12.5 * 0.25882 = 32.3525mm. Sine value corresponding to any angle can be found in the triangular logarithm table.
Setting instruction for grinding angle over 60°: When the workpiece surface angle is bigger than 60°, at first, you need to calculate the complement angle value, which can be obtained by 90° deducting the degree to be ground. Use the composite block height of the complement angle for adjusting the sine bar. Once workpiece is mounted on the angle plate, turn the angle plate to another side, and then the correct angle can be obtained.

B. SINE MAGNETIC CHUCK: This type of chuck is a wide sine bar with self magnetic field. It is used for mounting workpiece for angular grinding. A correct angle can be obtained by using block at one end of sine bar.

C. COMPOSITE SINE PLATE AND CHUCK: They are suitable for holding workpiece for composite angle grinding. The composite sine chuck consists of two sets of blocks for creating a composite angle.

D. ADJUSTABLE ANGLE PLATE: The workpiece can be clamped on the graduated angle plate end, and allows for setting angle to be ground. If high accuracy grinding is required, such device is not suggested.

E. ADJUSTABLE ANGULAR VISE: It is used for clamping workpiece for angular grinding. The vise base is equipped with a chain, allowing for tilting 0°~90°.

F. UNIVERSAL ANGULAR VISE: It permits swiveling and tilting to create a complex angle. When performing a simple angle grinding, it is requested to swivel the vise base to the 0° position before clamping the workpiece.

5.6.3 DRESSING GRINDING WHEEL ANGLE

There are two methods usually applied for dressing the grinding wheel angle: The first method is applying a sine dresser raised by block to dress the grinding wheel to your desired angle. The second method is applying an angle dresser graduated with 0°~90°, which is capable of dressing the grinding wheel to any angle as desired. If the sine dresser or angle dresser is not available, you can adjust the parallel block on the sine bar to a desired angle, and then clamp it on an angle plate. It may guide the diamond dresser to dress the grinding wheel surface according to this angle. Dressing the desired angle on the grinding wheel surface according to following procedures:

a. Set the dresser at your desired angle.
b. Clean the magnetic chuck, and then install the dresser.
c. Adjust the base of dresser and the magnetic chuck position until they are properly square.
d. Move table until the diamond tip is just located at the grinding wheel center position. Make sure the angle on the grinding wheel to be dressed is correct.
e. Tighten the workpiece securely to avoid longitudinal displacement.
f. Turn the cross feed hand wheel to move the diamond tip approaches the grinding wheel.
g. Start the wheel spindle running, and then lower the wheel head until the grinding wheel just touches the diamond.
h. Feed diamond across the grinding wheel from the near side.
i. Every time when the diamond moves across the grinding wheel, the grinding wheel lowers 0.005~0.0075mm.
j. Continue dressing the grinding wheel face angle until your desired width is obtained.

5.6.4 ANGULAR SURFACE GRINDING

ANGULAR SURFACE GRINDING: As above mentioned, the angular surface grinding can be performed by using the straight face of grinding wheel to grind a workpiece, which is positioned at a desired angle. Or you can dress the grinding wheel to a desired angle, then downfeed the grinding wheel to workpiece for performing plunge grinding. The so called plunge grinding is the grinding wheel moves in a radial direction to workpiece for grinding. When the workpiece is clamped at an angle, grinding performed by a straight grinding wheel face is same as that of common surface grinding. Dressing the grinding wheel face to a desired angle according to following procedures:

a. Mount the workpiece on a magnetic chuck or another clamping device.
b. Move the saddle of grinding machine, so that the workpiece is positioned under the grinding wheel angular face.
c. Tighten the saddle securely, which may avoid displacement during grinding.
d. Start the wheel spindle running, and then lower the grinding wheel until it just touches the workpiece and sparks occur.
e. Slowly move table, and find the highest point where the grinding wheel touches the workpiece.
f. The grinding wheel lowers 0.025~0.05mm at each pass. Continuously perform grinding until size approaches your desired final size.
g. Dress the grinding wheel, and then perform fine grinding operations.

5.7 TROUBLE SHOOTING FOR SURFACE GRINDING

5.7.1 TWO FACTORS THAT CAUSE GRINDING PROBLEM

There are many factors that may affect the final grinding result. A machine operator must understand wheat items should be noted. In addition, the operator should understand the cause of problem, and then try to find the solutions for solving the problem. There are two major factors that cause grinding problem:

A. MACHINE PROBLEMS: Such as the spindle bearings must be precise. All moving parts require proper lubrication for smooth movement. The machine structure should be rigid enough to produce fine finish on surface. The machine installation location must be kept away from external vibrating sources, such as railway or punch press.
B. MACHINE OPERATION PROBLEMS: Such as the correct selection of grinding wheel. If grinding wheel dressing method is correct or not. If coolant contains dusts or not. If the grinding wheel face is clogged or smooth or not. If the operator fully understands the machine construction, cross movement and feed and operation method, etc.

5.7.2 FREQUENTLY OCCURRED PROBLEMS, CAUSES AND CORRECTION FOR SURFACE GRINDING

PROBLEM: Intermittent grinding caused by unbalanced grinding wheel or external vibration. The grinding wheel is clogged, smooth and chattering. REMEDY: To balance, true and sharpen the grinding wheel. The machine installation location should be isolated from the external vibrating source.

- IRREGULAR SCRATCH MARKING OR FISHTAIL MARKING
  CAUSES: Dusts contained in coolant. Dusts drop from the grinding wheel guard. Insufficient coolant. Dusts drop from the chuck when removing the workpiece.
  REMEDY: Clean inside and outside of the grinding wheel guard. Clean coolant. Clean chuck before removing workpiece. Fill proper amount of coolant.
- BURNING DAMAGE AND COLOR CHANGE ON WORKPIECE
  CAUSES: Insufficient grinding amount. Grinding wheel is too hard or too fine. Too heavy grinding on a small area causes heat concentration.
  REMEDY: Increase table feed speed. Reduce grinding depth. Increase coolant flow speed and flow rate to cool down workpiece.
- WORKPIECE IS NOT PARALLEL
  CAUSES: Partial over-heat. Internal stress relieved. Workpiece is bending or twisting.
  REMEDY: Reduce holding force on the chuck. Place the bento side of workpiece on the chuck. Turn over workpiece then pad it with a sheet of paper. Light grinding several times, then turn over workpiece for continued grinding to achieve a flat surface.
- WORKPIECE IS NOT EVEN
  CAUSES: Partial over-heat. Internal stress. Workpiece is bent or twisted.
  REMEDY: Use low clamping force on the chuck. Place workpiece on the chuck with bent side facing upward. Place a sheet of paper under workpiece. Slightly grinding several times then turn over workpiece and grinding again. Repeat grinding until a plain surface is obtained.

5.7.3 SURFACE GRINDING PROBLEM ANALYSIS

Surface grinding defects and causes are shown on below table:

CAUSES	DEFECT CONDITIONS								
	Burning or grid pattern	Workpiece poor finish	Chattering mark	Scratch	Grinding wheel smooth	Grinding wheel clogged	Workpiece not parallel	Workpiece not parallel	Workpiece slip on chuck
・Machine operation									
Coolant dirted				×		×			
Insufficient coolant amount	×						×	×	
Incorrect coolant					×	×			
Chuck is dirted or has burrs				×			×	×	
Insufficient holding force									×
Poor holding							×	×	×
Workpiece slip on chuck				×					
Diamond is dulled					×				
Grinding wheel is dressed too fine	×				×	×	×	×	
Too long grinding travel								×	
Guard is loosened				×					
・Grinding wheel									
Grains are too fine	×				×	×			
Grinding wheel structure is too tight					×	×			
Bonding is too hard	×	×	×		×	×	×		
Bonding is too soft			×	×					
・Machine setup									
Incorrect chuck position								×	
Diamond is loosened or broken				×			×	×	
No magnetic force on chuck									×
vibration			×						
・Workpiece condition									
Heat treatment stress							×		
Too thin							×		

Surface grinding defects and causes

5.8 RECOMMENDED GRINDING WHEEL SPECIFICATIONS FOR SURFACE GRINDING

The grinding wheel specifications supplied by KINIK are shown on below table:

Grinding Wheel Standard Specif. / Workpiece Material		Horiz. Spindle (1st, 5th and 7th Type)						Vertical Spindle (2nd Type)		
		D	T	H	D	T	H	D	T	W
		180	13,16,19	31.75 50.80	255	32	50.80 76.20	205 205	75 100	25 32
		205	13,16,19 25	31.75 50.80	305	32,38, 50	76.20 127.00	305 355	125,150 125,150	32,38 32,38
		255	13,16,19 25	50.80 76.20	355	32,38, 50	127.00	405 405	125,150 125,150	32,38 32,38
		305	13,16,19 25	76.20 127.00	405	32,98, 50	127.00 203.30	For pottery shape, the bond type should increase by one grade		
S..C,S..CK SF..,SNC..,SK..	Raw material	19A46K8V 〔WA46K8V〕			19A36K8V 〔WA36K8V〕			19A30J8V 〔WA30J8V〕		
Quenched material same as above	Quenched material (alloy steel)	®WA46H8V ©SA46I8V			WA36H8V SA36I8V			WA36G8 V SA36H8V		
	Quenched material (tool steel)	SA46H8V			SA36H8V			SA36G8V		
	Stainless steel Heat resistant steel	SA46I8V			SA36I8V			SA30H8V		
FC.. Ductile iron, Meehanite cast iron, etc	Cast iron	®C46J5V ©19A46K8V			C46I5V 19 A46J8V			C36I5V 19A36J8V		

Recommended grinding wheel specifications for surface grinding

5.9 PERFORMANCE COMPARISON AMONG VARIOUS GRINDING WHEELS

Below table shows various grinding wheels performance.

Grinding Wheel Type (Abrasive and production method)	Abrasive Wear Resistance	Abrasive Spacing	Coolant Effect	Dressing Effect
CBN, DIA (resin, metal, electrolytic iron)	◎	◎	×	×
CBA	◎	◎	△	△
AG, CA (ceramic)	△	×	○	○
A, GC (ceramic porosity)	△	◎	◎	◎

Performance comparison among various grinding wheels
Symbol Description: ◎ Excellent, ○ Good, △ Poor, × Bad

5.10 SELECTING GRINDING WHEEL

Selecting a grinding wheel for deep cutting with low speed feed:

- ABRASIVE TYPE: Use high hardness and semi-brittle abrasive. For high alloy tool steel, it is suggested to use the GC abrasive with high hardness that reduces wear and extends service life.
- GRAIN SIZE: Grain size can be finer by 2-grade when comparing with that of general surface grinding.
- BOND TYPE: Normally an extra soft bond type is suggested. For high-tensile strength materials, a slightly hard bond type should be used.
- STRUTURE: When selecting the abrasive percentage 32%~36%, for finer grain size, the narrow part of continuous abrasive spacing can be compensated by coarse structure. The selection of porous structure may ensure better dressing effect and increased coolant effect.

5.11 POROUS CERAMIC BONDING GRINDING WHEEL SPECIFICATIONS

Below table shows various porous ceramic bonding grinding wheel specifications recommended by Japan NORITAKE.

Workpiece Material	General Selection	Big Workpiece. Dressing Required. Big Horsepower of Machine.
Nickel based heat-resistant alloy	RA 80 D 15 V 51P.P10	RA 60 C 15 V 51P.P10
Stainless steel (austenitic)	RA 60 E 15 V 51P.P10	
Stainless steel (austenitic) quenched	PA 80 D^+ 15 V 51P.P10	
High alloy tool steel-SKD, SKH raw materials	RA 60 E 14 V 51P.P10	
High alloy steel-SKD, SKH (quenched)	DA 46 H 10 V 99P.P10(NOTE 1) DA 46 H 12 V 99P.P10 DA 46 G 13 V 99P.P10	DA 80 C^+ 15 V 51P.P10
Extra hard alloy	GC 120 5D 13 V 99P.P10	
Magnetic alloy (Sendust)	GC 120 E 12 V 99P.P10	
Sintered alloy (Iron series)	PA 80 C 15 V 51P.P10	
General steel (raw material)	WA 60 F 14 V 51P.P10	
General steel (quenched)	WA 80 D^+ 15 V 51P.P10	RA 80 C^+ 15 V 51P.P10

Porous ceramic bonding grinding wheel specifications

NOTE: The grinding wheels used by the machine manufacturer.
DA 46 H 10 V 99P.P10 Suitable for 8” and 9” grinding wheel
DA 46 H 12 V 99P.P10 Suitable for 12” grinding wheel
DA 46 G 13 V 99P.P10 Suitable for 14” grinding wheel

※The contents shown in the chapter 6.2~6.11 are referred to the book of “Grinding Technology”. Page 112~132 edited by Mr. J. P. Chi and Mr. W. F. Chea, issued by the KINIK COMPANY.

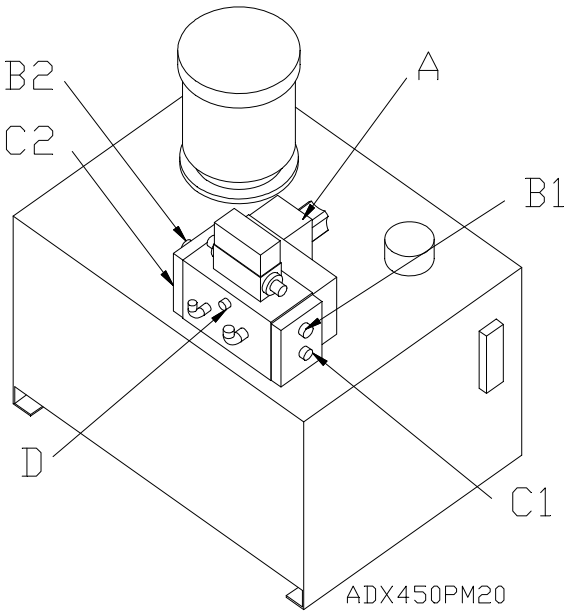
CHAP. 6 MACHINE MAINTENANCE

6.1 NOTICES:

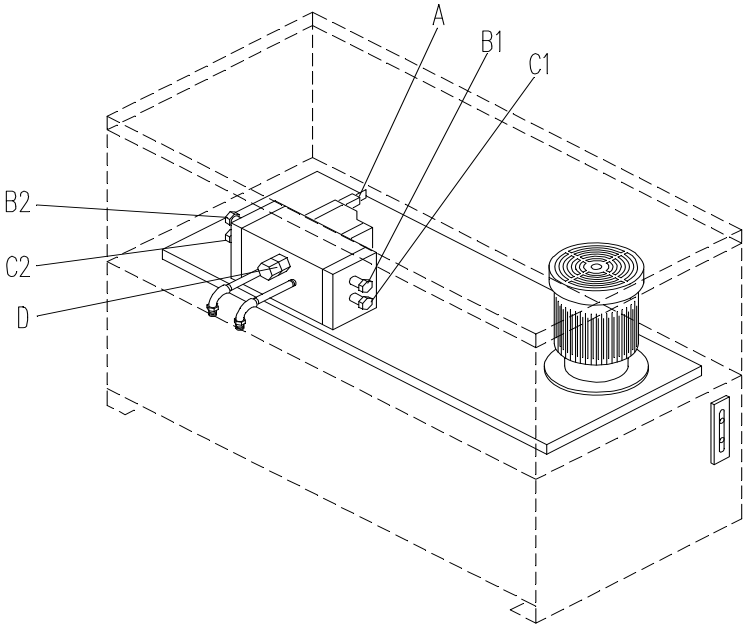
1. Everyday when cleaning the machine, do not apply compressed air for cleaning.
2. Do not allow dusts to enter into the linear ways. When performing dry grinding, the use of a dust collector is suggested.
3. When cleaning the spindle motor, use vacuum dust suction device. Do not use compressed air.
4. Periodically check if any wire is loosened.
5. Check the machine leveling at least once a year.
6. During operation, in case any abnormal noise occurs, stop the machine immediately and check problem.
7. Everyday before starting the machine, it is requested to check lubrication oil amount and hydraulic oil amount.
8. Be sure to implement periodic maintenance. Periodically replace lubrication oil and hydraulic oil.
9. In order to ensure the operator's health and fine finish of surface, always keep coolant clean.

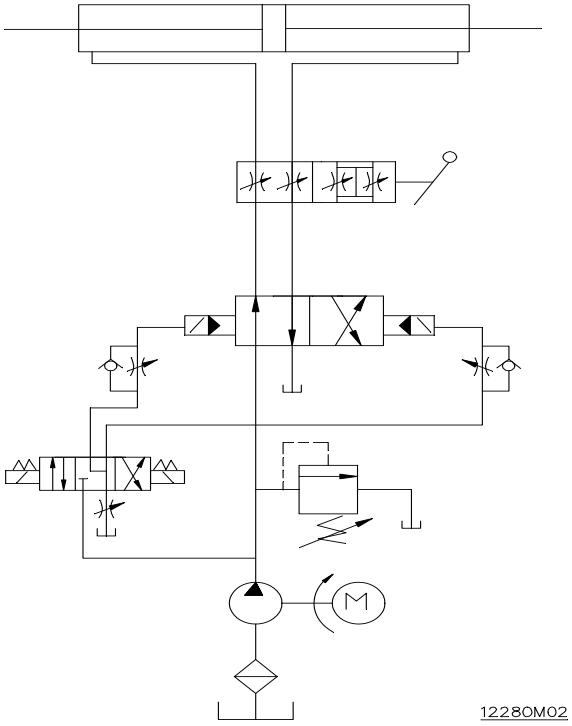
6.2 HYDRAULIC SYSTEM

818PD



1020~2040PD





6.2.1 ADJUSTING HYDRAULIC SYSTEM

1. VAIRIOUS ADJUSTMENT SCREWS:
   A：Pressure regulation handle
   B1，B2：Right / left moving direction change impact force adjustment screw (buffering)
   C1，C2：Right / left moving speed adjustment screw (speed)
   D：Right / left direction change impact force adjustment screw
2. Pressures have been properly set before shipment. If not required, do not adjust them.
   ※Maximum table speed limit is 25M/min. (60 HZ area), and 20M/min. (50HZ area).
3. B1，B2：Used for adjusting buffering forces if they are different in right / left direction change or in case impact force is excessive. Use B1 and B2 for adjusting impact force to achieve an consistency. If impact force is still too much, you may directly adjust the screw (D).
4. C1，C2：These have been properly tested and adjusted before shipment. Do not adjust them except a high / low speed function in a single direction is required.

6.2.2 NOTICES:

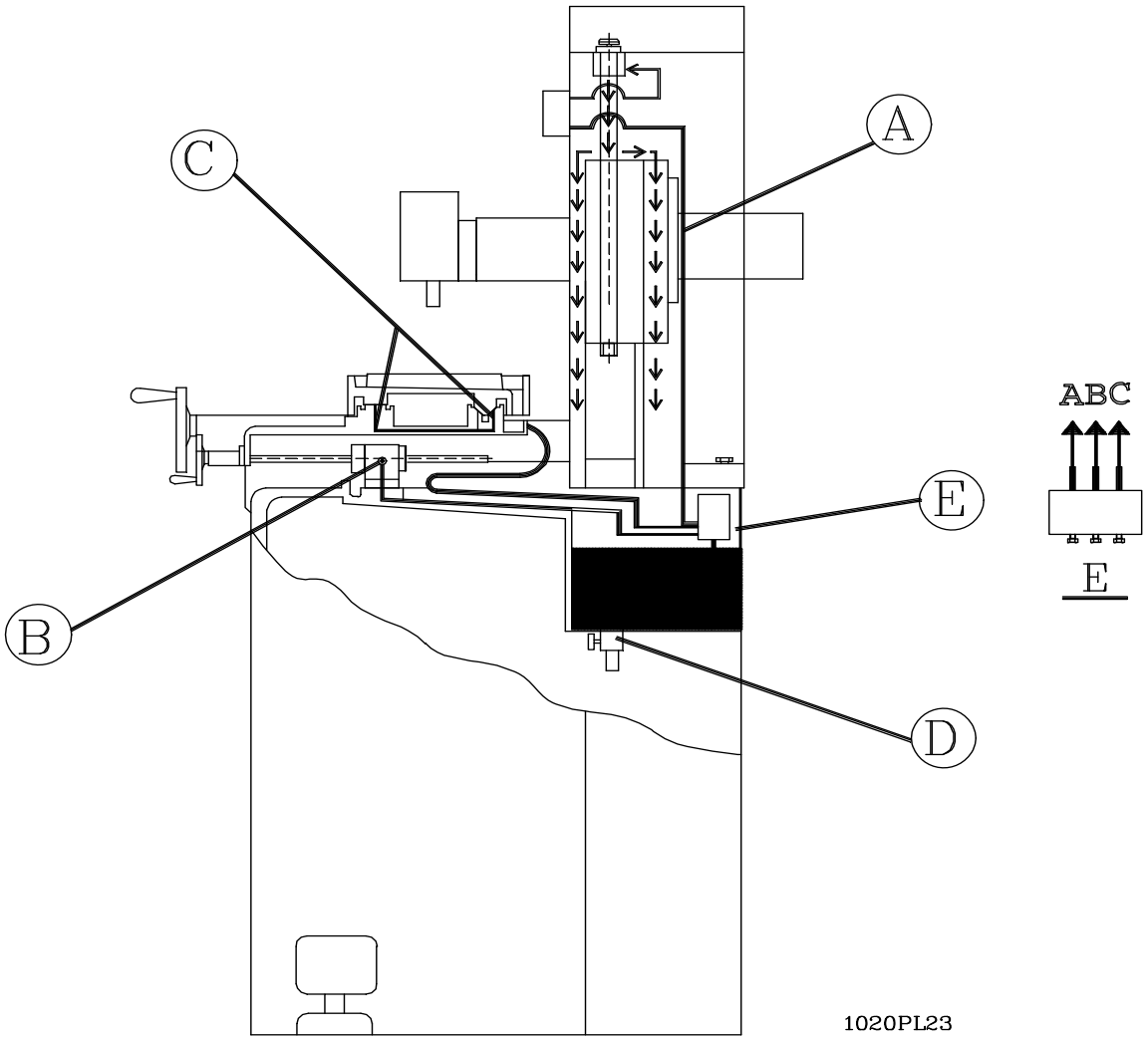
1. Use only the correct hydraulic oil, and make sure oil is clean enough to ensure normal operation performance of the machine.
2. For a new machine, replace hydraulic oil after the initial use of 3 months. Afterwards, replace oil every 3 months or half a year.
3. Frequently check if oil hose connectors are tightened securely or oil leaked or not.
4. Frequently check oil amount in the oil tank. Check if oil level reaches to 1/3~2/3 position of the oil sight window. If not, fill oil.
5. Always keep the hydraulic power unit and hydraulic motor clean, and preventing any dusts entering.
6. **Frequently check if any part of the hydraulic system is loosened or damaged.**

6.3 LUBRICATION SYSTEM

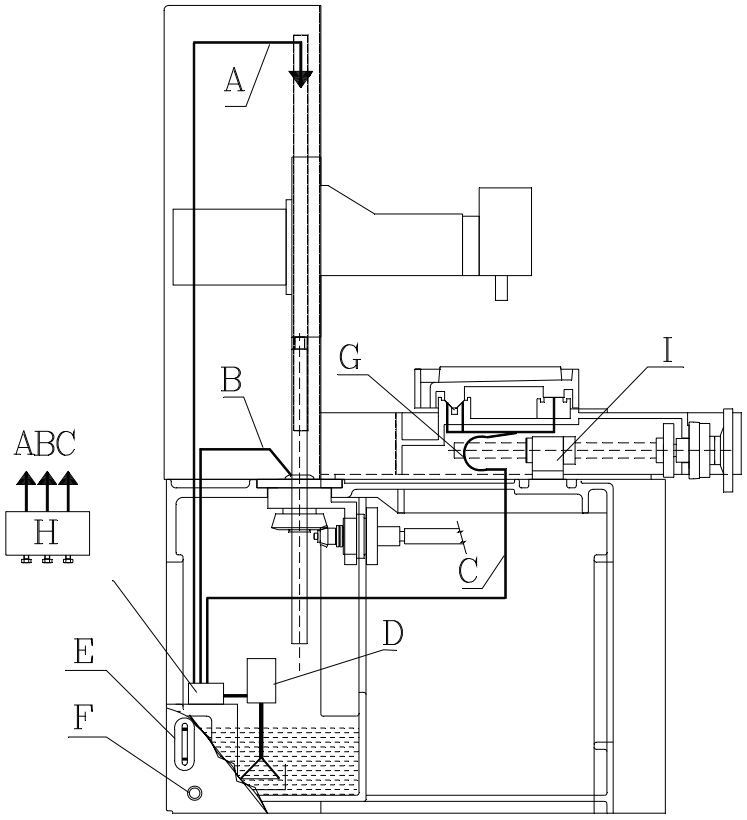
6.3.1 LEGEND OF LUBRICATION SYSTEM

6.3.1-1 LEGEND OF 818PD SERIES LUBRICATION SYSTEM

A: Vertical feed slideways and elevating screw lubrication on column
B: Cross feed screw lubrication
C: Table longitudinal and cross feed slideways lubrication
D: Oil drain port
E: Oil flow regulation valve (Oil distributor)



6.3.1-1 LEGEND OF 1020~2040PD SERIES LUBRICATION SYSTEM



A：Lubrication oil hose for vertical feed slideways

B：Lubrication oil hose for elevating screw and transmission gears

C：Lubrication oil hose for table slideways and saddle slideways

D：Lubrication oil pump

E：Oil sight gauge

F：Oil drain port

G：Lubrication oil hose for cross feed screw

H：Oil distributor

I：Oil inlet port for cross feed screw (manual lubrication)

6.3.2 ADJUSTING LUBRICATION OIL FLOW

1. Open the lower guard located at the back side of the machine. Try to find the position H shown the figure on the previous page (Lubrication oil regulation valve).
2. Check oil flow in A, B, C.
3. Apply an wench to loosen the nut on the regulating screw, then apply a "— " shape screw driver for adjusting oil flow. (Turn it clockwise for reducing or closing oil flow. Turn counter-clockwise for increasing oil flow).
4. After adjustment, slightly tighten the nut.
5. The machine is standard equipped with an automatic lubrication system. Once the hydraulic system starts, lubrication oil will flow to all slideways and the vertical feed screw.

6.3.3 LUBRICATION OIL BRANDS AND GRADES:

1： ESSO FEBIS K#53　　2： FULL-BORE HD#32
3： MOBIL ISO VG32(SW32)　　4： CPC Slideway lubrication oil #32
5： SHELL TONNA S#32　　6： BP MACCURAT D#32

6.3.4 MANUAL LUBRICATION OIL BRANDS AND GRADES:

1： ESSO FEBIS K68
2： MOBIL VACTRA 2
3： SHELL TONNA S68

6.3.5 LUBRICATION INDICATION LAMPS ON CONTROL PANEL

A：When lubrication indication lamps light on, it means lubrication oil supply is normal.
B：If indication lamp does not light on, it may be caused by following factors:
1. Lubrication pump does not start.　　2. Insufficient oil pressure.
3. Lubrication pump is damaged.　　4. Filtrating screen is jammed.
5. Power failure on lubrication pump.

6.4 ELECTRIC CONTROL SYSTEM

6.4.1 CONTROL PANEL:

1. Always check if any key, button and switch, etc. on the control panel is damaged or not. Also keep each one work normally.
2. Always keep control panel clean.
3. Make sure each indication lamp light on normally and indication is correct.

6.4.2 ELECTRICAL CABINET

1. Keep all electronic parts in the electrical cabinet complete. Also, keep the electrical cabinet clean.
2. Always keep spare fuse in the electrical cabinet.
3. Periodically check if any electric wire is loosened or broken or not.
4. To prevent dusts, coolant and oil from entering into the electrical cabinet.

6.4.3 OTHERS

1. Periodically check if any electric wire is loosened or broken or not.
2. Check if wiring for each motor is loosened or not. Check if all electrical devices are normal or not.

6.5 PERIODIC MAINTENANCE

6.5.1 DAILY MAINTENANCE:

1. Check if lubrication oil amount is sufficient or not.
2. Check if each key, switch and button works normally or not.
3. Check if hydraulic oil amount is sufficient or not.
4. Check if coolant of the cooler is sufficient or not.
5. Check if the machine is clean or not.
6. Check if the magnetic chuck surface is plain or not.
7. During the machine is running, check if there is any abnormal condition or noise or not.
8. Check if the grinding wheel is properly balanced or not.
9. Check if there is any malfunction on other parts.

6.5.2 MONTHLY MAINTENANCE:

1. Check if lubrication oil amount is sufficient or not. If not, fill oil immediately. If necessary, replace oil.
2. Check if each key, switch and button works normally or not.

3A. Check if hydraulic oil amount is sufficient or not. Replace oil every 3 months to half year.

3B. Replace manual lubrication oil every two weeks to one month.

4. Check if coolant of the cooler is sufficient or not.
5. Check if the machine is clean or not.
6. Check if the magnetic chuck surface is plain or not.
7. During the machine is running, check if there is any abnormal condition or noise or not.
8. Check if the grinding wheel is properly balanced or not.
9. Check if each hose connector is tightened or oil leaked or not.
10. Check if oil level in the hydraulic oil tank reaches to 1/3~2/3 position on the oil sight window. If not, fill oil immediately.
11. Keep the hydraulic power unit and hydraulic motor clean to avoid any dust entering.
12. Check if any part of the machine is loosened or damaged or not.
13. Keep electronic parts in the electrical cabinet complete. Also, keep the electrical cabinet clean.
14. Check if any electric wire is loosened or broken or not. Also, prevent dust, coolant and oil from entering into the electrical cabinet.
15. Check if there is any malfunction on other parts.

※If there is any item is not listed or any question, contact us.

ACER

HIGH PRECISION SURFACE GRINDER

CONTROL SYSTEM OPERATION MANUAL

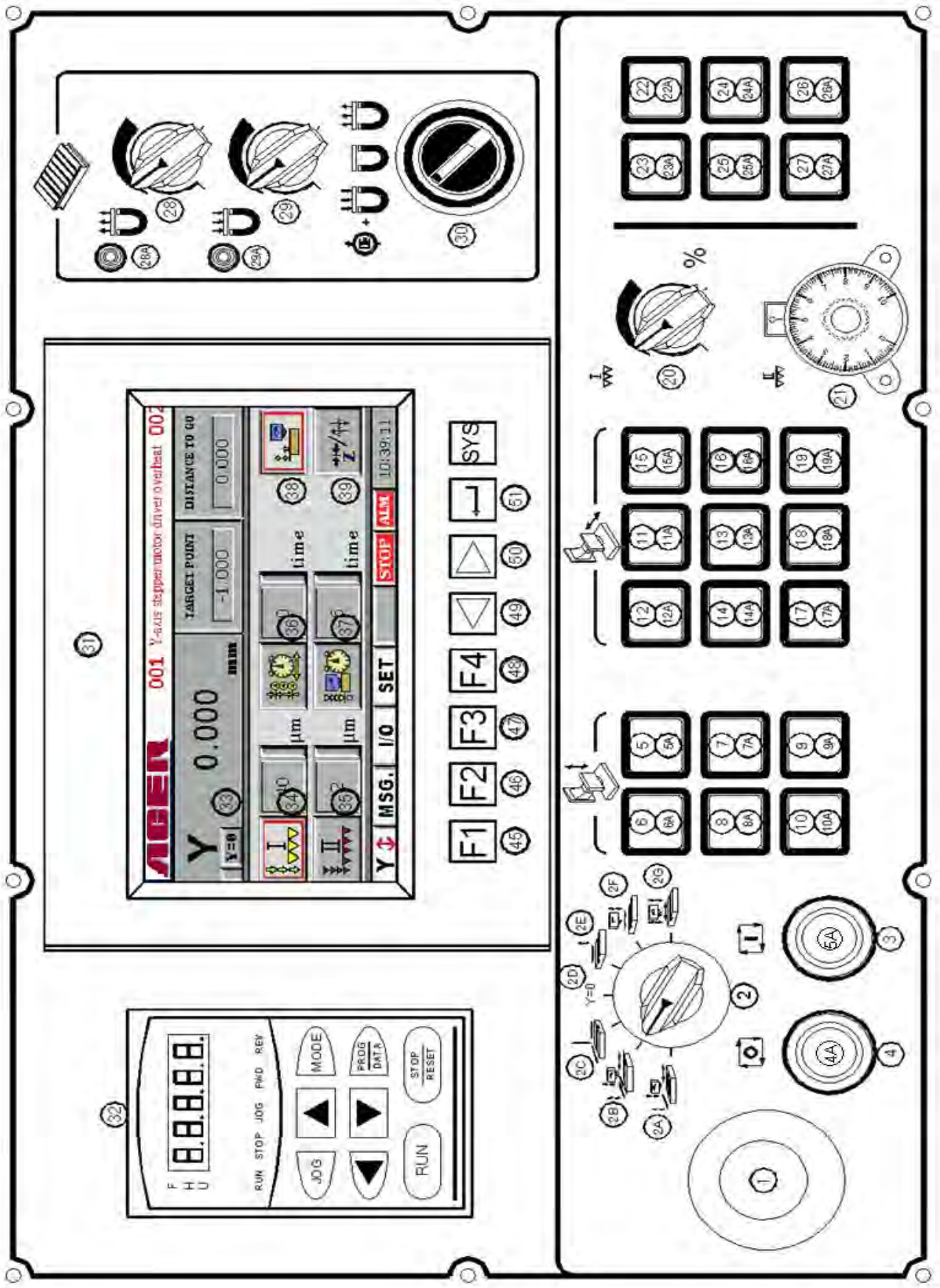
MODEL：Supra 818PD～
Supra 2040 PD

CONTENTS

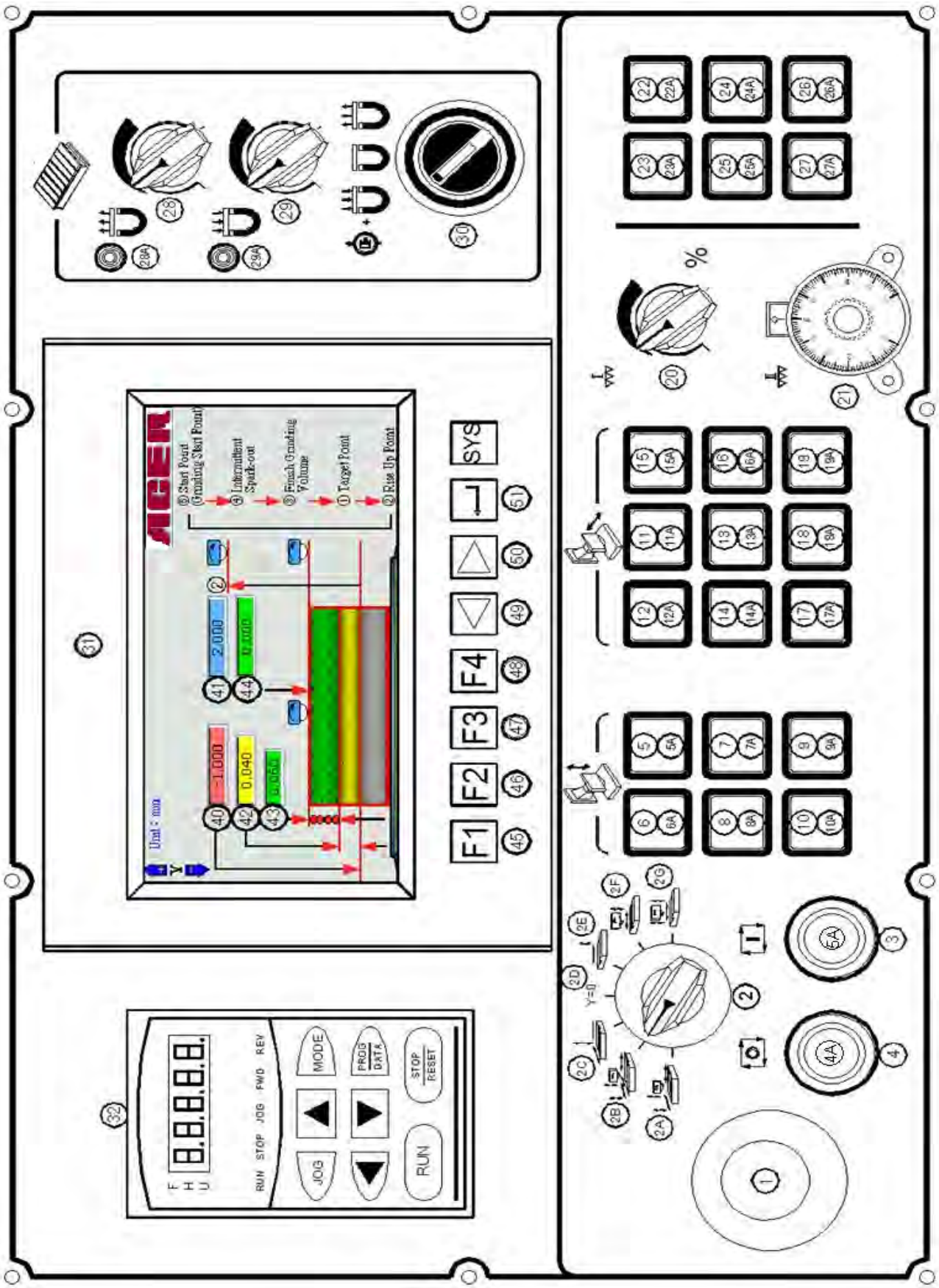
CHAP. 1 CONTROL PANEL OPERATION

1-1. LAYOUT OF CONTROL PANEL

1-2. MAIN DISPLAY AND BUTTON NUMBERS ON CONTROL PANEL



1-3. GRINDING SETTING DISPLAY AND BUTTON NUMBERS:



1-4. DESCRIPTION OF PUSH BUTTONS:

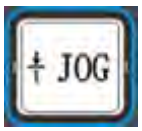
NO.	DESCRIPTION / FIGURE	DESCRIPTION / OPERATION
1	EMERGENCY STOP SWITCH 	Used for turning power off in case an emergency condition occurs (Press it for turning power off. Turn it clockwise or pull up for reset)
2	OPERATION MODE SELECTION KNOB 	Select your desired mode according to grinding method
2A	CROSS FEED SPEED CONTROLLED CONTINUOUS AUTOMATIC SURFACE GRINDING 	1: When the 4A lamp lights on, following motions can be performed: 1. Hydraulic drive longitudinal feed by using key (24). 2. Spindle drive by using key (22). 3. Cross movement controlled by keys (11, 12, 13 and 14). 4. Cross movement by handwheel control. 5. Slow raising controlled by key (7). 6. Intermittent downfeed controlled by key (10). 2-1: When the 3A lamp lights on, following motions can be performed 1. Hydraulic drive longitudinal feed by using key (24). 2. Spindle drive by using key (22). 3. Automatic continuous cross feed (The regulators 20 and 21 are used for controlling feed speed). 4. Automatic downfeed grinding and spark out grinding. (It performs downfeed motion at the front and rear fixed position, and performs coarse grinding according to the value shown on the display (34). When the current value shown on the display (33) reaches the setting value shown on the display (42), the machine will then perform fine grinding according to the value shown on the display (35). Once the current value shown on the display (33) reaches the setting value shown on the display (40), the machine will perform several times of spark out grinding according to the value shown on the display (37). After grinding has achieved your setting size, stop the hydraulic system, spindle running and coolant. The spindle may raise or not according to setting the selection key (38).

2A		After automatic grinding, the spindle may raise to a fixed position according to the value set by the display (41). 5. Once downfeed amount reaches the value shown on the display (43), the machine will perform intermittent spark out grinding according to the value shown on the display (36). 2-2: Other auxiliary controls: 1. The keys (13&14) provide forced direction change forward / backward. 2. The key (7) is used for controlling slow raising. 3. The keys (9&10) are used for intermittent downfeed.
2B	CROSS JOG FEED AUTOMATIC SURFACE GRINDING 	1: When the 4A lamp lights on , following motions can be performed: 1. Hydraulic drive longitudinal feed by using key (24). 2. Spindle drive by using key (22). 3. Cross movement controlled by keys (11, 12, 13 and 14). 4. Cross movement by handwheel control. 5. The key (7) controls slow raising. 6. The key (10) allows for controlling intermittent downfeed. 2-1: When the 3A lamp lights on, following motions can be performed: 1. Hydraulic drive longitudinal feed by using key (24). 2. Spindle drive by using key (22). 3. Automatic continuous cross feed (The regulators 20 and 21 are used for controlling feed speed). 4. Automatic downfeed grinding and spark out grinding. (It performs downfeed motion at the front and rear fixed position, and performs coarse grinding according to the value shown on the display (34). When the current value shown on the display (33) reaches the setting value shown on the display (42), the machine will then perform fine grinding according to the value shown on the display (35). Once the current value shown on the display (33) reaches the setting value shown on the display (40), the machine will perform several times of spark out grinding according to the value shown on the display (37). After grinding has achieved your setting size, stop the hydraulic system, spindle running and coolant, etc. The spindle may raise or not according to setting the selection key (38). After automatic grinding, the spindle may raise to a fixed position according to the value set by the display (41). 5. Once the downfeed amount reaches the value shown on the display (43), the machine will perform intermittent spark out grinding according to the value shown on the display (36). 2-2: Other auxiliary controls: 1. The keys (3&4) provide forced direction change forward / backward. 2. The key (7) is used for controlling slow raising. 3. The keys (9&10) are used for intermittent downfeed.

2C	MANUALLY CONTROLLED SURFACE GRINDING 	1: When the 4A lamp lights on, following motions can be performed: 1. Hydraulic drive longitudinal feed by using key (24). 2. Spindle drive by using key (22). 3. Cross movement controlled by keys (8, 9, 10 and 11). 4. Cross movement by handwheel control. 5. The keys (5, 6, 7 &8) are used for elevation control. 6. The key (10) allows for controlling intermittent downfeed. 2: When the 3A lamp lights on, following motions can be performed: 1. Hydraulic drive longitudinal feed by using key (24). 2. Spindle drive by using key (22). 3. Automatic jog cross feed (The regulators 20 and 21 are used for controlling jog feed amount) 4. The keys (11&12) provide forced direction change forward / backward. 5. The keys (5, 6, 7 &8) are used for elevation control. 6. The key (7) is used for raising control. 7. The keys (9&10) are used for intermittent downfeed.
2D	ZERO-SET FOR Y-AXIS POSITION COORDINATE VALUE 	1: Zero-set for Y-axis position coordinate value (Set value on the display 33 at “0”) 2: This mode is used only for following motions 1. Hydraulic longitudinal movement. 2. Cross movement controlled by handwheel.
2E	MANUAL SLOT GRINDING 	1: When the 4A lamp lights on, following motions can be performed: 1 Hydraulic drive longitudinal feed by using key (24). 2. Spindle drive by key (22). 3. Cross movement controlled by handwheel. 4. The keys (5, 6, 7 & 8) are used for elevation control. 5. The key (10) allows for controlling intermittent downfeed. 2: When the 3A lamp lights on, following motions can be performed: 1. Hydraulic drive longitudinal feed by using key (24). 2. Spindle drive by using key (22). 3. The keys (5, 6, 7 & 8) are used for elevation control. 4. The key (10) allows for controlling intermittent downfeed.

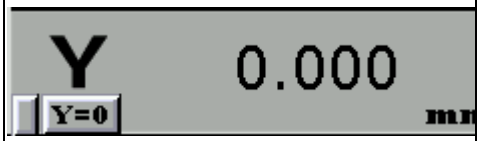
2F	RIGHT SIDE AUTOMATIC FEED SLOT GRINDING 	1: When the 4A lamp lights on, following motions can be performed: 1. Hydraulic drive longitudinal feed by using key (24). 2. Spindle drive by using key (22). 3. Cross movement by handwheel. 4. The key (7) is used for controlling slow raising. 5. Intermittent downfeed is controlled by key (10). 2-1: When the 3A lamp lights on, following motions can be performed: 1. Hydraulic drive longitudinal feed by using key (24). 2. Spindle drive by using key (22). 3. Automatic downfeed grinding and spark out grinding. (It performs downfeed motion at the right fixed position, and performs coarse and fine grinding according to the values shown on the display 34 (coarse grinding) and display 35 (fine grinding). When the current value shown on the display (33) reaches the setting value shown on the display (40), the machine will perform several times of spark out grinding according to the value shown on the display (37). After automatic grinding is finished, stop the hydraulic system, spindle running and cooling system, etc. The spindle may raise or not according to setting the selection key (38). After automatic grinding, the spindle may raise to a fixed position according to the value set by the display (41). 4. Once the downfeed amount reaches the value shown on the display (43), the machine will perform intermittent spark out grinding according to the value shown on the display (36). 2-2: Other auxiliary control: 4. The key (7) is used for controlling slow raising. 5. The keys (9 & 10) are used for intermittent downfeed.
2G	DOUBLE SIDE AUTOMATIC FEED SLOT GRINDING 	1: When the 4A lamp lights on, following motions can be performed: 1. Hydraulic drive longitudinal feed by using key (24). 2. Spindle drive by using key (22). 3. Cross movement by handwheel. 4. The key (7) is used for controlling slow raising. 5. Intermittent downfeed is controlled by key (9 & 10). 2-1: When the 3A lamp lights on, following motions can be performed: 1. Hydraulic drive longitudinal feed by using key (24). 2. Spindle drive by using key (22). 3. Automatic downfeed grinding and spark out grinding. (It performs downfeed motion at the right fixed position, and performs coarse and fine grinding according to the values shown on the display 34 (coarse grinding) and display 35 (fine grinding). When the current value shown on the display (33) reaches the setting value shown on the display (40), the machine will perform several times of spark out grinding according to the value

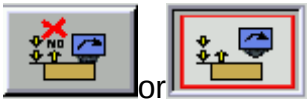
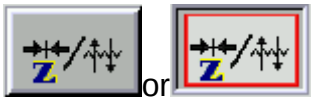
2G		shown on the display (37). After automatic grinding is finished, stop the hydraulic system, spindle running and cooling system, etc. The spindle may raise or not according to setting the selection key (38). After automatic grinding, the spindle may raise to a fixed position according to the value set by the display (41). 4. Once the downfeed amount reaches the value shown on the display (43), the machine will perform intermittent spark out grinding according to the value shown on the display (36). 2-2: Other auxiliary control: 4. The key (7) is used for controlling slow raising. 5. The keys (9 & 10) are used for intermittent downfeed.
3	WORKING MODE EXECUTION CONFIRM KEY 	1. Start selection of working mode. 2. When the green lamp lights on, it means selecting working mode is being executed.
4	WORKING MODE EXECUTION STOP KEY 	1. To stop working. 2. When the red lamp lights on, it means working stop.
5	RAPID RAISING KEY 	1: For quickly moving the spindle head (Y-axis) upward. 2: When the blue lamp lights on, it means the key (5) is allowed to execute its function. 3: When the blue lamp flashes, it means rapid raising is executing.
6	RAPID LOWERING KEY 	1: For quickly moving the spindle head (Y-axis) downward. 2: When the blue lamp lights on, it means the key (6) is allowed to execute its function. 3: When the blue lamp flashes, it means rapid lowering is executing.
7	SLOW RAISING KEY 	1: For slowly moving the spindle head (Y-axis) upward. 2: When the blue lamp lights on, it means the key (7) is allowed to execute its function. 3: When the blue lamp flashes, it means slow rising is executing. 4: (In case automatic grinding amount is too much, you can use this key for raising the spindle head to avoid danger)

8	LOW SPEED DOWNFEED KEY 	1: The spindle head (Y-axis) moves down at low speed. 2: When the blue lamp lights on, it means the key (8) is allowed to execute its function. 3: When the blue lamp flashes, it indicates downfeed at low speed is performing.
9	BIG DOWNFEED KEY (Value shown on display 33) 	1: Refer to value shown on display 34 (Y-axis at coarse grinding position) and display 35 (Y-axis at fine grinding position). Press this key for intermittent downfeed. 1: When the blue lamp lights on, it means the key (9) is allowed to execute its function. 2: When the blue lamp flashes, it indicates intermittent downfeed is performing. 3: During manual or automatic grinding operation, you may use this key for auxiliary downfeed.
10	JOG DOWNFEED KEY 	1: Press this key for intermittent micrometric downfeed. Press it one time for downfeed & 1um or 0.000025". 2: When blue lamp lights on, it means the key (10) is allowed to execute its function. 3: When the blue lamp flashes, it indicates intermittent micrometric downfeed is performing.
11	RAPID TRAVERSE KEY FOR SADDLE MOVES INWARD 	1: When this key is pressed, the saddle will move inward at a high speed. 2: Press this key for 2 seconds to force the saddle to change direction (Used in automatic jog feed) 3: When the orange lamp lights on, it means the key (12) is allowed to execute its function. 2: When the orange lamp flashes, it indicates the motions shown as below are performing. (A). Moves inward at high speed. (B). Automatic jog move inward function.
12	RAPID TRAVERSE KEY FOR SADDLE MOVES OUTWARD 	1: When this key is pressed, the saddle will move outward at a high speed. 2: Press this key for 2 seconds to force the saddle to change direction (Used in automatic jog feed). 3: When the orange lamp lights on, it means the key (12) is allowed to execute its function. 4: When the orange lamp flashes, it indicates the motions shown as below are performing. (A). Moves outward at high speed. (B). Automatic jog move outward function.
13	SLOW TRAVERSE KEY FOR SADDLE MOVES INWARD 	1: When this key is pressed, the saddle will move outward at a low speed. 2: Press this key for 2 seconds to force the saddle to change direction (Used in automatic continuous feed) 1: When the orange lamp lights on, it means the key (13) is allowed to execute its function. 2: When the orange lamp flashes, it indicates the motions shown as below are performing. (A). Moves forward at low speed. (B). Automatic continuous feed inward for grinding.
14	SLOW TRAVERSE KEY FOR SADDLE MOVES OUTWARD 	1: When this key is pressed, the saddle will move outward at a low speed. 2: Press this key for 2 seconds to force the saddle to change direction (Used in automatic continuous feed) 1: When the orange lamp lights on, it means the key (14) is allowed to execute its function. 2: When the orange lamp flashes, it indicates the motions shown as below are performing. (A). Moves forward at low speed. (B). Automatic continuous feed outward for grinding.

15	Spare	Spare
16	Spare	Spare
17	Spare	Spare
18	Spare	Spare
19	Spare	Spare
20	AUTOMATIC CROSS JOG FEED REGULATOR / RAPID CROSS FEED SPEED REGULATOR / AUTOMATIC CONTINUOUS CROSS FEED SPEED REGULATOR 	1: For adjusting big jog feed amount in automatic cross feed. 2: For adjusting rapid cross feed speed. 3: For increasing speed during performing automatic continuous cross feed.
21	AUTOMATIC CROSS JOG FEED REGULATOR / SLOW CROSS FEED SPEED REGULATOR / AUTOMATIC CONTINUOUS CROSS FEED SPEED REGULATOR 	1: For adjusting small jog feed amount in automatic cross feed. 2: For adjusting slow cross feed speed. 3: For reducing speed during performing automatic continuous cross feed.
22	SPINDLE START KEY 	1: Press this key for starting spindle running (For CE approved model, start the hydraulic system, then start the grinding wheel running). 2: When the indication lamp lights on, it means the spindle is running (Care should be taken for safety, and prevent your head, hands and body from touching the running grinding wheel).
23	SPINDLE STOP KEY 	1: Press this key for stopping spindle. 2: When the indication lamp lights on, it means the spindle stop.
24	LONGITUDINAL FEED HYDRAULIC SYSTEM START KEY 	1: Press this key for starting the hydraulic system for table longitudinal feed. 2: When its indication lamp lights on, it means the hydraulic system is working.
25	LONGITUDINAL FEED HYDRAULIC SYSTEM STOP KEY 	1: Press this key for stopping the hydraulic system for table longitudinal feed. 2: When its indication lamp lights on: (1) Hydraulic system for longitudinal feed stops. (2) Hydraulic system running is allowed. 3: When the indication lamp 25A does not light on: (1) It means the throttle handle for longitudinal feed is

		not closed to a proper position. (2) The switch no. 30 is not energized.
26	COOLER START KEY 	1: Used for starting cooler. 2: When the indication lamp lights on, it means the cooler is running.
27	COOLER STOP KEY 	1: Used for stopping cooler. 2: When the indication lamp lights on, it means the cooler stops.
28	DEMAGNETIZING TIME REGULATOR 	When the selection switch (30) is set at demagnetizing position, magnetism will release according to the setting time. Turn the regulator clockwise for increasing demagnetizing time. (The bigger working area, the longer release time. The smaller working area, the shorter release time).
28A	DEMAGETIZING INDICATION LAMP 	When the selection switch (30) is set at demagnetizing position, the lamp will flash according to the time set by the regulator (28). (When flash stops or the lamp does not light on, it means magnetism release is finished).
29	MAGNETISM REGULATOR 	When the selection switch (30) is set at magnetizing position, the workpiece will be sucked by the setting magnetism. Turn the regulator clockwise for increasing magnetism. (A workpiece with bigger area requires less suction force. A workpiece with smaller area requires more suction force. Use your hand to push the workpiece for checking if it is held securely or not).
29A	MAGNETIZING INDICATION LAMP (GREEN) 	When the indication lamp lights on, it means magnetizing is performing.
30	MAGNETIZING & DEMAGNETIZING SELECTION SWITCH	1: When turning this selection switch to demagnetizing position, magnetism will be released according to the time set by the regulator (28). 2: When turning this selection switch to magnetizing position, the workpiece will be sucked according to the time set by the regulator (29). * The hydraulic system circuit for table longitudinal feed is interlocked by the magnetizing switch and the longitudinal throttle valve.

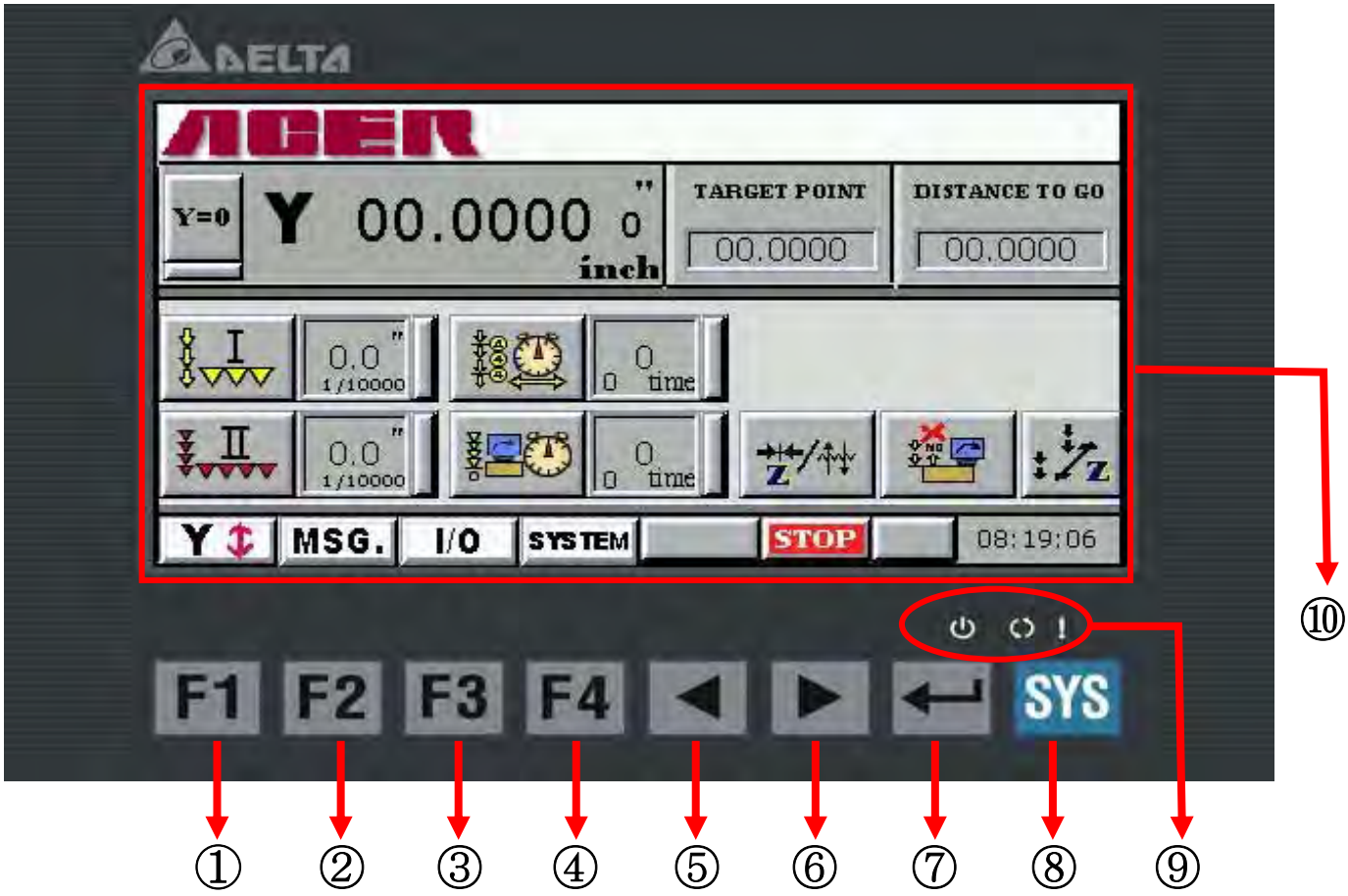
		
31	MONITOR 	It provides various functions, such as Y-axis downfeed grinding data, coordinate, machine input / output signal monitoring, system parameter setting and error message monitoring, etc.
32	WHEEL SPINDLE SPEED SETTING 	Used for setting the wheel spindle speed and monitoring current wheel spindle speed.
33	Y-AXIS (VERTICAL AXIS) CURRENT VALUE DISPLAY 	For displaying current spindle position value.
34	Y-AXIS COARSE GRINDING DOWNFEED SETTING VALUE 	When Y-axis (vertical axis) performs automatic downfeed, it provides downfeed value setting at each time at coarse grinding position.
35	Y-AXIS FINE GRINDING DOWNFEED SETTING VALUE	When Y-axis (vertical axis) performs automatic downfeed, it provides downfeed value setting at each time at fine grinding position.

		
36	INTERMITTENT SPARK OUT GRINDING TIMES SETTING VALUE 	When Y-axis (vertical axis) performs automatic grinding, if the total downfeed is over or equal to the setting value shown on the display (43), then automatic downfeed will stop. Once the setting times shown on the display (36) reaches (Automatic zero return), Y-axis (vertical axis) will perform automatic downfeed at cross and longitudinal downfeed point.
37	SPARK OUT GRINDING TIMES SEETING VALUE 	When Y-axis (vertical axis) performs automatic grinding, the spindle will automatically downfeed until the current value shown on the display (33) reaches the setting value shown on the display (40). Then the machine will perform spark out grinding according to the times set on the display (37). (Once times reaches, it will automatically return to zero)
38	SPINDLE HEAD RAISE SELECTION KEY 	1. When the display shows "red X ", it means the spindle head does not raise automatically. 2. When the column shows "red, concave" and "red X " disappear, it means the spindle head raises automatically.
39	CROSS LOCK KEY 	1. When the display shows "no frame, convex", it means cross feed is not locked. 2. When the display shows "red column, concave", it means cross feed is locked. (In this case, the cross feed motor can't run. When this occurs, check if the CROSS LOCK KEY is pressed and Z. LOCK lamp flashes or not).
40	AUTOMATIC GRINDING TARGET POINT SETTING	When Y-axis (vertical axis) performs automatic grinding, it provides target point setting value for workpiece to be ground.
41	SPINDLE HEAD AUTOMATIC RAISING POINT SETTING VALUE	When Y-axis (vertical axis) performs automatic grinding, the spindle will automatically downfeed until the current value shown on the display (33) reaches the setting value shown on the display (40). Then the machine will perform spark out grinding according to the times set on the display (37). Once times reaches, the control will automatically judge if the key no. 38 should be set at automatic raise or not. If setting at automatic raise condition, the spindle will automatically raise to the position set by the raising point value.
42	ALLOWANCE SETTING VALUE FOR FINE GRINDING IN AUTOMATIC GRINDING	When Y-axis (vertical axis) performs automatic grinding, the spindle will automatically downfeed. Before the current value shown on the display (33) reaches the setting value shown on the display (40), an allowance will be left for final finish grinding. The setting value is the allowance setting value for final finish grinding before the current value on the display (33) reaches the setting value on the display (40).
43	INTERMITTENT SPARK OUT GRINDING AMOUNT SETTING VALUE IN AUTOMATIC GRINDING	When Y-axis (vertical axis) performs automatic grinding, you can properly set the intermittent spark out grinding amount, so that when the total downfeed is over or equal to the setting value shown on the display, then automatic dewnfeed will stop. Once the setting times shown on the display (36) reaches (Automatic zero return), Y-axis (Vertical axis) will perform automatic downfeed at cross and longitudinal downfeed point.

44	GRINDING START POINT SETTING VALUE IN AUTOMATIC GRINDING	When Y-axis (vertical axis) performs automatic grinding, the system will calculate the total grinding amount based on this setting value in combination with the target setting value shown on the display (40). (Normally set at 0)
45	POSITION DATA SETTING DISPLAY KEY FOR Y-AXIS (SPINDLE HEAD) AUTOMATIC GRINDING 	When this key is pressed, the screen will change to various positions data setting display when Y-axis (spindle head) is set for automatic grinding mode.
46	SYSTEM MESSAGE DISPLAY KEY 	When this key is pressed, the screen will change to system message display. (In case the system malfunction occurs, error message will be shown on this display. This provides operator a reference when making trouble shooting).
47	MACHINE CONTROL INPUT / OUTPUT SIGNAL MONITORING DISPLAY 	When this key is pressed, the screen will change to the machine control input / output signal monitoring display. (This display indicates the machine control input / output signal conditions, providing the maintenance personnel a diagnosis reference)
48	SYSTEM PARAMETER SETTING DISPLAY 	When this key is pressed, the screen will change to the system parameter setting display, which includes various functions, such as operator parameter, system management parameter, setting password list, system date, time setting and screen brightness adjustment, etc. (All functions on this display are controlled by password).
49	PAGE UP KEY 	Press this key for changing to the last page. This key is invalid for the first page and only one page on the screen.
50	PAGE DOWN KEY 	Press this key for changing to the next page. This key is invalid for the last page and only one page on the screen.
51	RETURN TO POWER ON DISPLAY 	When this key is pressed, the screen will change to the power on display. The display provides Chinese / English conversion.
NOTE 1	RETURN TO ORIGINAL SETTING	1. Turn the mode selector to Y=0. 2. Turn the magnetic chuck selection switch to the middle position (No demagnetization and no magnetization) 3. Keep pressing on the button for grinding wheel, hydraulic, coolant OFF + automatic stop button for 3 seconds, then the control will automatically load the factory-set parameters.

CHAP. 2 INTRODUCTION TO MONITOR

2-1 FUNCTION DESCRIPTION ON MONITOR OUTLOOK (FRONT SIDE)



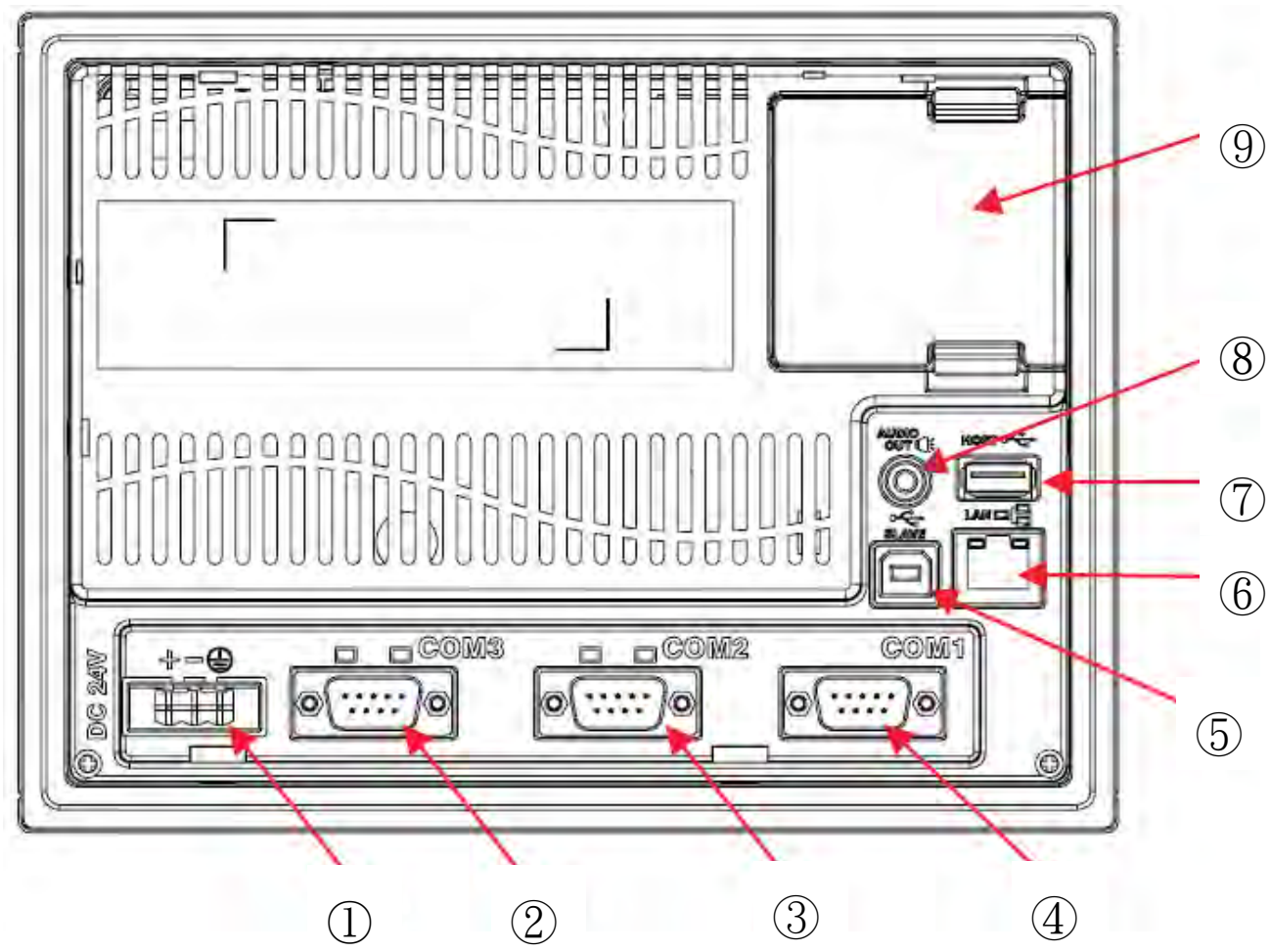
NO.	KEY FUNCTION	KEY FUNCTION DESCRIPTION
1	Y-AXIS GRINDING DATA SETTING DIPSLAY	1. This key is valid on the main monitoring display. 2. This display provides various settings, such as: target point, raising point, allowance for fine grinding, intermittent spark out grinding amount and grinding start point, etc.

2	ALARM MESSAGE MONITORING DISPLAY	1. This key is valid on the main monitoring display. 2. This display shows various error messages and records alarm occurring time.
3	MACHINE I/O STATUS MONITORING DISPLAY	1. This key is valid on the main monitoring display. 2. This display shows input signal status to the machine and the control output signal status, which provides a reference for the maintenance personnel in repairing the machine.

NO.	KEY FUNCTION	KEY FUNCTION DESCRIPTION
4	SYSTEM PARAMETER AND MANAGEMENT DISPLAY	1. This key is valid on the main monitoring display. 2. This display provides various functions, such as operator parameters, system maintenance personnel parameters, setting password list, system time and date and brightness adjustment, etc.
5	PAGE UP	1. This key is valid on similar-function displays. 2. Press this key for changing to the previous page. This key is invalid for the first page.
6	PAGE DOWN	1. This key is valid on similar-function displays. 2. Press this key for changing to the next page. This key is invalid for the last page.
7	RETURN TO HOME PAGE OR MAIN MONITIORING PAGE	1. This key is valid on all displays. 2. Press this key on the main monitoring display for entering into the power on display. (The power on display allows for changing language display).
8	CONTROL SYSTEM KEY	This key is used for setting the internal function parameters of the control. Do not use this key except for a system maintenance personnel.
9	CONTROL STATUS INDICATION LAMPS	Descriptions are given as below:
		Power indication lamp Green lamp lights on: Normal operation

		Motion indication lamp Blue lamp flashes: During communication / During accessing data.
		Alarm indication lamp Red lamp flashes: Alarm is occurring
10	TFT LCD SCREEN	For displaying various functions displays. (operation / display area)

2-2 FUNCTION DESCRIPTION ON MONITOR OUTLOOK (BACK SIDE)



NO.	FUNCTION	NO.	FUNCTION

1	Power input terminal	**6**	Internet pork (LAN)
2	COM3（RS-232／RS-422／RS-485）（Support communication status indication lamp）	**7**	USB Host
3	COM2（RS-232／RS-422／RS-485）（Support communication status indication lamp）	**8**	Sound output port
4	COM1（RS232）	**9**	Battery / memory card cover
5	USB Client	**-**	-

CHAP. 3 DESCRIPTION OF AUXILIARY DISPLAYS

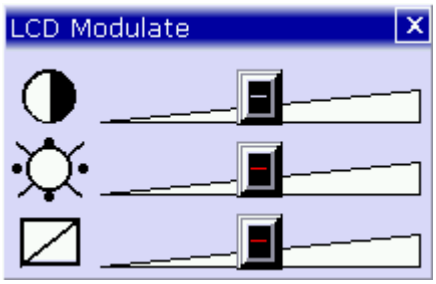
3-1 VALUE SETTING KEYPAD WINDOW

3-2 PASSWORD INPUT KEYPAD WINDOW

3-3 PASSWORD LIST MANAGEMENT WINDOW

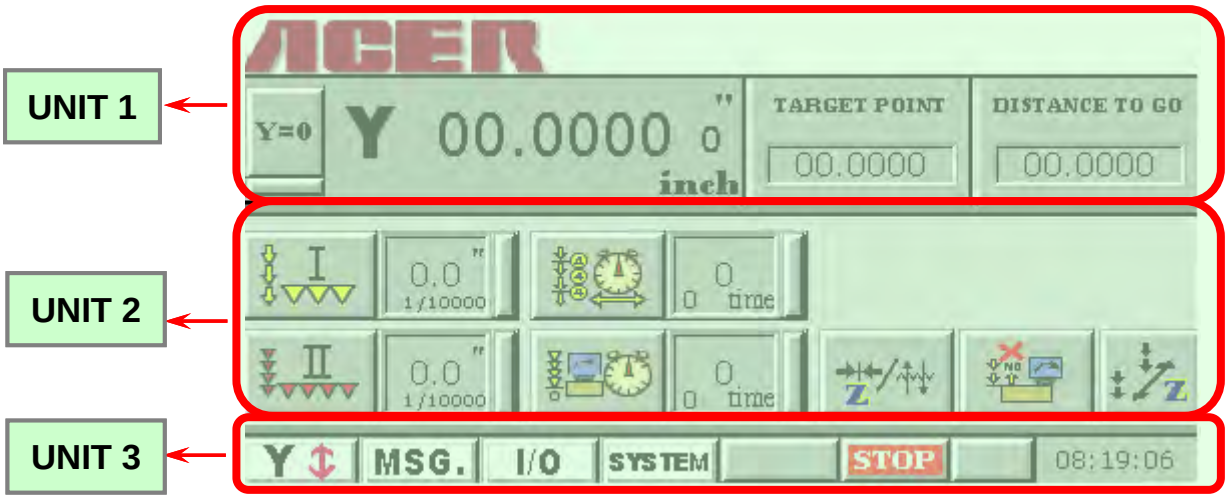
3-4 SYSTEM TIME & DATE SETTING WINDOW

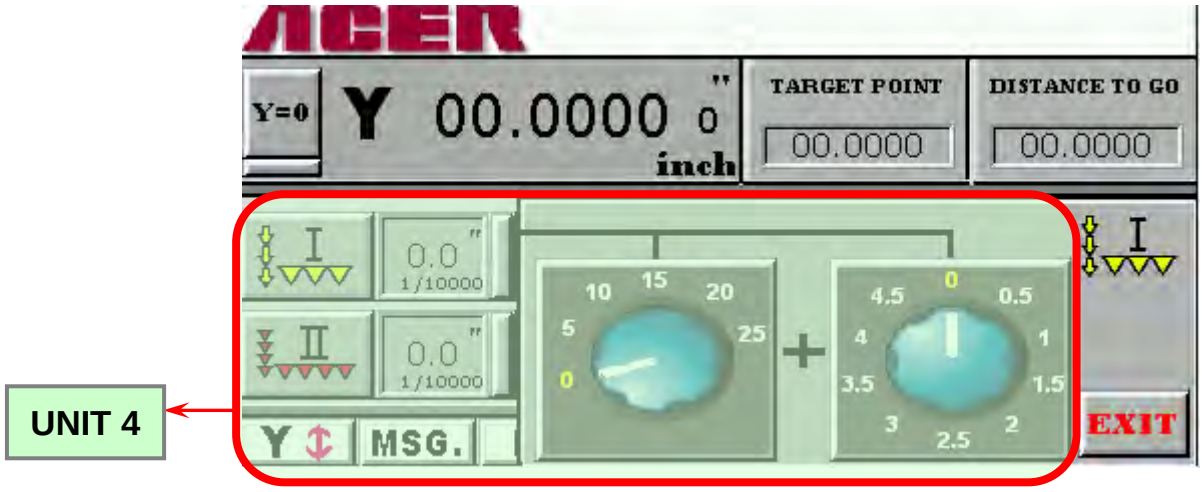
3-5 SCREEN CONTRAST & BRIGHTNESS WINDOW

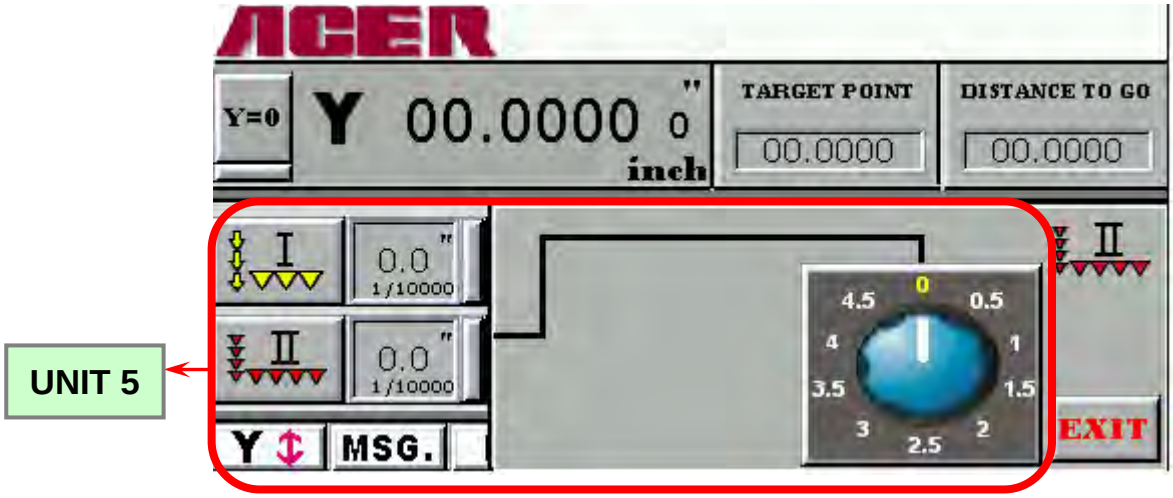


CHAP. 4 FUNCTION DESCRIPTION ON SCREEN

4-1 HOME PAGE- MAIN MONITORING DISPLAY

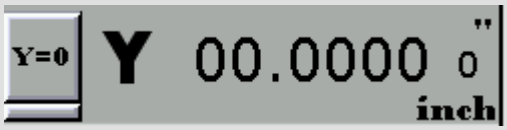
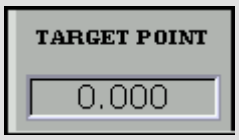
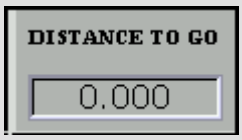




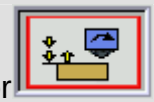


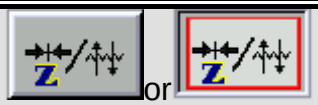
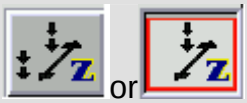
HOME PAGE-UNIT DESCRIPTION ON MAIN MONITORING DISPLAY

MAIN MONITORING DISPLAY / UNIT 1

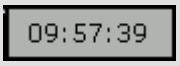
NO.	DISPLAY UNIT	DESCRIPTION
1		Error message running display.
2		1. Y-axis coordinate value display. 2. or is Y-axis motion indication lamp. 3. Press the Y=0 key for setting Y-axis coordinate at zero. Or you may press the position of the coordinate on the window, and open a numeric keypad window for directly entering or changing the current coordinate value.
3		Y-axis travel target point.
4		The distance between the Y-axis current position and the target point.

MAIN MONITORING DISPLAY / UNIT 2

NO.	DISPLAY UNIT	DESCRIPTION
1	 or  and	Coarse grinding setting status display
2	 or  and	Fine grinding setting status display
3	 or  and 	Intermittent spark out grinding times setting
4	 or  and 	No spark grinding times setting
5	 or 	Raising or not setting after Y-axis grinding finished

6		Z-axis cross feed control lock
7		Two sides downfeed or back side downfeed setting

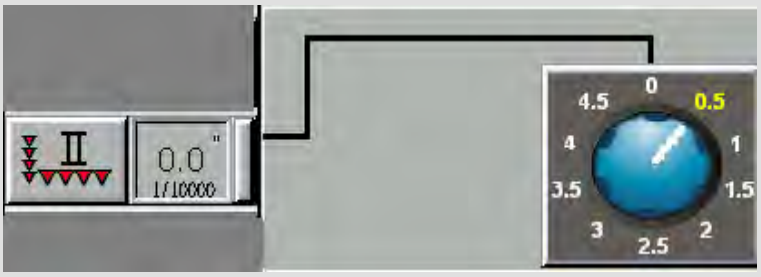
MAIN MONITORING DISPLAY / UNIT 3

NO.	DISPLAY UNIT	DESCRIPTION
01		Y-axis grinding travel data setting
02		Error message record & display
03		Machine I/O status monitoring
04		System parameter management setting
05		Z-axis lock status display lamp
06		Automatic grinding status display lamp
07		System malfunction display
08		System time

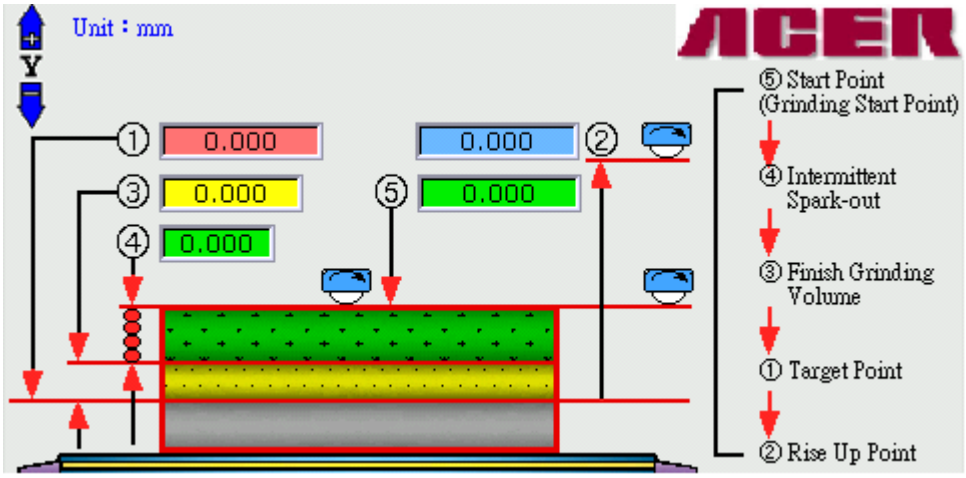
MAIN MONITORING DISPLAY / UNIT 4

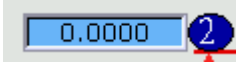
NO.	DISPLAY UNIT	DESCRIPTION
01		For inch unit, this regulator is used for setting coarse grinding feed value on Y-axis.

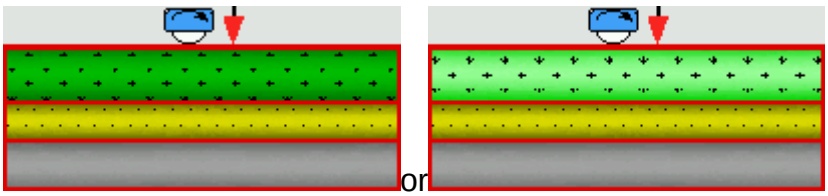
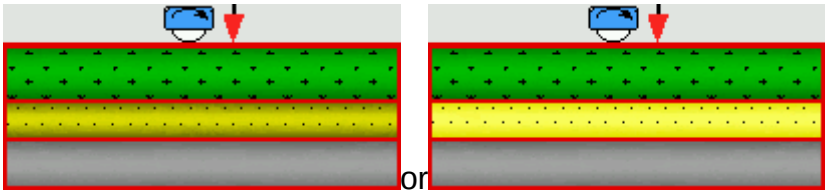
MAIN MONITORING DISPLAY / UNIT 5

NO.	DISPLAY UNIT	DESCRIPTION
01		For inch unit, this regulator is used for setting fine grinding feed value on Y-axis.

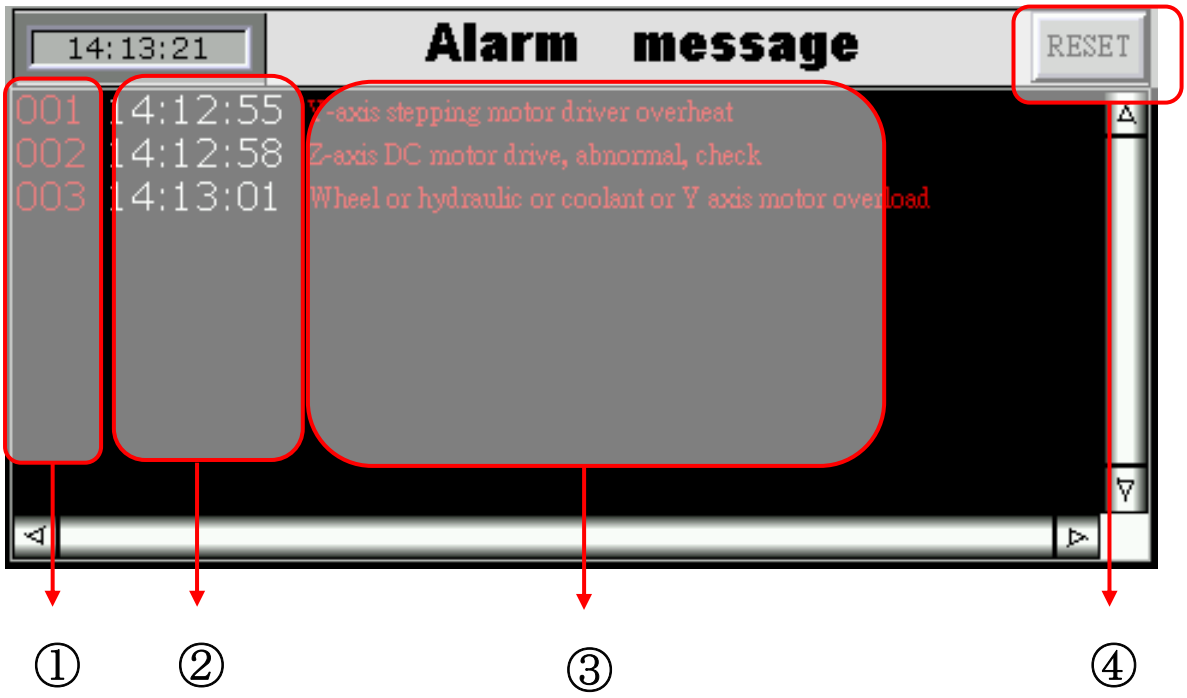
4-2 DESCRIPTION FOR Y-AXIS GRINDING TRAVEL DATA DISPLAY (Enter from Y)



NO.	DISPLAY UNIT	DESCRIPTION
1		Press the red column for setting the target point to be ground.
2		Press the blue column for setting the start point.
3		Press the yellow column for setting the allowance for fine grinding.
4		Press the green column for setting the intermittent spark out grinding.

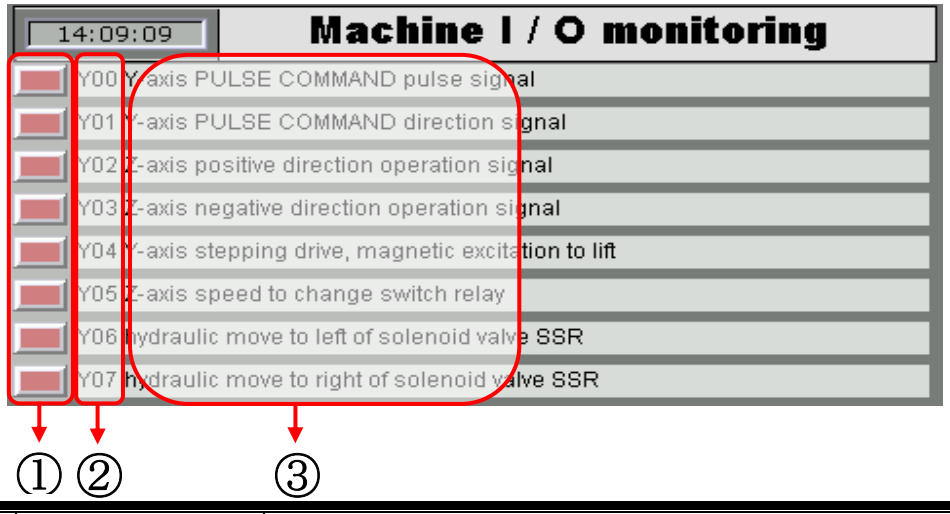
5		Press the green column for setting the grinding start point.
6	 or	When performing coarse grinding, the coarse grinding figure (green area) flashes.
7	 or	When performing fine grinding, the fine grinding figure (green area) flashes.

4-3 DESCRIPTION OF ERROR MESSAGE DISPLAY (Enter from MSG.)

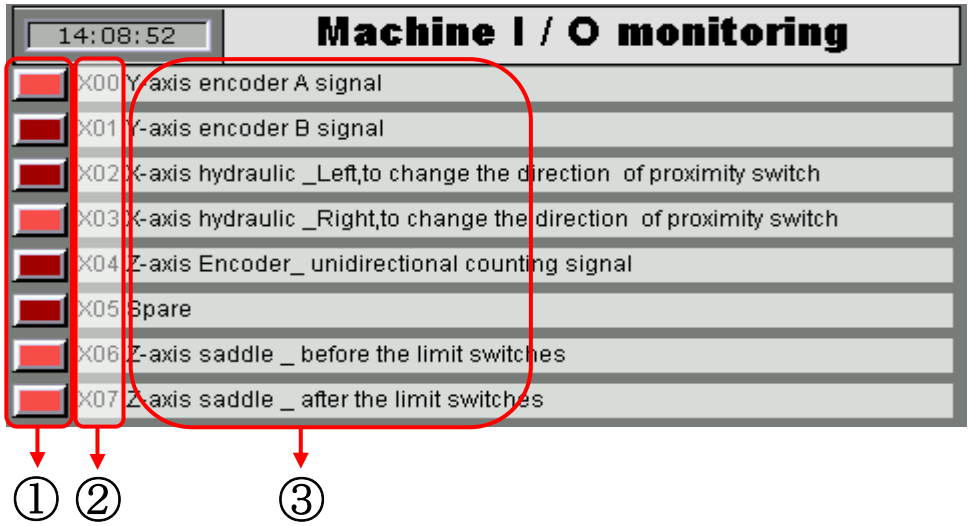


NO.	DESCRIPTION	FUNCTION DESCRIPTION
1	Error message code	The error message number corresponds to the error message.
2	Error occurring time	It indicates the error occurring time.
3	Error message content	The error message contents provide operator convenience in repair.
4	Reset	In case error message displayed and problem has corrected, you need to press the RESET key to finish the trouble shooting procedures.

4-4 DESCRIPTION OF MACHINE I/O MONITORING DISPLAY (Enter from I/O)



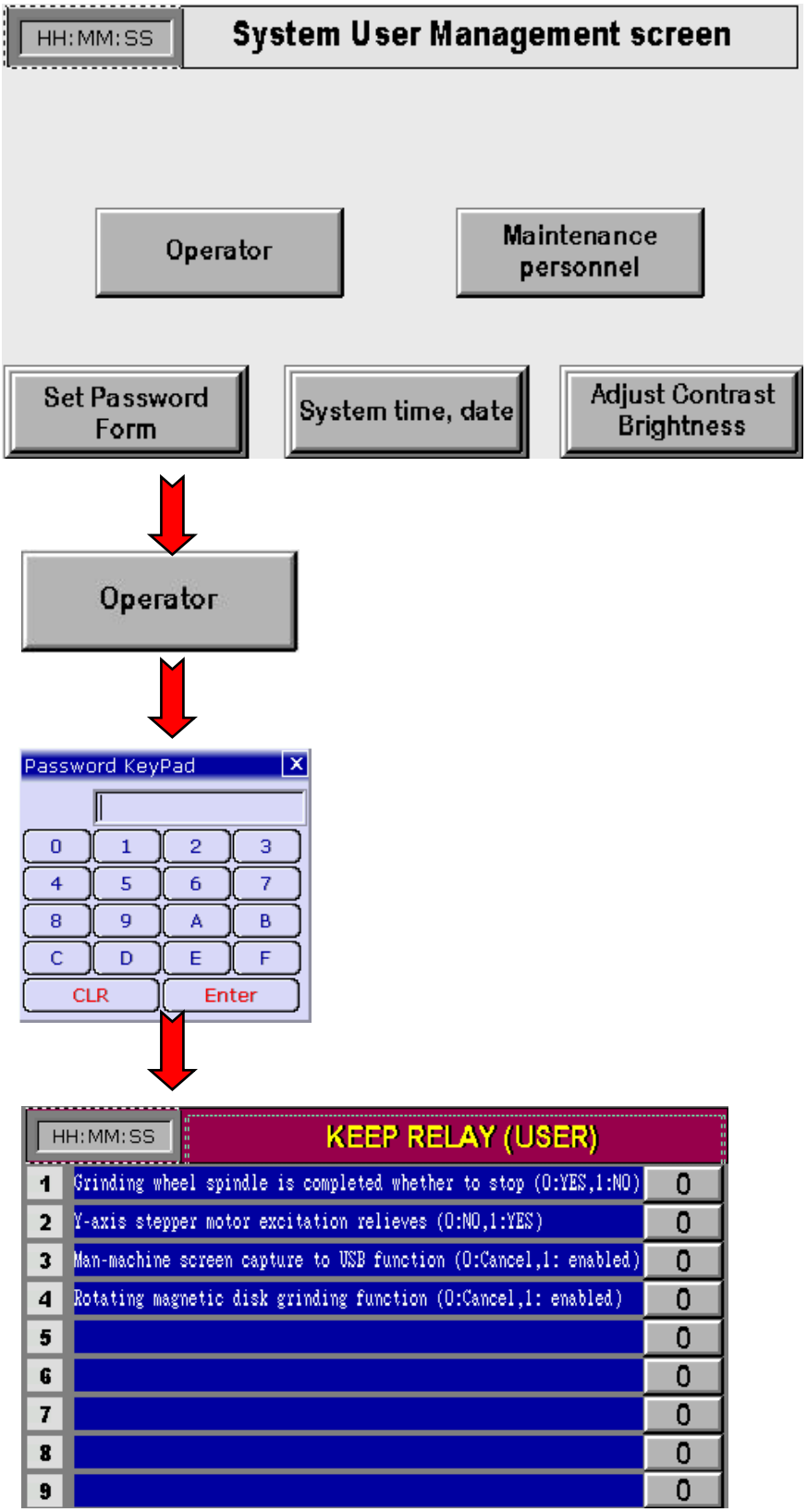
NO.	DESCRIPTION	FUNCTION DESCRIPTION
1	Lamp numbers	These are I/O monitoring lamp numbers. When external function, device and coil are conducted, the red lamp lights on. If not conducted, the red lamp extinguishes.
2	Output signal point	These are output signal points (Y00~YO7, Y10~Y17, Y20~Y27, Y30~Y37 and Y40~Y47). All together 5 pages.
3	Function description	Each output signal corresponds to its function (device or coil)



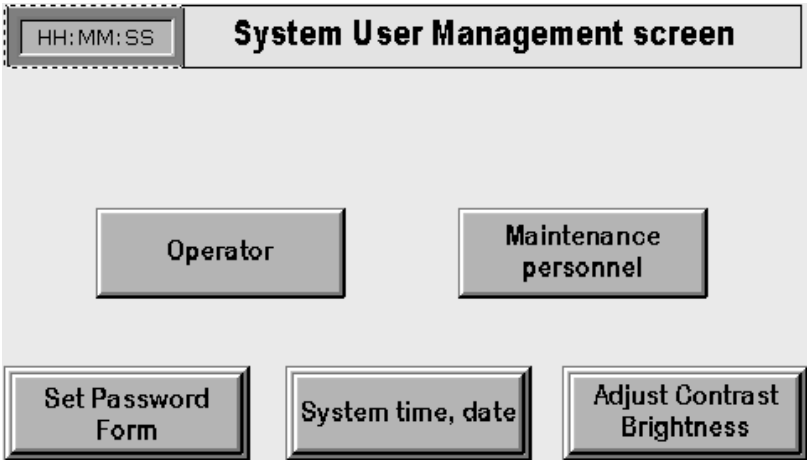
NO.	DESCRIPTION	FUNCTION DESCRIPTION
1	Lamp numbers	These are machine I/O monitoring lamp numbers. When external function, switch and push-button signals are conducted, the green lamp lights on. If not conducted, the red lamp lights on.
2	Input signal point	These are input signal points (X00~X07, X10~X17, X20-1~X27-1, X20-2~X27-2, X20-3~X27-3, X20-4~X27-4 and X20-5~X27-5). Total 7 pages.
3	Function description	Each input signal corresponds to its function (switch or push-button)

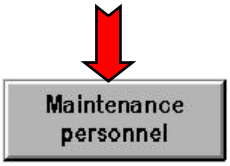
4-5 SYSTEM PARAMETER (Enter from SET)

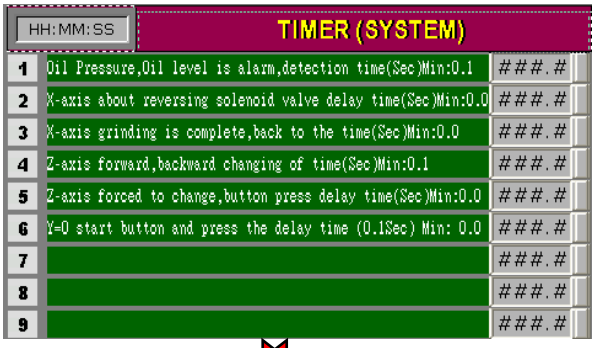
4-5-1 OPERATOR



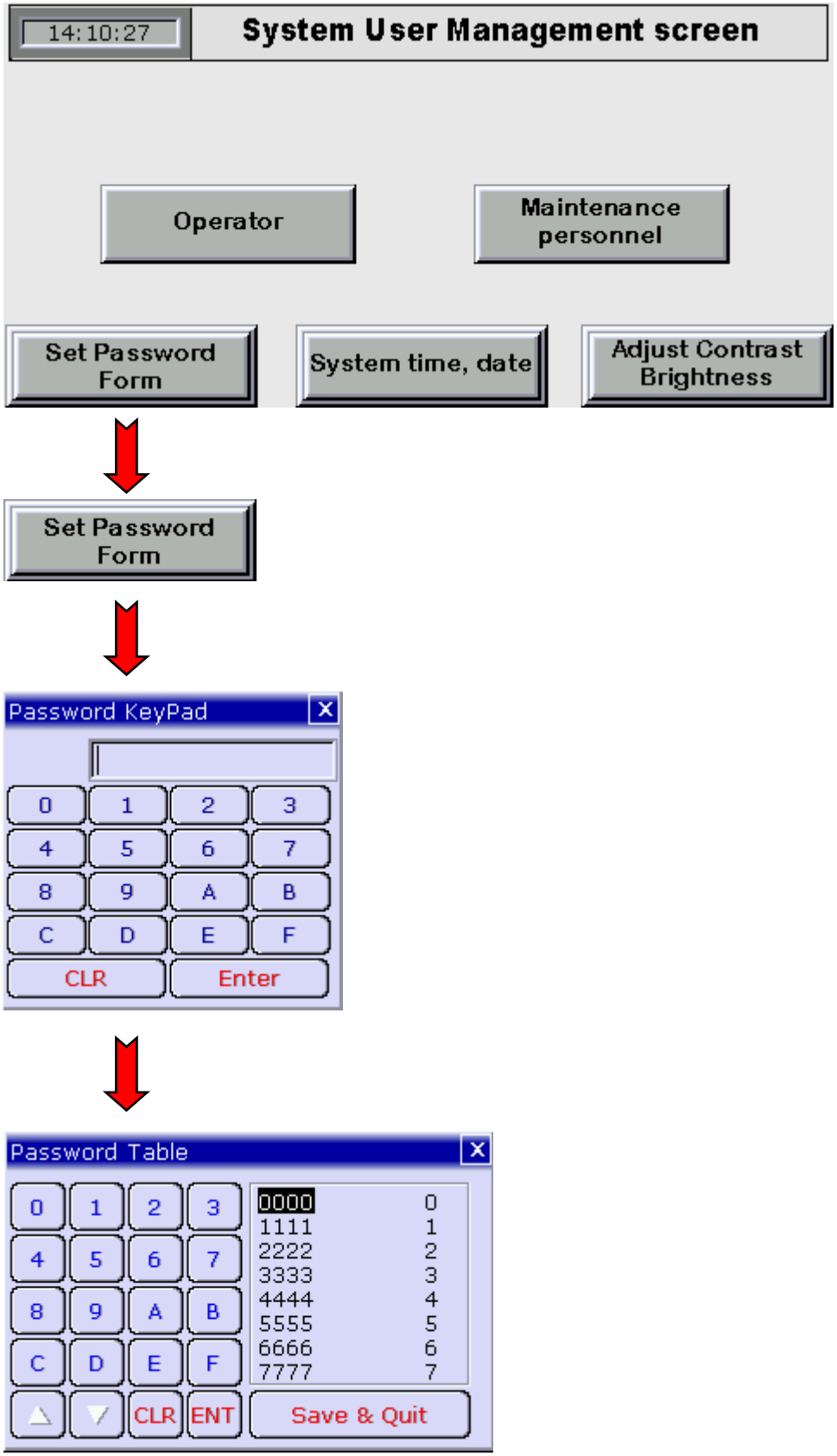
SYSTEM MAINTENANCE PERSONNEL



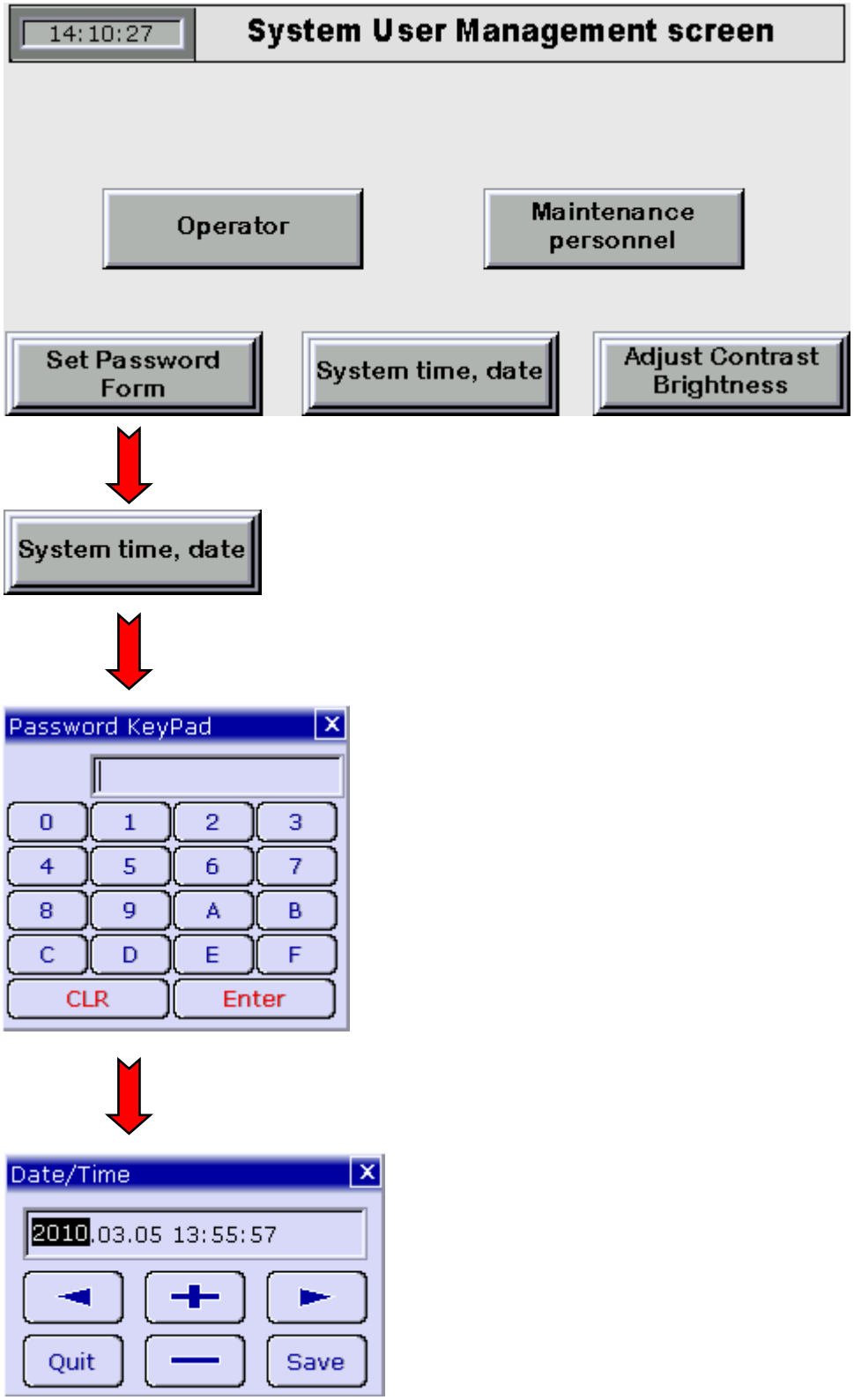




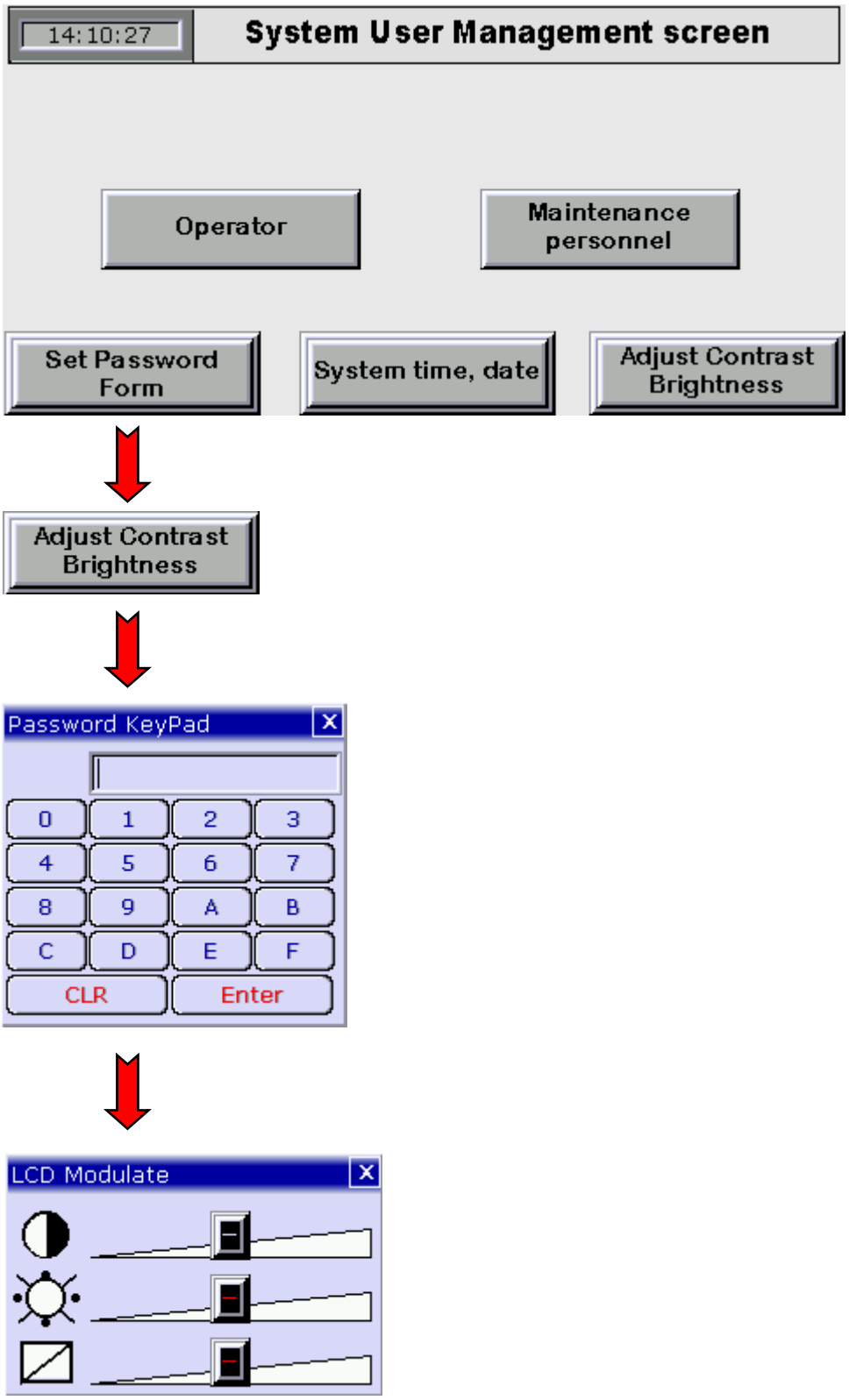
4-5-2 SETTING PASSWORD TABLE



4-5-3 SYSTEM DATE & TIME



4-5-4 ADJUSTING CONTRAST & BRIGHTNESS



CHAP. 5 APPENDIX

5-1 COPY DISPLAY TO USB

5-1-1 USB

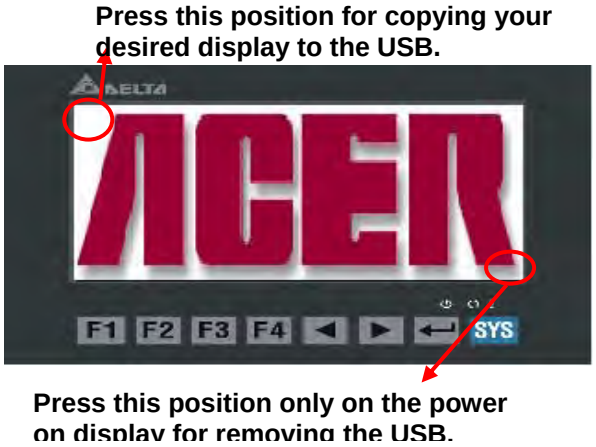
The USB is used for saving the control data, and copying control data. The support file format is FAT32. Suggested capacity is under 1GB. When applying USB for saving data, if you need to remove USB, be sure to shut off write-in motion to ensure the data completeness. There are two types of write-in motion:

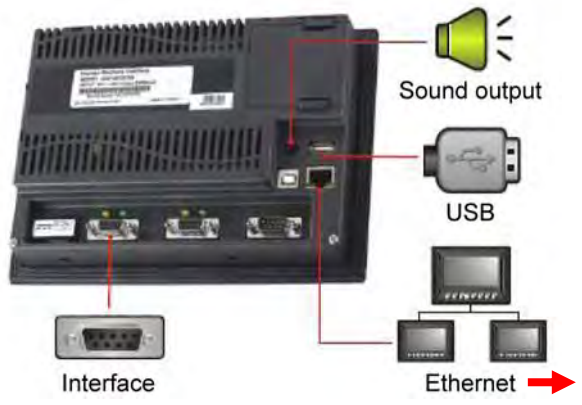
1. Keep pressing the control system for 3 seconds for entering into the control system display (In case there is no password locking the system key). Then control will turn off USB.
2. Change the screen to power on display, and press the right lower corner on the display, then the control will turn off USB (NOTE 1).

The two methods mentioned as above are used for removing USB. To remove USB, be sure to follow above mentioned two methods that will ensure completeness of contents in USB.

5-1-2：DESCRPTION OF DISPLAY COPY

1. Enter into user man agent display at first → operator → system parameter setting → keep relay set (user) display, then copy display to USB (0: cancel. 1: use). This function is set at “1”. The parameter is controlled by password.
2. Insert the USB into the “USB HOST” position located at the back side of the control. Change the screen to the display to be copied, and then press the left top corner of the screen. When the system display a message of during copying, do not remove the USB. After copy, if you need to remove the USB, do it according to the correct procedures to ensure completeness of contents in the USB.



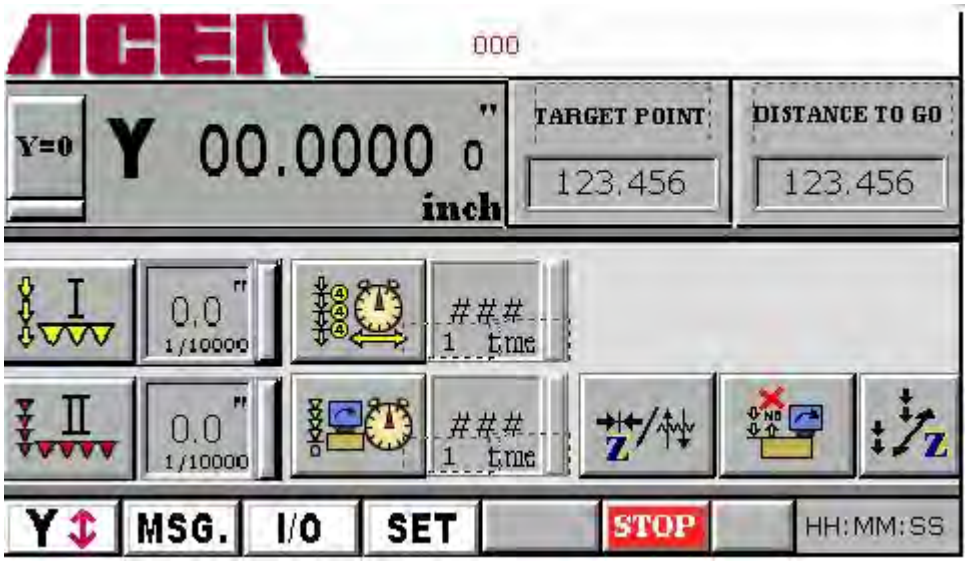


NOTE 1: Using this method according to the procedures as following. System user management display → Operator → System parameter setting → Keep relay set (user), then “copy display to USB (0: cancel. 1: use).” This function is set at “1”. The parameter is controlled by password.

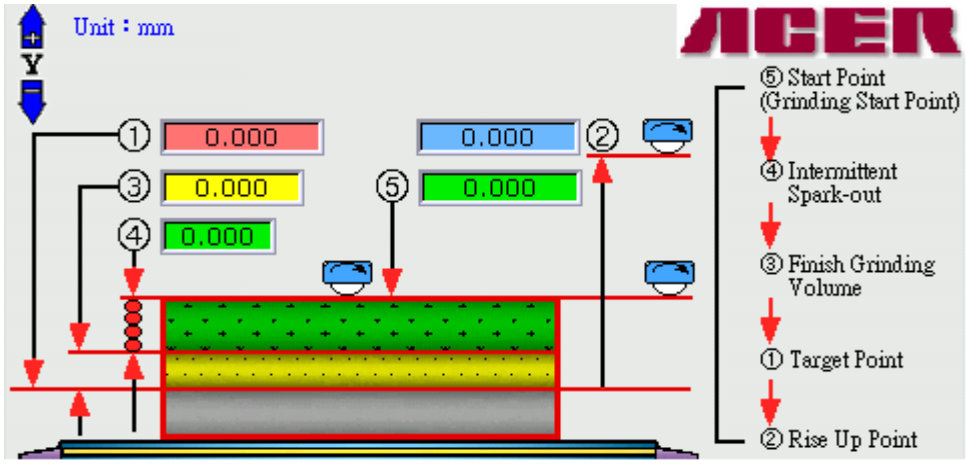
5-2 SCREEN DISPLAYS

5-2-1 HOME PAGE:

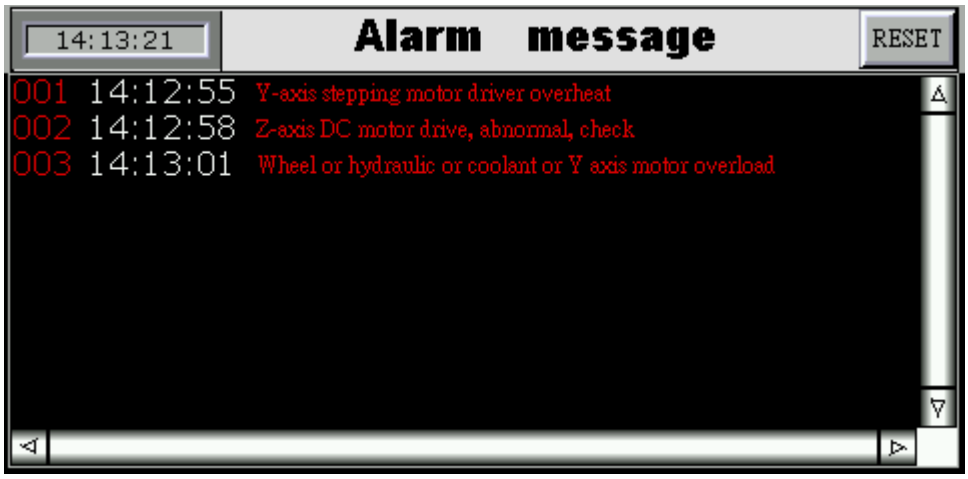
5-2-2 GRINDING MAIN MONITORING DISPLAY:



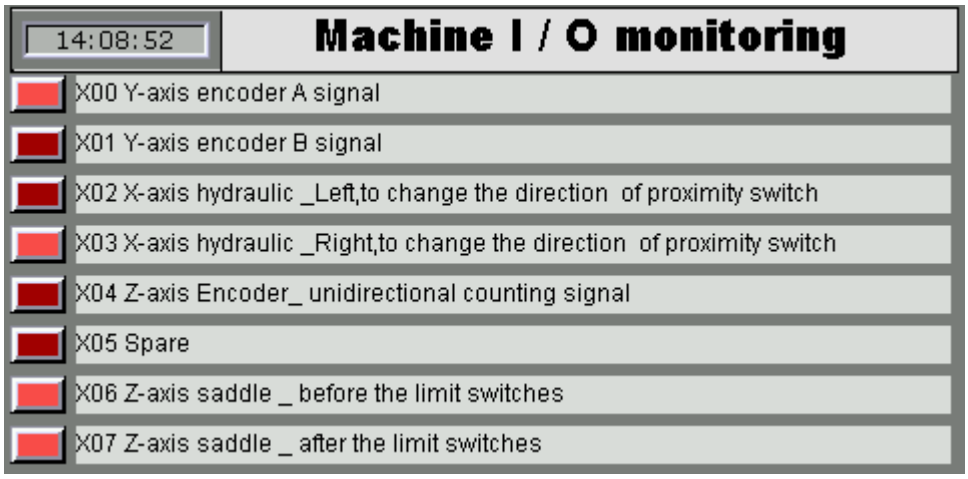
5-2-3 Y-AXIS GRINDING DATA SETTING DISPLAY:



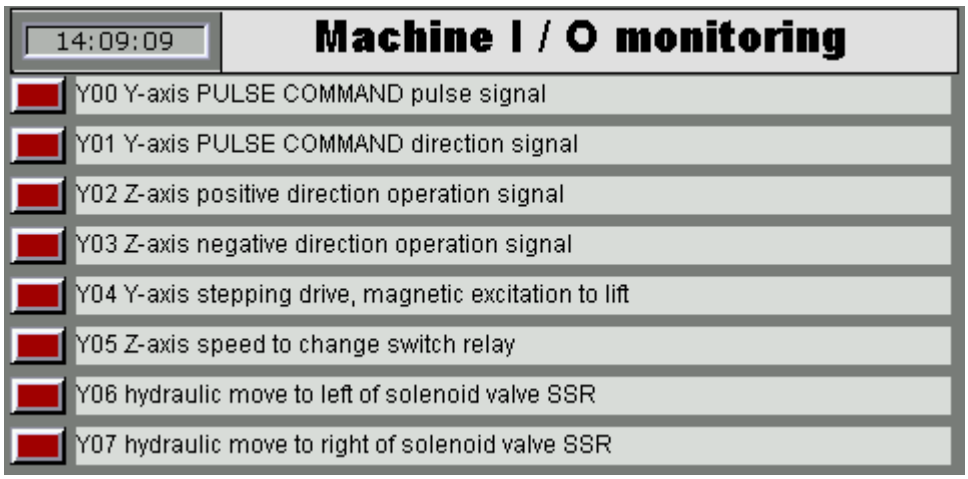
5-2-4 ALARM MESSAGE DISPLAY



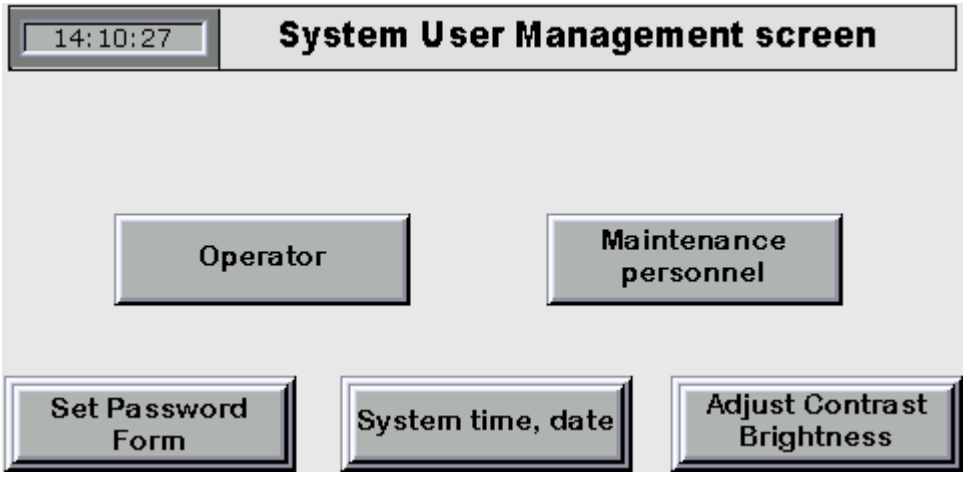
5-2-5 MACHINE I/O MONITORING DISPLAY (INPUT, 7 PAGES)



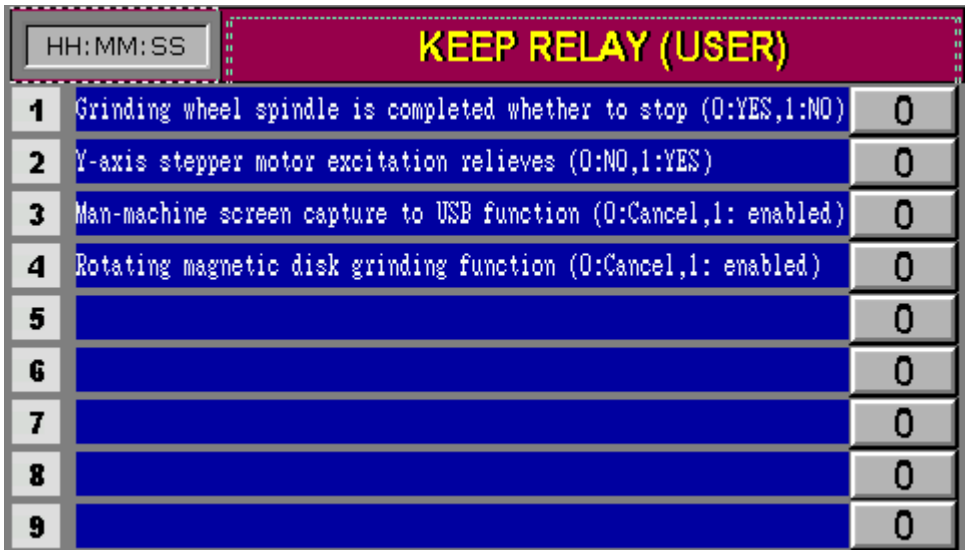
5-2-6 MACHINE I/O MONITORING DISPLAY (OUTPUT, 5 PAGES)



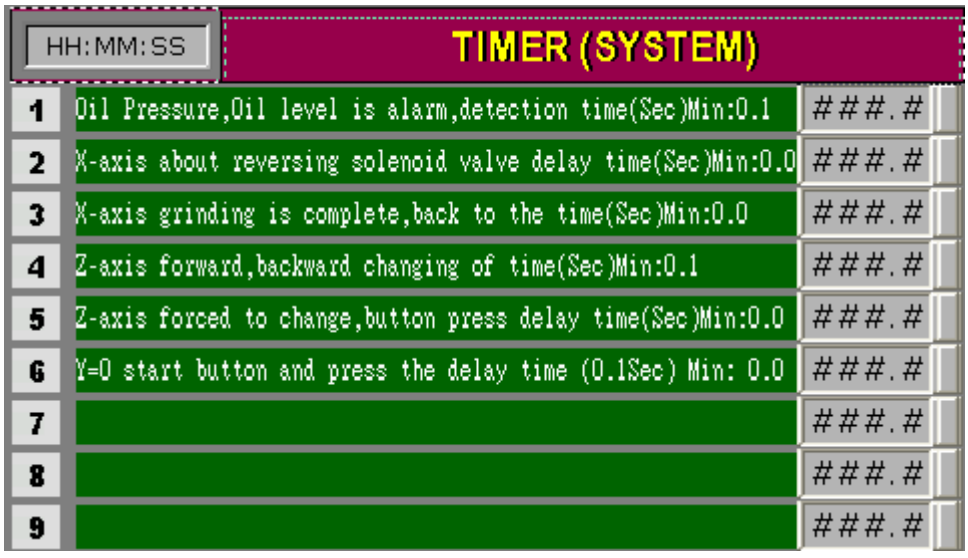
5-2-7 SYSTEM USER MANAGEMENT DISPLAY:



5-2-8 SYSTEM DATA SETTING – KEEP SET (USER) DISPLAY:



5-2-9 SYSTEM DATA SETTING – MACHINE TIME PARAMETER DISPLAY



5-2-10 SYSTEM DATA SETTING – KEEP SET (SYSTEM) DISPLAY:

5-3 PLC I/O LIST
INPUT

SIGNAL POINT NAME	SIGNAL POINT FUNCTION	SIGNAL POINT NAME	SIGNAL POINT FUNCTION
X00	Y-axis encoder A Phase signal	**X20-3**	Z-axis slowly forward button
X01	Y-axis encoder B Phase signal	**X21-3**	Z-axis slowly return button
X02	X-axis hydraulic-Change to left proximity	**X22-3**	F3 model function (Z-axis speed increase button)
X03	X-axis hydraulic-Change to right proximity	**X23-3**	F2 model function (Z-axis speed reduce button)
X04	Z-axis forward direction change proximity	**X24-3**	Z-axis auto backward direction change point setting button
X05	Z-axis backward direction change proximity	**X25-3**	Z-axis auto forward direction change point setting button
X06	Z-axis saddle-Front limit switch	**X26-3**	F1 (Spared key)
X07	Z-axis saddle-Rear limit switch	**X27-3**	Scanning check -3
X10	High speed CNT_C253 spared point	**X20-4**	Grinding wheel spindle stop button
X11	High speed CNT_C253 spared point	**X21-4**	Grinding wheel spindle start button
X12	MPG handwheel enable button	**X22-4**	Hydraulic motor stop button
X13	Z-axis driver abnormal	**X23-4**	Hydraulic motor stop button
X14	MPG handwheel A phase signal	**X24-4**	Coolant motor start button
X15	MPG handwheel B phase signal	**X25-4**	Coolant motor stop button
X16	Y-axis stepping motor continuing relay=ON	**X26-4**	Magnetic chuck magnetizing selection switch
X17	Spare (Z-axis servo motor continuing relay=ON)	**X27-4**	Scanning check point -4
X20-1	Mode selection 1	**X20-5**	Peripheral motor overload O.L
X21-1	Mode selection 2	**X21-5**	Hydraulic motor running signal (K2M)
X22-1	Mode selection 3	**X22-5**	Lubricator pressure reach signal
X23-1	Mode selection-signal change point	**X23-5**	Lubricator insufficient oil level signal
X24-1	Auto start button	**X24-5**	Y-axis travel top limit switch
X25-1	Auto stop button	**X25-5**	Spare (Z-axis lock switch)
X26-1	Y-axis rapid downfeed button	**X26-5**	Hydraulic throttle valve close positioning switch
X27-1	Scanning check point -1	**X27-5**	Scanning check point -5
X20-2	Y-axis rapid raise button		
X21-2	Y-axis slow downfeed button		
X22-2	Y-axis rapid raise button		
X23-2	Y-axis 1u downfeed button		
X24-2	Y-axis jog downfeed button		
X25-2	Z-axis rapid forward button		
X26-2	Z-axis rapid return button		
X27-2	Scanning check point -2		

NOTE: The input points with grey based columns are used for scanning signals.

OUTPUT

SIGNAL POINT NAME	SIGNAL POINT FUNCTION	SIGNAL POINT NAME	SIGNAL POINT FUNCTION
Y00	Y-axis pulse command pulse signal	**Y30**	F2 model function (Z-axis _ speed reduce lamp)
Y01	Y-axis pulse command direction signal	**Y31**	Z-axis _ auto return direction change setting lamp
Y02	Z-axis CW signal	**Y32**	Z-axis _ auto forward direction change setting lamp
Y03	Z-axis CCW signal	**Y33**	F1 (spared) lamp
Y04	Y-axis stepping driver energizing release	**Y34**	Auto start lamp
Y05	Z-axis speed change relay	**Y35**	Auto stop lamp
Y06	Hydraulic left movement solenoid valve SSR	**Y36**	Z-axis jog feed change relay
Y07	Hydraulic right movement solenoid valve SSR	**Y37**	MPG handwheel enable lamp
Y10	Y-axis _ slow raise lamp	**Y40**	Grinding spindle running. Running lamp
Y11	Y-axis _ 1u downfeed lamp	**Y41**	Hydraulic motor running. Running lamp
Y12	Y-axis _ jog downfeed lamp	**Y42**	Coolant motor running. Running lamp
Y13	Z-axis _ rapid traverse forward lamp	**Y43**	Y-axis _ Stepping motor continuing relay
Y14	Z-axis _ rapid traverse backward lamp	**Y44**	Y-axis _ Rapid raise motor running
Y15	Z-axis _ slow move forward lamp	**Y45**	Y-axis _ Rapid lower motor running
Y16	Z-axis _ slow move backward lamp	**Y46**	Z-axis _ Servo motor continuing magnetic switch
Y17	F3 model function (Z-axis _ speed increase lamp)	**Y47**	Spared point (Z-axis _ Servo motor continuing magnetic switch)
Y20	X_DI scanning first line		
Y21	X_DI scanning 2nd line		
Y22	X_DI scanning 3rd line		
Y23	X_DI scanning 4th line		
Y24	X_DI scanning 5th line		
Y25	Y-axis _ rapid downfeed lamp		
Y26	Y-axis _ rapid raise lamp		
Y27	Y-axis _ slow downfeed lamp		

5-4-1 ALARM MESSAGE

ALARM NO.	ALARM MESSAGE	CORRECTION
001	Y-axis stepping motor is overheat	Check if there is any obstacle existing on Y-axis travel, which may cause Y-axis motor overload and overheat. After check, reset it.
002	Z-axis servo motor driver is abnormal. Check it.	Check the error code displayed on the Z-axis servo motor driver. Refer to alarm code given in the operation manual for correction. After check, reset it.
003	Grinding wheel motor, hydraulic motor or Y-axis elevation motor or coolant motor is overload and skipped.	Check if grinding wheel motor, hydraulic motor, Y-axis elevation motor or coolant motor runs abnormally that may cause motor overload and skip. Reset the overload protector. After check, reset it.
004	Lubrication oil level is insufficient	Check if lubrication oil level is too low or oil leaked or not. After check, reset it.
005	Lubrication motion fails	Check if lubrication oil hose or oil shooting is normal or not. After check reset it.
006	Y-axis top limit switch is touched. Move Y-axis down.	Check if Y-axis top limit switch is touched or not. If touched, manually move Y-axis down to leave from the limit switch. Or check if the limit switch works normally or not. After check, reset it.
007	Z-axis forward limit switch is touched. Move Z-axis backward.	Check if Z-axis forward limit switch is touched or not. If touched, manually move Z-axis backward to leave from the limit switch. Or check if the limit switch work normally or not. After check, reset it.
008	Z-axis backward limit switch is touched. Move Z-axis forward.	Check if Z-axis backward limit switch is touched or not. If touched, manually move Z-axis forward to leave from the limit switch. Or check if the limit switch works normally or not. After check, reset it.
009	Z-axis forward direction change proximity sensor is abnormal. Check it.	Check if Z-axis forward direction change proximity sensor is damaged or not. After check, reset it.
010	Z-axis backward direction change proximity sensor is abnormal. Check it.	Check if Z-axis backward direction change proximity sensor is damaged or not. After check, reset it.
011	X-axis move leftward direction change proximity sensor is abnormal. Check it.	Check if X-axis move leftward direction change proximity sensor is damaged or not. After check, reset it.
012	X-axis move rightward direction change proximity sensor is abnormal. Check it.	Check if X-axis move rightward direction change proximity sensor is damaged or not. After check, reset it.
		Check Y-axis motor driver.
013	Y-axis stepping motor positioning incorrectly.	1. To screen→ Set Y-axis parameter for increasing acceleration / deceleration time.
014	Z-axis stepping motor positioning incorrectly.	Check Z-axis motor driver. 1. To screen→ Set Z-axis parameter for increasing acceleration / deceleration time. 2. Turn on the Y-axis stepping motor driver again. 2. Turn on the Z-axis stepping motor driver again.
015	Battery voltage for PLC control is too low. Replace it.	When the message displays, contact the machine manufacturer for purchasing battery

		for PLC control.

5-4-2 OPERATION ERROR MESSAGE

ALARM NO.	ALARM MESSAGE	CORRECTION
101	Hydraulic regulation valve is not closed properly. Hydraulic motor can't start.	When the message displays, check if the hydraulic regulation valve is closed properly or not. After check, reset it.
102	Magnetic chuck does not magnetize. Hydraulic motor can't start.	When the message displays, check if the magnetic chuck is started. After check, reset it.
103	Peripheral motor is reset. Motor can't start.	When the message displays, check if overload protectors for hydraulic, grinding wheel, Y-axis elevation and coolant have been reset or not. After check, reset it.
104	Hydraulic motor stop button is jammed. Correct it.	When the message displays, check if the hydraulic motor stop button is jammed and can't be released.
105	Grinding wheel motor stop button is jammed. Correct it.	When the message displays, check if the grinding wheel motor stop button is jammed and can't be released.
106	Coolant motor stop button is jammed. Correct it.	When the message displays, check if the coolant motor stop button is jammed and can't be released.
107	For CE approved model, if hydraulic motor is not started, the grinding wheel can't be started.	When the message displays, start the hydraulic motor at first, then start the grinding wheel spindle.
108	Y-axis grinding value is set incorrectly.	When the message displays, turn to Y-axis data setting page on the screen. Check following data are correctly set or not, such as: ①target point ②start point ③fine grinding allowance ④ Intermittent spark out grinding ⑤grinding start point.
109	Turn power off then turn on again, so that the new system parameter setting values will become valid.	When new system parameter setting is finished, it is necessary to turn power off then turn on again, so that the setting parameter will become valid.
110	Y-axis reaches top limit and can't raise further.	When the message displays, it means Y-axis has reached the top limit, which can't raise further manually. When this occurs, move Y-axis down.
111	Grinding data is set incorrectly → Raising point Y1<= Grinding start point Y2	Check the grinding data setting. The raising point should be bigger than the start point. If data setting is incorrect, correct it.
112	Grinding data is set incorrectly→ Grinding start point Y2<= Target point Y4	Check the grinding data setting. The grinding start point should be bigger than the target point. If data setting is incorrect, correct it.
113	Grinding data is set incorrectly→ Coarse grinding amount < 0	Check the grinding data setting. The coarse grinding amount should be a positive value. If setting is incorrect, correct it.
114	Grinding data is set incorrectly→ Total grinding amount = Fine grinding allowance.	Check the grinding data setting. Fine grinding allowance should be less than total grinding amount. If setting is incorrect, correct it.
115	Incorrect mode selection→ Z-axis locked. Unlock it.	When the incorrect mode selection message displays, check if Z-axis is locked or not. If locked, unlock it.
117	"Magnetization released" on Y-axis stepping motor. Reset it.	When the message displays, turn to the screen→ system user display→ Operator set "KEEP RELAY SET"→ set the Y-axis stepping motor at magnetized condition.
116	"Magnetization released" on Y-axis stepping motor. Reset it.	"KEEP RELAY SET"→ set the Y-axis stepping motor at magnetized condition.
118	Auto start fails→ Hydraulic is not started	Hydraulic motor should start running at first, then auto start can be performed.

119	Auto start fails→ Grinding wheel is not started	Grinding wheel spindle should start running at first, then auto start can be performed.

5-5 RETURNING PARAMETERS TO DEFAULT SETTING DISPLAY:

1. Set mode selection at Y=0.
2. Turn the magnetic chuck selection switch to middle position (no demagnetization and no magnetization).
3. Keep pressing on the buttons for 3 seconds, such as grinding wheel button, hydraulic button or coolant stop button + auto button, then the factory- set parameters will be loaded automatically.

.EC MACHINERY DIRECTIVE 89/392/EEC

PARTS LIST

PRESERVE THIS MANUAL FOR
FUTURE REFERENCE AND USE

MACHINE NAME: HORIZONTAL SURFACE GRINDING MACHINE

BRAND: ACER

MODEL: SUPRA 8 1 8 P D

MANUFACTURE: YA-GIN MACHINE TOOL MANUFACTURING INC.

ADDRESS: NO 101, LANE 506, SEND-TSO RD., SENG-KARNG
DISTRICT, TAICHUNG CITY, TAIWAN

TELEPHONE: 886-4-2520-4120

FAX.: 886-4-2520-4123

INTERNET: www.aceronline.net
www.acerlinks.com

E-mail: info@acerlinks.com
info@aceronline.net

VERSION: 1
DATE OF ISSUE : May. 2011
FILE NO.: 818 PD

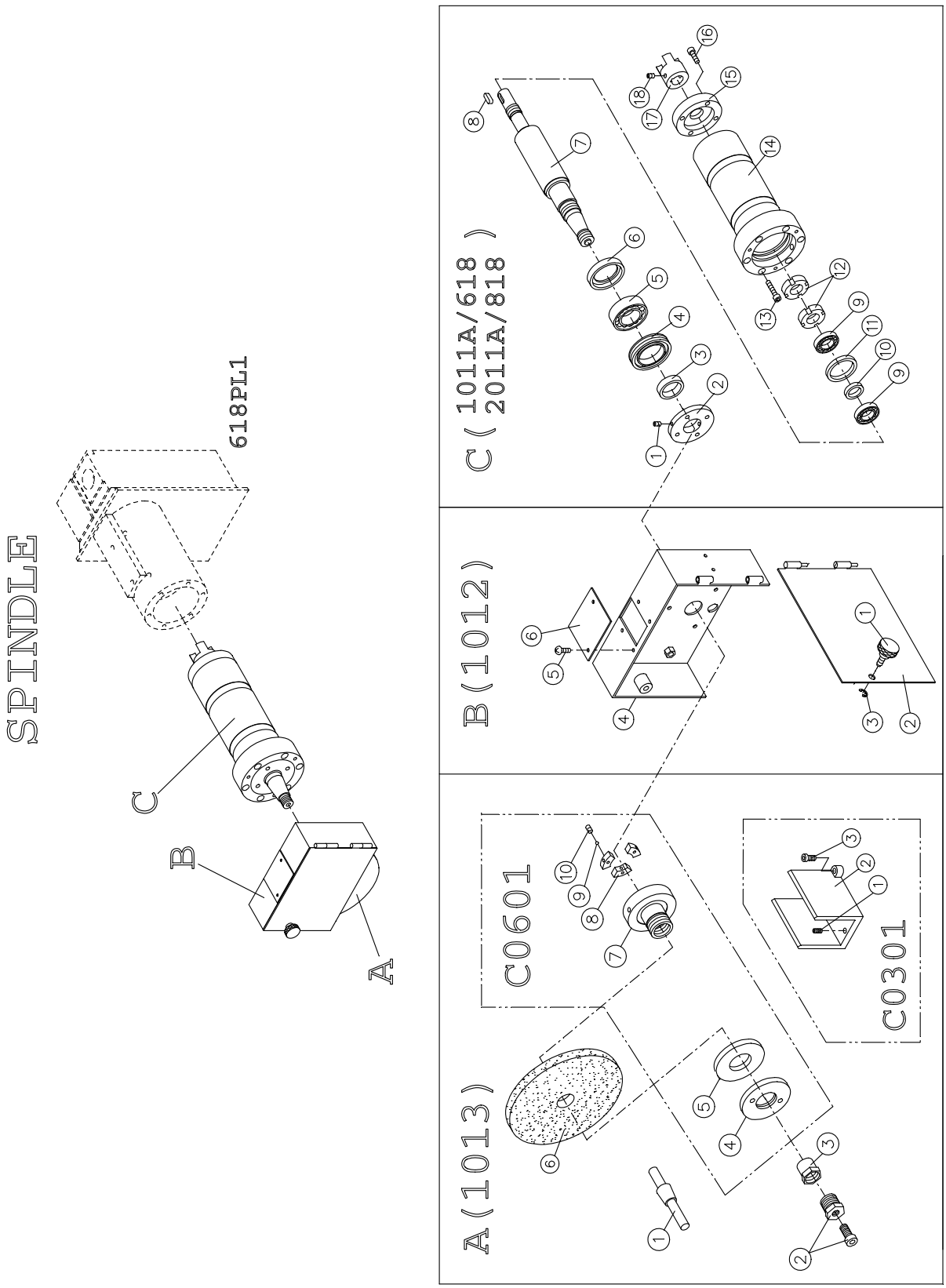
CONTENT

※ Following parts list are for many kinds of models. As there are several different specification of parts depends on different orders,plase check carefully before placing any order. And you shall be able to contact local distributor for correct parts by this way. Thank you your attention to the above.

Approved by: Checked by: Prepared by:

VERSION: 1 Date:

SPINDLE


SPINDLE
618PL1
C
B
A
C (1011A/618)
(2011A/818
B(1012)
A(1013)
C0601
C0301

SPINDLE (818)

A: WHEEL ASSEMBLY (1013)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.	1080001005	BALANCING ARBOR	1	
2.		WHEEL extractor	1	
3.	2630008005	NUT	1	
4.	3950007005	WHEEL SETTING NUT	1	
5.	3930006005	WASHER	1	
6.		GRINDING WHEEL	1	ϕ 203x31.75x12
7.	3920018005	WHEEL HUB	1	
8.	3960006005	BALANCE BLOCK	3	
9.		STEEL BALL	3	ϕ 4
10.		SET SCREW	3	M5x5L

BALANCING STAND (C0301)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.		SET SCREW	1	M8x16L
2.	1000001005	BALANCING STAND	1	
3.		HEX SOCKET SCREW	2	M8x25L

B: WHEEL GUARD (1012)

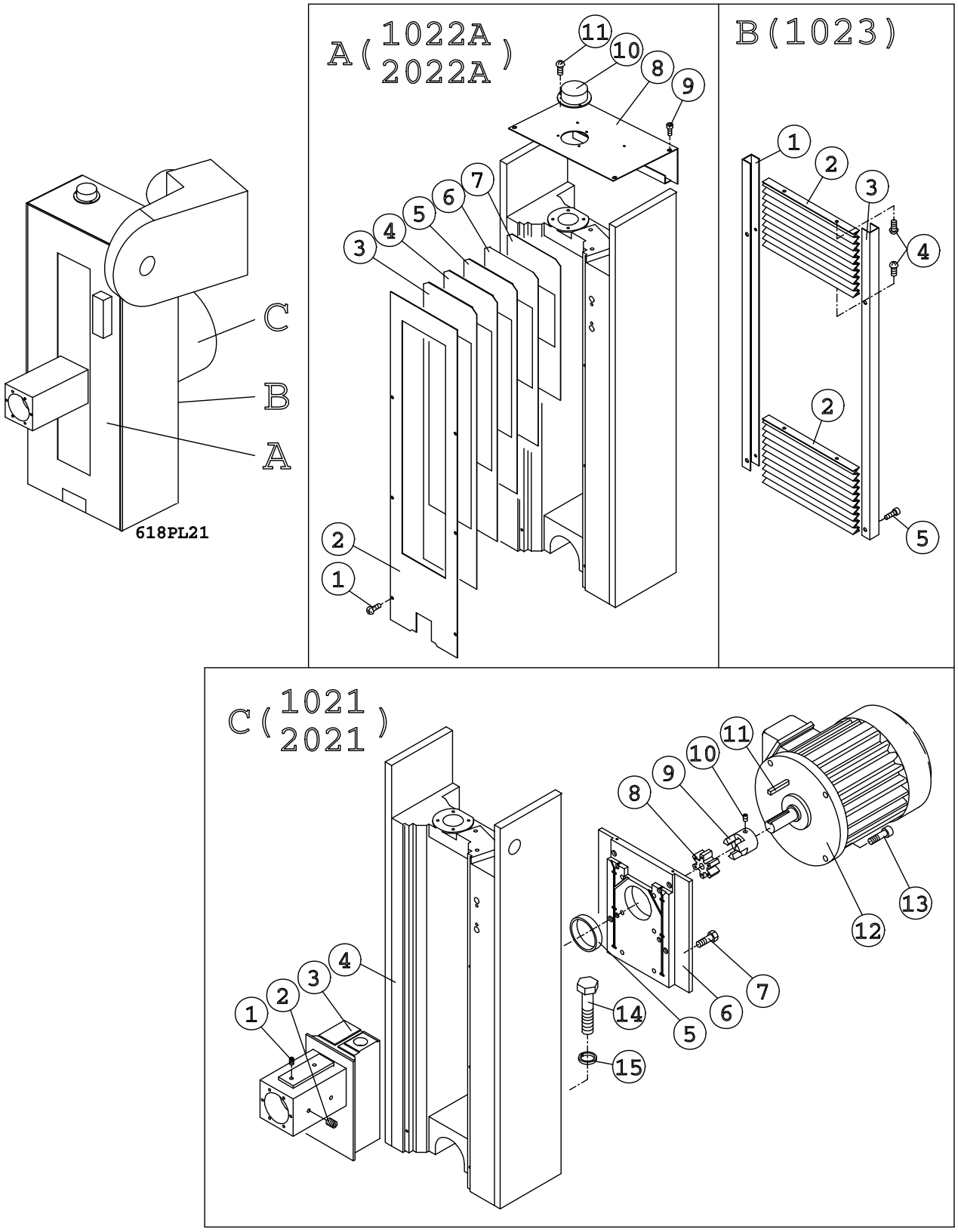
NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.	2630014005	LOCK SCREW	1	
2.	3900028005	WHEEL GUARD DOOR	1	
3.		RETAINING RING	1	E8
4.	1910001005	WHSEEL GUARD	1	
5.		CROSS HEAD SCREW	2	M5x8L
6.	3500036005	COVER	1	

C: SPINDLE ASSEMBLY (2011A)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.		SET SCREW	1	M5x5L
2.	2630005005	SETTING NUT	1	
3.	1460001005	COLLAR	1	
4.	2630002005	PRESSING PLATE	1	
5.		BALL BEARING	1	NN3006
6.	1440006005	SPACING RING	1	
7.	1050007005	SPINDLE	1	
8.		SETTING KEY	1	6x6x15L
9.		BALL BEARING	2	#7204C
10.	1440003005	BEARING WASHER	1	
11.	1440004005	NEARING WASHER	1	
12.		SETTING NUT	2	AN04
13.		HECX SOCKET SCREW	6	M6x30L

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
14.	1430020005	SPINDLE HOUSING	1	
15.	3500035005	REAR COVER	1	
16.		HEX SOCKET SCREW	4	M6x25L
17.	2770011005	COUPLING	1	
18.		SET SCREW	2	M6x6L

COLUMN



COLUMN (818)

A: FRONT COVER SHEET ASSEMBLY (2022A)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.		CROSS HEAD SCREW	6	M5x8L
2.	3500043015	FRONT GUARD	1	
3.	2000038005	ERONT GUARD	1	
4.	2000039005	FRONT GUARD	1	
5.	2000040005	FRONT GUARD	1	
6.	2000041005	FRONT GUARD	1	
7.	2000042005	FRONT GUARD	1	
8.	2000046005	COVER	1	
9.		CROSS HEAD SCREW	4	M6x10L
10.	2000053005	ENCODER COVER	2	
11.		CROSS HEAD SCREW	3	M4x8L

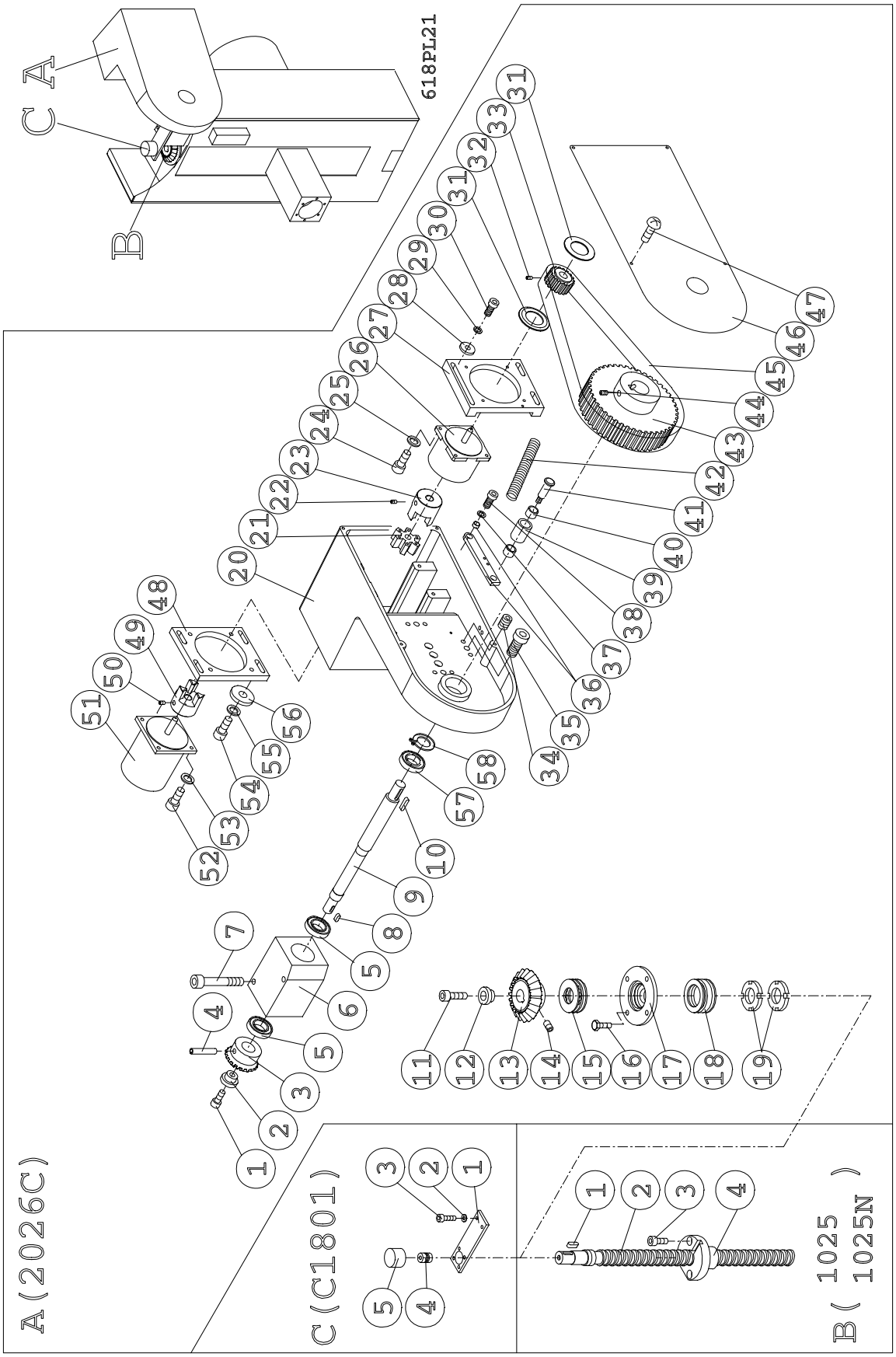
B: REAR COVER SHEET ASSEMBLY (1023)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.	2260002005	PLATE SEAT	1	
2.	3500040005	TELESCOPIC COVERE	2	
3.	2260001005	PLATE SEAT	1	
4.		CROSS HEAD SCREW	8	M4x10L
5.		HEX HEAD SCREW	4	M4x6L

C: COLUMN AND SPINDLE SEAT (2021)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.		SET SCREW	2	M8x14L
2.		SET SCREW	6	M6x12L
3.	0106006005	HEAD STOCK	1	
4.	0206005005	COLUMN	1	
5.	1440005005	BUSHING	1	
6.	1700001005	MOTOR SUPPORT	1	
7.		HEX HEAD SCREW	6	M8x25L
8.	2760001005	RUBBER COUPLINFG	1	
9.	2770013005	COUPLING	1	
10.		SET SCREW	2	M6x8L
11.		KEY	1	8x7x40L
12.		MOTOR (2.0 HP)	1	
13.		HEX SOCKET SCREW	4	M10x30L
14.		HEX AGON HEAD SCREW	4	M16x60L
15.		SPRING WASHER	4	ϕ 16

VERTICAL ASSEMBLY



VERTICAL ASSEMBLY

A: VERTAICAL TRANSMITTING ASSEMBLY (2026C)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.		HEX SOCKET SCREW	1	M5x14L
2.	2410001005	WASHER	1	
3.	1200020005	PINION GEAR	1	
4.		SPRING PIN	1	ϕ 4x25L
5.		BALL BEARING	2	6002NR
6.	1800001005	SHAFT SEAT	1	
7.		HEX SOCKET SCREW	2	M6x65L
8.		SETTING KEY	1	4x4x10L
9.	1030027005	SHAFT	1	
10.		SETTING KEY	1	5x5x22L
11.		HEX SOCKET SCREW	1	M6x20L
12.	2640001005	WASHER	1	
13.	1200019005	BEVER GEAR	1	
14.		SET SCREW	1	M5x14L
15.		THRUST NEDDLE BEARING	1	51103
16.		HEX HEAD SCREW	4	M5x15L
17.	0010001005	BEARING SEAT	1	
18.		THRUST NEEDLE BEARING	1	ANK1730,AS1730,CS1730
19.		SETTING NUT	2	AN04
20.	1820003005	MOTOR SUPPORTER	1	
21.	2760001005	RUBBER COUPLING	1	
22.		SET SCREW	4	M6x8L
23.	2770019005	COUPLING	1	
24.		HEX SOCKET SCREW	4	M6x16L
25.		SPRING WASHER	4	ϕ 6
26.	4300001005	STEPPING MOTOR	1	
27.	1700013005	MOTOR SUPPORT	1	
28.		WASHER	4	ϕ 6
29.		SPRING WASHER	4	ϕ 6
30.		HEX SOCKET SCREW	4	M6x25L
31.	2490027005	RING WASHER	2	
32.		SET SCREW	2	M5x8L
33.	1210009005	TIMING BELT PULLEY(SMALL)	1	
34.		SET SCREW	1	M8x20L
35.		HEX SOCKET SCREW	3	M6x25L
36.	0640027005	PRESSING BAR OF BELT	1	
37.		WASHER	1	ϕ 6
38.		HEX SOCKET SCREW	1	M6x20L
39.		BUSHING	1	
40.		NEEDLE BEARING	2	NHK-1212
41.		GEAR SHAFT	1	
42.		SPRING	1	

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
43.	1210005005	TIMING BELT PULLEY	1	
44.		SET SCREW	2	M5x8L
45.		TIMING BELT	1	T5x156Tx12mm
46.	2000373005	SAFETY COVER	1	
47.		CROSS HEAD SCREW	1	
48.	1700014005	MOTOR SUPPORT	1	
49.	2770018005	COUPLING	1	
50.		SET SCREW	1	M6x8L
51.	G03AD00011	MOTOR	1	
52.		HEX SOCKET SCREW	4	M6x20L
53.		SPRING WASHER	4	ϕ6
54.		HEX SOCKET SCREW	4	M6x25L
55.		SPRING WASHER	4	ϕ6
56.		WASHER	4	ϕ6
57.		BALL BEARING	1	6002
58.		C SHARP RING	1	C14

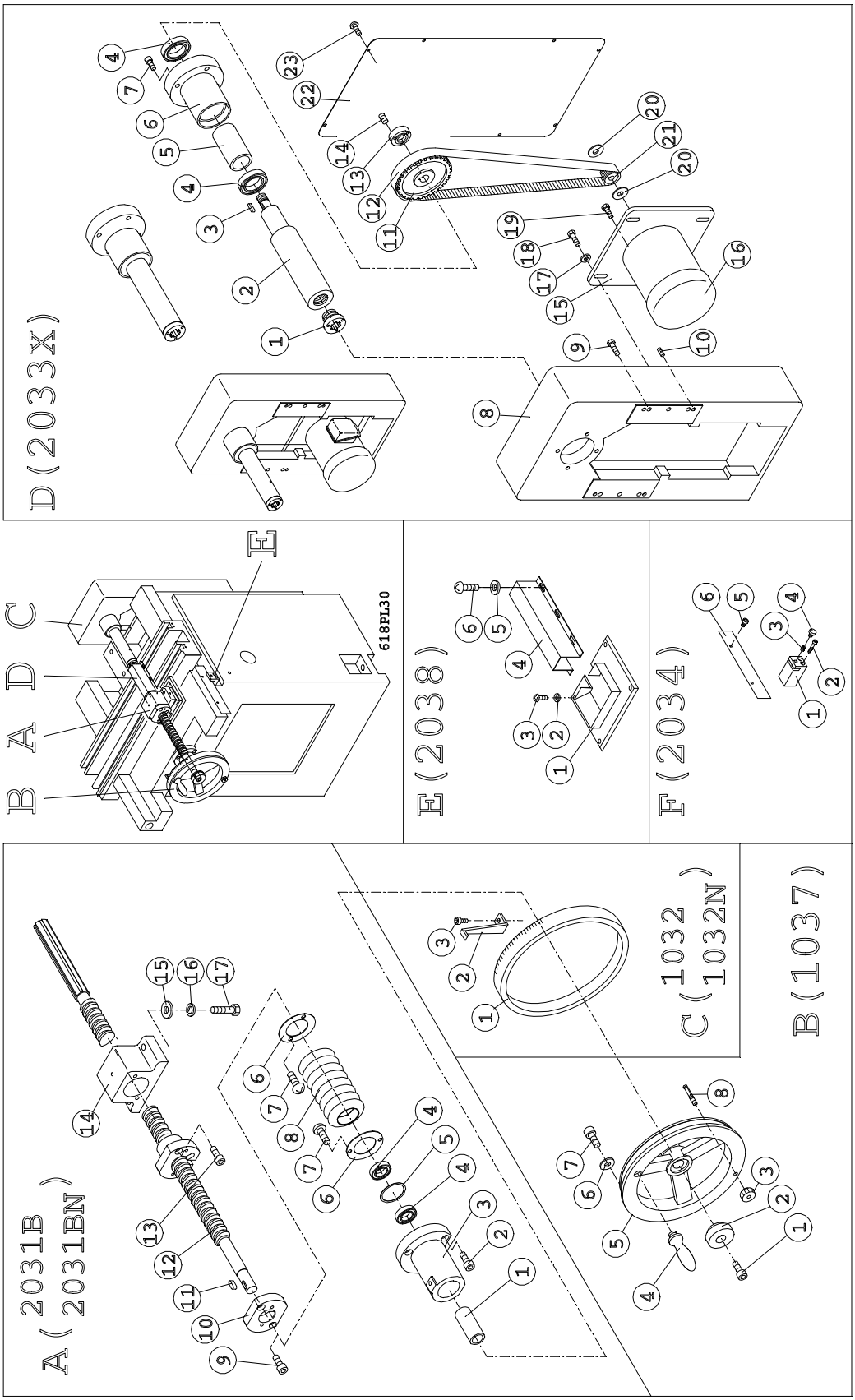
B: VERTICAL LEADSCREW ASSEMBLY (1025&1025N)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.		SETTING KEY	1	5x5x15L
2.	1130001005	ELEVATING LEADSCREW	1	(1025)
	1130002005	ELEVATING LEADSCREW	1	(1025N)
3.		HEX SOCKET SCREW	2	M6x16L
4.	2630017005	LEADSCREW NUT	1	(1025)
	2630018005	LEADSCREW NUT	1	(1025N)

C: ENCODER(C1801)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.	2420041005	ENCODER FIXED PLATE	1	
2.		WASHER	1	ϕ6
3.		HEX HEAD SCREW	1	M6x10L
4.		COUPLING	1	MFC-0606
5.		ENCODER	1	OEW-05-2

CROSSWISE DRIVE (818)



CROSSWISE DRIVE (818)

A: CROSSFEED LEADSCREW SET(2031B&2031BN)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.	1460002005	SLEEVE	1	
2.		HEX HEAD SCREW	3	M5x20L
3.	0010002015	BEARING SEAT	1	
4.		BEARING	2	6202ZZ
5.	1440007005	WASHER	1	
6.	2420001005	WASHER	2	
7.		CROSS HEAD SCREW	4	M4x6L
8.	3500002005	PROTECT PLASTIC COVER	1	
9.		HEX SOCKET SCREW	2	M4x20L
10.	2400002005	OIL BAFFLE	1	
11.		SETTING KEY	1	5x5x10L
12.	1120014005	CROSS TRANSFER SHAFT	1	(2031B)
	1120017015	CROSS TRANSFER SHAFT	1	(2031BN)
13.		HEX SOCKET SCREW	2	M5x20L
14.	0030008005	NUT SEAT	1	
15.		WASHER	2	ϕ8
16.		SPRING WASHER	2	ϕ8
17.		HEX HEAD SCREW	2	M8x50L

B: CROSSFEED DIAL SET(1037)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.		HEX HEAD SCREW	1	M5x16L
2.	0640008005	WASHER	1	
3.	2630019005	LOCKING NUT	1	
4.	4210004005	HANDLE	1	
5.	1260002005	CROSS HANDWHEEL	1	
6.		WASHER	2	ϕ4
7.		HEX SOCKET SCREW	2	M4x6L
8.	2630020005	KEY-SCREW	1	

C: CROSSFEED DIAL SET(1032&1032N)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.	0890008025	SCALE RING	1	(1032)
	0890012025	SCALE RING	1	(1032N)
2.	0890014015	INDICATION PLATE	1	
3.		HEX SOCKET SCREW	1	M5x10L

D: MOTOR FOR CROSSFEED MOVEMENT SET(2033X)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.	1430015005	INTEMAL SIX-SPLINE SLEEVE	1	
2.	1030046005	CONNECTING SHAFT	1	
3.		SETTING KEY	1	5x5x20L

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
4.		BEARINGS	2	6007Z
5.	1430014005	BEARING SLEEVE	1	
6.	0010008005	BEARING SEAT	1	
7		HEX SOCKET SCREW	4	M8x25L
8.	1800013005	MOTOR SUPPORTER	1	
9.		HEX HEAD SCREW	6	M8x40L
10.		SET SCREW	4	M8x20L
11.	1210016005	TIMING BELT PULLEY	1	
12.		TIMEING BELT	1	T5x180Tx18mm
13.	2630009005	LOCKING NUT	1	
14.		SET SCREW	3	M6x12L
15.	1700021005	MOTOR FIXING PLATE	1	
16.		CROSS MOVEMENT MOTOR	1	
17.		WASHER	4	ϕ8
18.		HEX HEAD SCREW	4	M8x20L
19.		HEX HEAD SCREW	3	M6x16L
20.	2490027005	RING WASHER	2	
21.	1210022005	TIMING BELTPULLY(SMALL)	1	
22.	2000032005	SAFETY COVER	1	
23.		CROSS HEAD SCREW	8	M5x10L

E: CROSSFEED LEADSCREW COVER SET(2038)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.	3500001005	OIL COVER	1	
2.		WASHER	4	ϕ5
3.		CROSS HEAD SCREW	4	M5x8L
4.	1910029005	SHAFT COVER	1	
5.		WASHER	6	ϕ5
6.		CROSS HEAD SCREW	6	M5x8L

F: CROSSFEED LOCK(2034)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.	2420103005	TRAVEL SETTING BLOCK	1	
2.		HEX SOCKET SCREW	2	M5x65L
3.	2400001005	SCREW	1	
4.	2640002005	LOCK SCREW	1	
5.		FLAT HEAD SCREW	2	M4x6L
6.	2420012015	COVERING PLATE	1	

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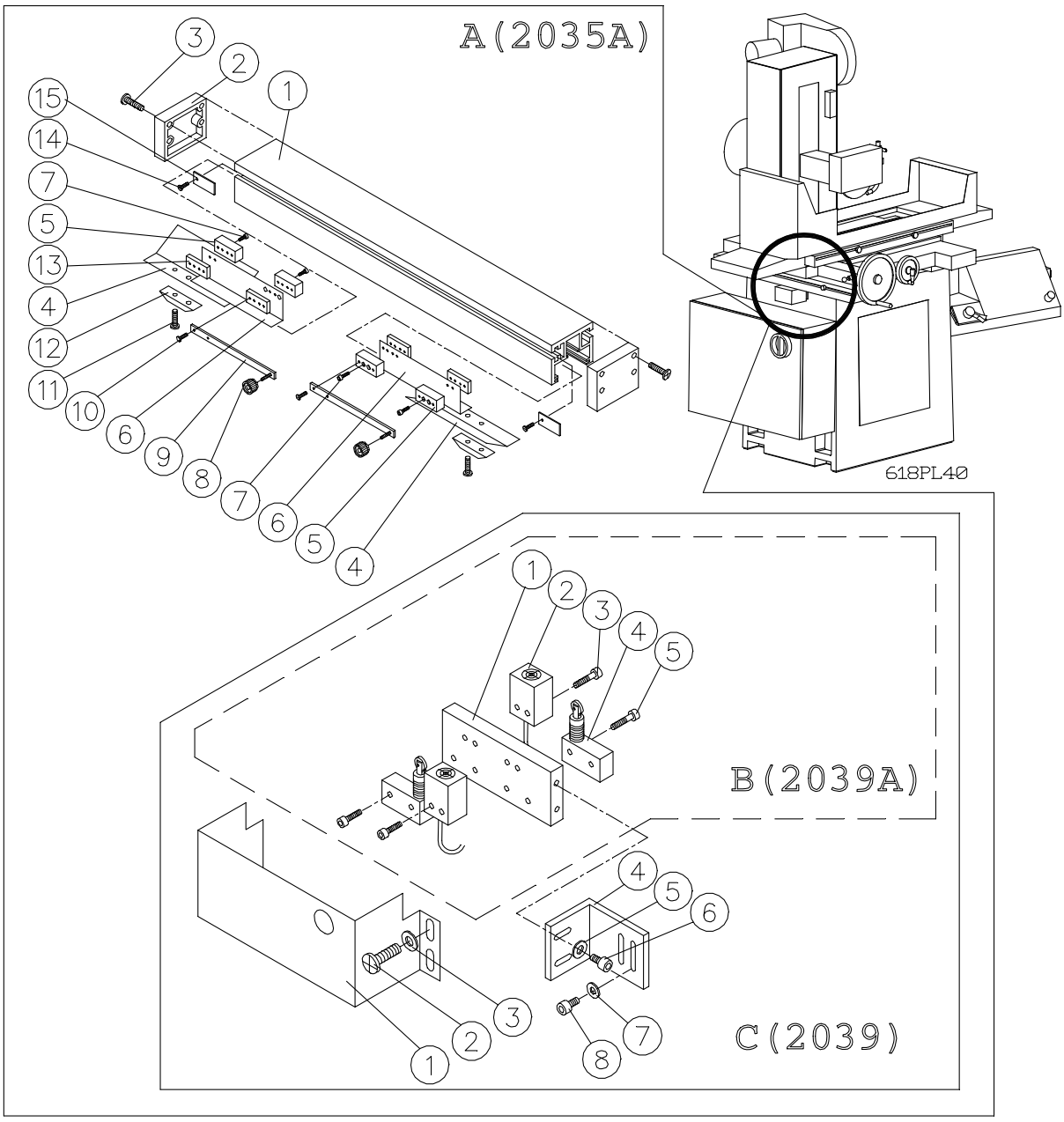
SADDLE CROSSWISE DRIVE (818)



SADDLE CROSSWISE DRIVE

A: CROSSWISE SENSOR-DETECTED RAIL (2035A)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2260010005	SENSOR-DETECTED RAIL	1	
2.	3870003005	SIDE COVER OF SENSOR-DETCTED RAIL	2	
3.		CROSS HEAD SCREW	8	M4x16L
4.	3500020005	INDUCTION LIMIT PLATE	2	
5.	2430003005	LOCKING BLOCK OF SENSOR-DETCTED SHEET	4	
6.	2000033005	CROSSWISE SENSOR-DETECTED SHEET	2	
7.		SOCK HEAD CAP SCREW	8	M4x14L
8.	2430002005	CLAMMPING BLOCK OF SECSOR-DETECTED SHEET	2	
9.	2890017005	CROSSWISE SENSOR-DETECTED ADJUSTING BLOCK	1	
10.		CROSS HEAD SCREW	4	M4x20L
11.		CROSS HEAD SCREW	4	M4x6L
12.	2490010005	CROSSWISE LIMIT SETTING PLATE	2	
13.	2430002005	CLAMPING BLOCK OF SENSOR-DETECTED SHEET	4	
14.		CROSS HEAD SCREW	2	M4x6L
15.	2490004005	POSITIONING LIMITED PLATE	2	

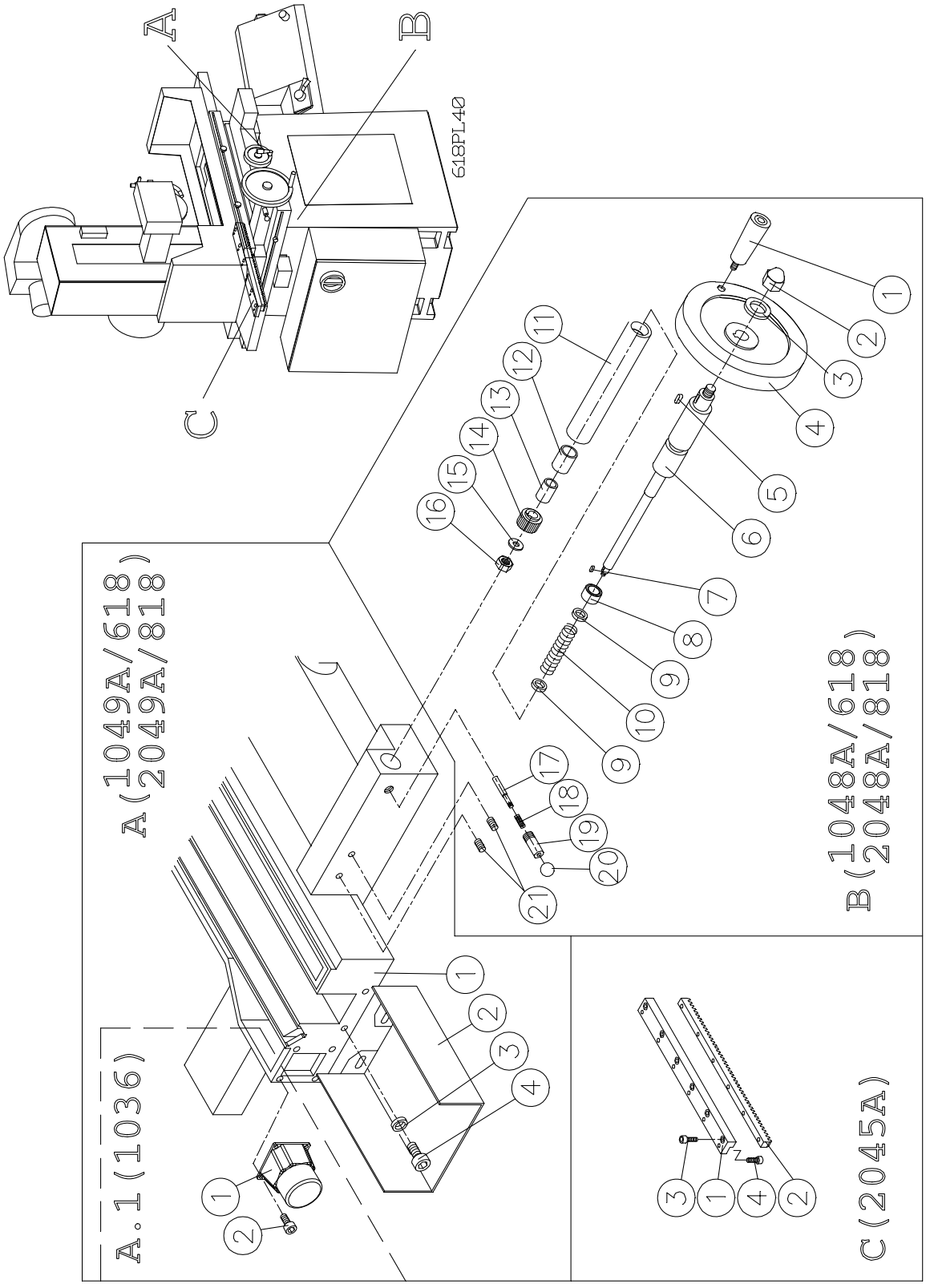
B: CROSSWISE PROXIMITY SWITCH (2039A)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3820003005	CROSS PROXIMITY SWITCH BRACKET	1	
2.		PROXIMITY SWITCH	2	17*17*28
3.		CROSS HEAD SCREW	4	M3x25L
4.		LIMIT SWITCH	2	Z-15GQ22-B
5.		SOCK HEAD CAP C SCREW	4	M4x25L

C: CROSSWISE LOCKING DEVICE (2039/818)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1910091015	CROSSWISE INDUCTION SWITCH PROTECTION COVER	1	
2.		CROSS HEAD SCREW	4	M5x8L
3.		WASHER	4	ϕ5
4.	2420015005	SENSOR SWITCH FIXED PLATE	1	
5.		WASHER	2	ϕ5
6.		HEX HEAD SCREW	2	M5x10L
7.		WASHER	2	ϕ5
8.		HEX HEAD SCREW	2	M5x12L

LONGITUDINAL TRANSMITTING SET & SADDLE DUST (818PD)



LONGITUDINAL TRANSMITTING SET & SADDLE DUST (818PD)

A: SADDLE DUST (2049A)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.	0406015005	SADDLE	1	
2.	3500019005	SLIDE DUST COVER	1	
3.		WASHER	2	ϕ6
4.		HEX HEAD SCREW	1	M6x8L

A.1: OUTLET HOSE (1036)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.	2450001005	OUTLET	1	
2.		HEX HEAD SCREW	4	M4x8L

B: LONGITUDINAL HANDWHEEL SET (2048A)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.	4210007005	KNOB	1	
2.		CUP NUT	1	M12
3.		WASHER	1	ϕ12
4.	1260003005	HANDWHEEL	1	
5.		SETTING KEY	1	5x5x20L
6.	1030049005	TRANSMIT SHAFT	1	
7.		SETTING KEY	1	4x4x12L
8.		NEEDLE BEARING	1	HK1712
9.	2410025005	WASHER	2	
10.		SPRING	1	ϕ1.5xϕ18x92L
11.	1430023005	SHAFT SLEEVE	1	
12.		BEARING	1	DU2012
13.	1430018005	BEARING SLEEVE	1	
14.	1200022005	LONGITUDINAL DRIVING GEAR	1	
15.	2410024005	WASHER	1	
16.		HEX NUT	1	M8
17.	2610005005	PIN	1	
18.	2700003005	COMPRESSION SPRING	1	
19.	2490003005	POSITION SEAT	1	
20.	3870002005	PLASTIC BLOCK BALL	1	
21.		SET SCREW	2	M6x8L

C: LONGITUDINAL RACK SET (2045A)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.	1830006005	LONGITUDINAL RACK SEAT	1	
2.	1150001005	LONGITUDINAL RACK	1	
3.		HEX HEAD SCREW	5	M6x20L

4.	HEX HEAD SCREW	6	M6x10L

TABLE LONGITUDINAL DRIVE

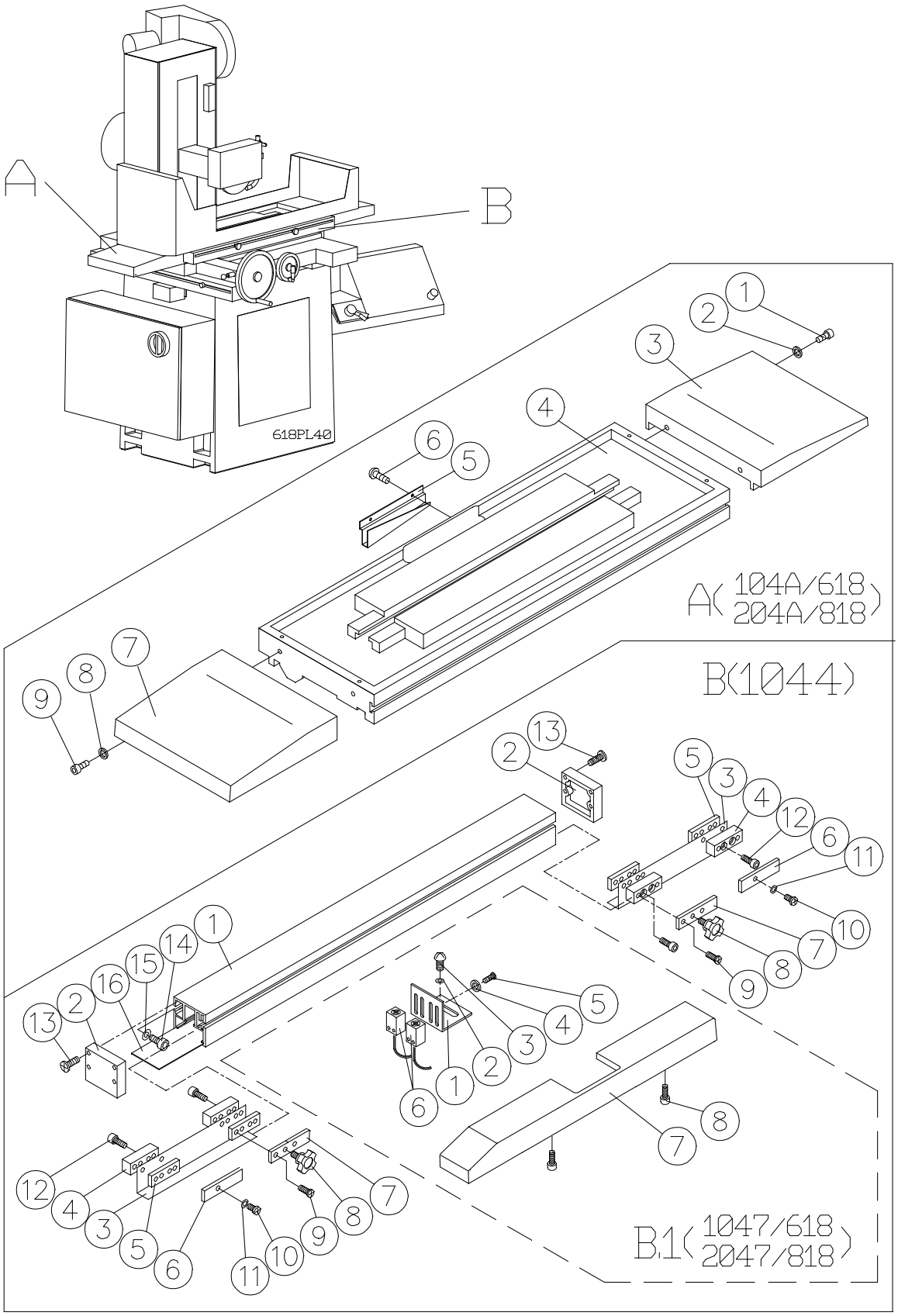


TABLE LONGITUDINAL DRIVE (818)

A: TABLE (204A)

NO.	PART NO.	DESCRIPTION	Q,TY	SIZE
1.		HEX HEAD SCREW	3	M8x20L
2.		SPRING WASHER	3	ϕ 8
3.	1930009005	RIGHT-END COVER	1	
4.	0506017005	TABLE	1	
5.	3520013005	ANTI-WATER PLATE	1	
6.		CROSS HEAD SCREW	2	M4x8L
7.	1930008005	LEFT-END COVER	1	
8.		CROSS HEAD SCREW	3	M8x20L
9.		SPRING WASHER	3	ϕ 8

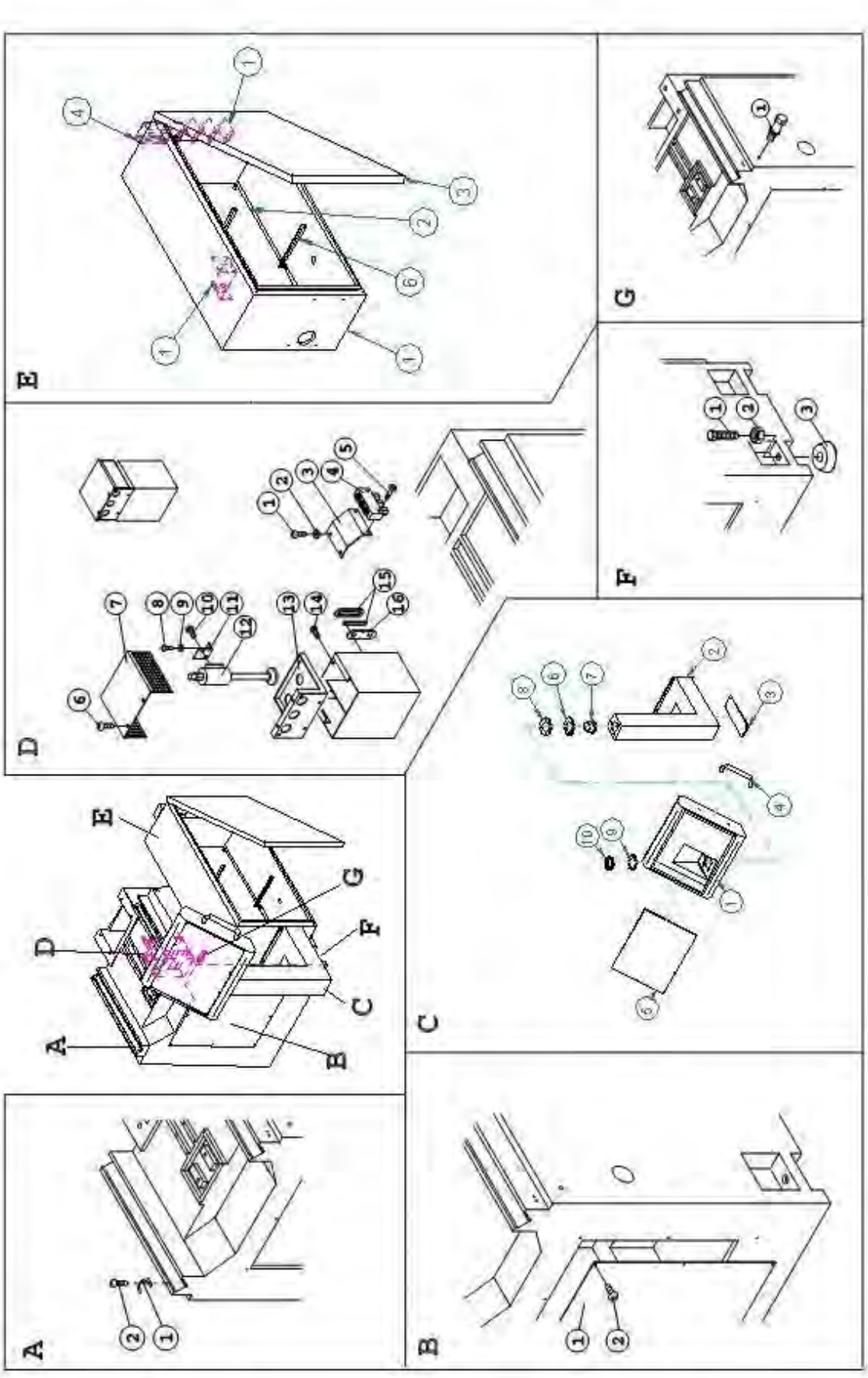
B: LONGITUDINAL SENSOR-DETECTED SET (1044)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2260010005	LONGITUDINAL INDUCTION RAIL	1	
2.	3870003005	SIDE COVER OF INDUCTION RAIL	2	
3.	2000033005	LONG ITUDIAL SENSOR-DETECTED SHEET	2	
4.	2430003005	LOCKING BLOCK OF SENSOR-DETECTED SHEET	4	
5.	2430002005	CLAMPING BLOCK OF SENSOR-DETECTED SHEET	4	
6.	2490004005	LONGITUDINAL LIMIT BLOCK	2	
7.	2890004005	LONGITUDINAL SENSOR ADJUSTING BLOCK	2	
8.	2620005005	LOBE KNOB	2	
9.		CROSS HEAD SCREW	4	M4x20L
10.		CROSS HEAD SCREW	2	M4x8L
11.		SOCK HEAD CAP SCREW	2	M6x16L
12.		SOCK HEAD CAP SCREW	8	M5x14L
13.		CROSS HEAD SCREW	2	M6x16L
14.		SOCK HEAD PLATE WASHER	2	ϕ 4
15.		SOCK HEAD PLATE WASHER	2	ϕ 6
16.	3500015005	COVER	1	

B.1: LONGITUDINAL SENSOR-DELECTED RAIL (2047)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1760001005	PROXIMITY SWITCH SEAT	1	
2.		WASHER	2	ϕ 5
3.		CROSS HEAD SCREW	2	M5x6L
4.		WASHER	4	ϕ 4
5.		CROSS HEAD SCREW	4	M4x6L
6.		PROXIMITY SWITCH	2	
7.	1930010005	PROTECT COVER	1	
8.		HEX HAND SCREW	2	M8x20L

BASE (818PD)



BASE (818PD)

A: OIL WITER SET (1054)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.		COPPER WIPER	4	
2.		CROSS HEAD SCREW	4	M4x6L

B: BASE ACCESSORY SET (2053A)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.	2000101005	PLATE	1	
2.		CROSS HEAD SCREW	8	M6x12L

C: ELECTRICAL BOX (2095B)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.	3050075035	ELECTRICAL BOX	1	
2.	3090026005	ARM OF THE ELECTRICAL BOX	1	
3.	3600026005	TRANSFER BOX COVER A	1	
4.	J091UAGS20	HANDLE	1	AGS-200
5.		PD CONTROL PANEL	1	
6.	0640044005	CROSS AXIS CLAMP	1	
7.	3130011005	CROSS AXIS IN CONTROL BOX		1
8.	2420035005	FIXED PLATE IN CROSS AXIS		1
9.	A18BA0AW12	LOCKED WASHER	1	AW12
10.	A12000AN12	LOCKED NUT	1	AN12

D: LUBRICATION SYSTEM (1071A)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.		CROSS HEAD SCREW	1	M4x8L
2.		WASHER	1	ϕ4
3.	2420055005	SWITCH BRACKET	1	
4.		OIL DISTRIBUTOR	1	B-3 D6
5.		HEX SOCKET SCREW	2	M4x12L
6.		CROSS HEAD SCREW	2	M6x10L
7.	2000015005	COVER	1	
8.		CROSS HEAD SCREW	2	M4x8L
9.		WASHER	2	ϕ4
10.		CROSS HEAD SCREW	2	M6x8L
11.	1810018005	SWITCH BRACKET	1	
12.		PUMP (110V)	1	
13.	1810025005	PUMP SEAT	1	
14.		CROSS HEAD SCREW	1	M4x8L
15.	J02ACLT008	OIL SCALE	1	
16.	1810026005	OIL SCALE SEAT	1	

E: LONGITUDINAL HYDRAULIC SPEED CONTROL SET (1043)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.	3000046005	ELECTRICAL BOX	1	
2.	3030062005	SPLASH COVER	1	
3.	3010026005	COVER	1	
4.	3520070005	WATER PROOF COVER IN WIRING JUNCTION	1	
5.	3520011005	SEPARATION POLE IN ELECTRICAL PLATE	3	
6.	1440034005	SEPARATION POLE IN ELECTRICAL PLATE	2	
7.	2410060005	CUSHION PAD IN COVER	1	

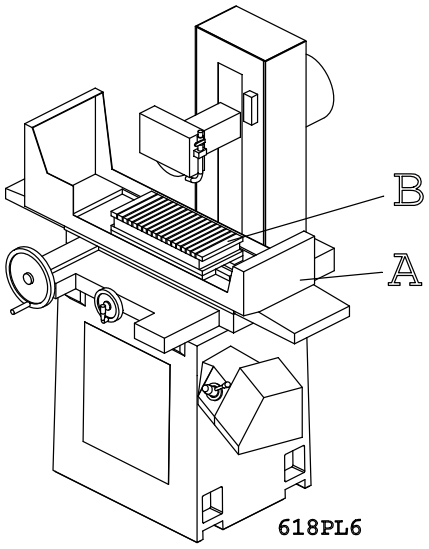
F: LEVELING SCREW SET(2052)

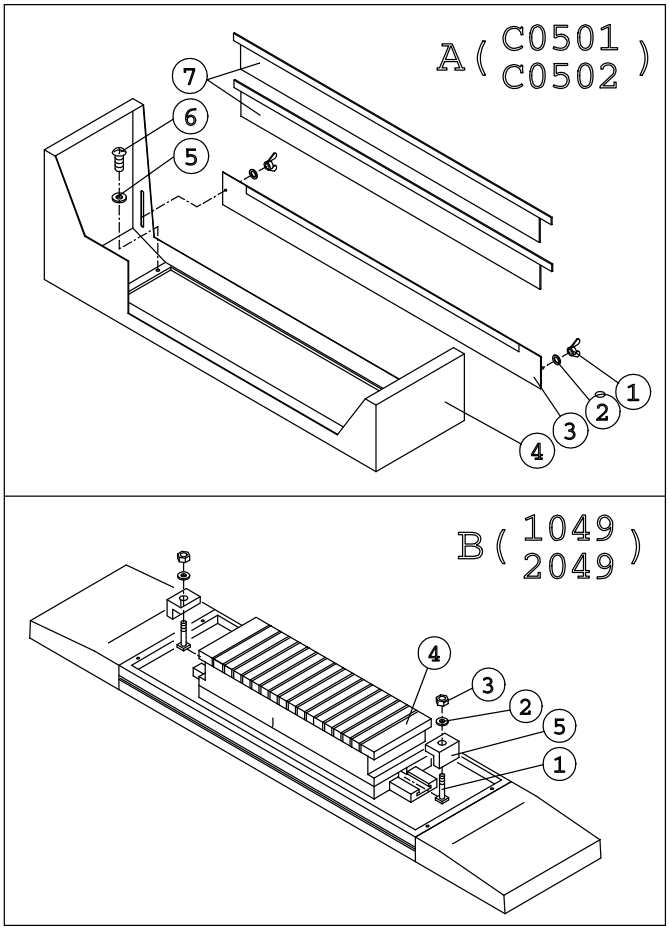
NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.	2620027005	LEVELING SCREW	5	
2.		HEX NUT	5	M22
3.	2410008005	LEVELING PLATE	5	

G: EYE BOLT SET(1051)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.	2620043005	EYE BOLT	4	

GUARD AND MAGNETIC CHUCK (818PD)





GUARD AND MAGNETIC CHUCK (818PD)

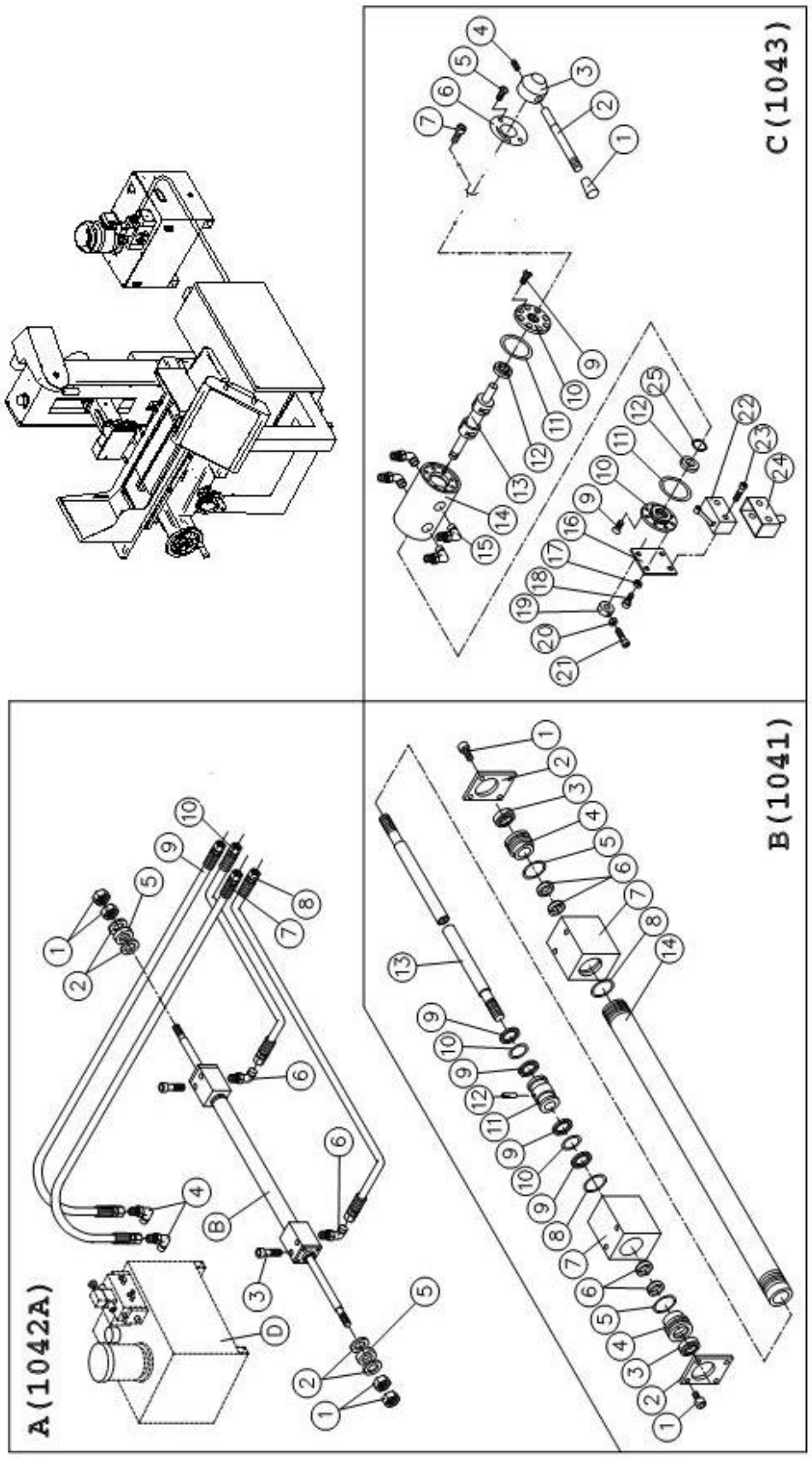
A: **SPLASH GUARD SET (C0502)**

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.		WING NUT	2	DCN 5M
2.		WASHER	2	
3.	3520004005	REAR APLASH PLATE	1	
4.	3520005005	GUARD	1	
5.		WASHER	2	
6.		CROSS HEAD SCREW	4	M6x20L
7.	2350007005	FRONT SPLASH PLATE	2	

B: TABLE MAGNETIC CHUCK SET (2049)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.	2630027005	T TYPE SCREW	2	
2.		WASHER	2	
3.		HEX NUT	2	M10
4.		MAGENETIC CHUCK	1	8"x18"
5.		CHUCK FIXED BLOCK	2	

DYDRAULIC CYLINDER SYSTEM



HYDRAULIC CYLINDER SYSTEM

A:HYDRAULIC (1042A)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.		HEX NUT	4	M12
2.		WASHER	4	ϕ 12
3.		HEX HEAD SCREW	4	M6x60L
4.		HIGH PRESSURE PIPE 90°CONNECTION	2	1/2PTx3/8PH
5.	2410026005	RECOIL CUSHION	1	
6.		HIGH PRESSURE PIPE 90°CONNECTION	2	1/2PTx3/8PH
7.		HIGH PRESSURE PIPE	1	3/8"x1100mm
8.		HIGH PRESSURE PIPE	1	3/8"x2500mm
9.		HIGH PRESSURE PIPE	1	3/8"x1100mm
10.		HIGH PRESSURE PIPE	1	3/8"x1460mm

B:CYLINDER SET (1041)

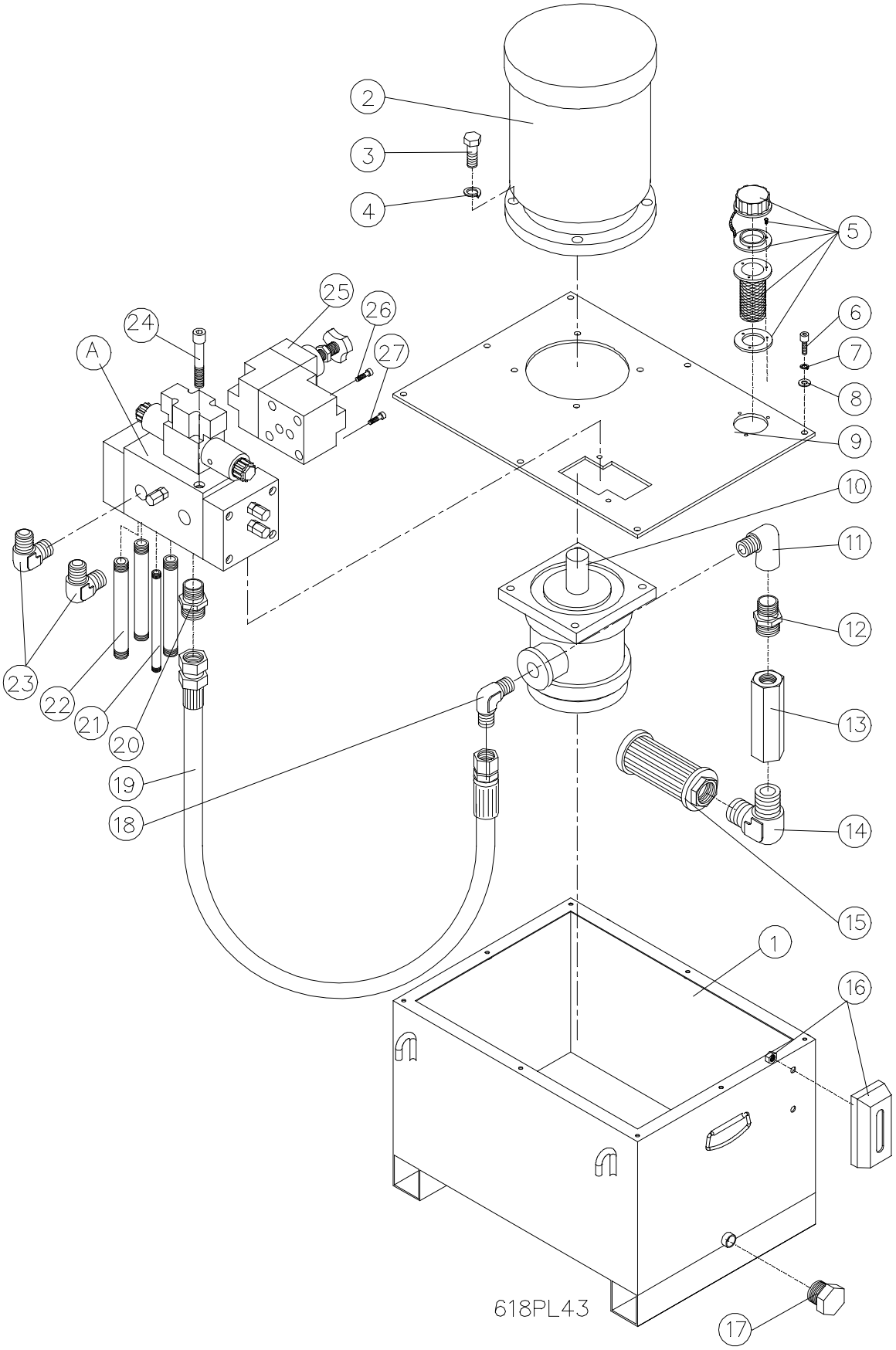
NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.		HEX HEAD SCREW	4	M5x12L
2.	0640030005	OIL SEAL PRESS PLATE	2	
3.		ANTI-DUST RING	2	ϕ 14
4.	1830013005	OIL SEAL SEAT	2	
5.		O-RING	2	P28
6.		OIL SEAL	4	ϕ 14
7.	2910010005	LEFT HUDRAULIC CYLINDER TOP HEAD	2	
8.		O-RING	2	P29
9.		O-RING	4	T-P-21
10.		O SHAPE	2	P21
11.	2920002005	PISTON	1	
12.		PIN	1	#5*25L
13.	2790005005	PISTON ROD	1	
14.	2800004005	HYDRAUIC PIPE	1	

C:CYLINDER SET (1043)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.	4210011005	THRDTTLE HANDLE HEAD	1	
2.	4210010015	THROTTLE HANDLE	1	
3.	2420009005	HANDLE SEAT	1	
4.		SET SCREW	1	M6x14L
5.		CROSS HEAD SCREW	2	M5x8L
6.	3700581005	THROTTLE INDICTOR PLATE	1	
7.		HEX HEAD SCREW	4	M5x12L
8.				
9.		FLAT HEAD SCREW	8	M5x10L
10.	2000035015	COVER PLATE	2	
NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
11.		O-RING	2	P28
12.		OIL SEAL	2	DH14
13.	2830001005	THROTTLE SHAFT	1	

14.	2820001015	THROTTLE DIRECTIONAL VALCE	1	
15.		HIGH PRESSURE PIPE 90°CONNECTION	4	3/8PTx3/8PH
16.	1810044005	SWITCH FIXED SEAT	1	
17.		NUT	2	M5
18.		HEX HEAD SCREW	2	M5x30L
19.	2490009005	POSITION BLOCK	1	
20.		NUT	1	M6
21.		HEX HEAD SCREW	1	M6x35L
22.		SWITCH	1	Z15G1703
23.		HEX HEAD SCREW	1	M4x25L
24.		LIMIT SWITCH COVER	1	CB-1
25.		WASHER	1	WW-0018

HYDRAULIC TANK SYSTEM (106)



HYDRAULIC TANK SYSTEM (106)

NO.	PART NO.	DESCRIPTION	Q'TY	SIZE
1.	3230001015	OIL TANK		
2.		MOTOR	1	1"HP
3.		HEX SCOKET SCREW	4	M10x25L
4.		SPRING WASHER	4	
5.		OIL-FEEDING FILTER	1	AB1163
6.		HEX HEAD SCREW	6	M8x20L
7.		SPRING WASHER	6	ϕ 8
8.		WASHER	6	ϕ8
9.	2000036005	FIXED PLATE	1	
10.		PUMP	1	VPNC-F14
11.		PIPE ELBOW	1	1"
12.		HIGH PRESSURE PIPE CONNECTION	1	1"Tx1"T
13		VALVE	1	1"-CIF08
14.		PIPE ELBOW	1	1"Tx1"T
15.		OIL FILTER	1	MF08
16.		OIL LEVER GAME	1	GS-3"
17.		HOLE PLUG	1	½"PT
18.		PIPE ELBOW	1	¾"Tx3/4"T
19.		HIGH PRESSURE PIPE	1	¾"x450L
20.		HIGH PRESSURE PIPE CONNECTION	1	½"Tx3/4"T
21.		STRAIGHT CONNECTION PIPE	1	1/8"x6"
22.		STRAIGHT CONNECTION PIPE	3	3/8"x6"
23.		PIPE ELBOW	2	1/2"Tx3/8"H
24.		HEX HEAD SCREW	2	M8x45L
25.		PRESSURE-REGULATING VALVE	1	1/2"
26.		SOCK HEAD CAP SCREW	2	M16*90L
27.		SOCK HEAD CAP SCREW	2	M16*70L

TABLE REVERSING MECHANISM (2561)

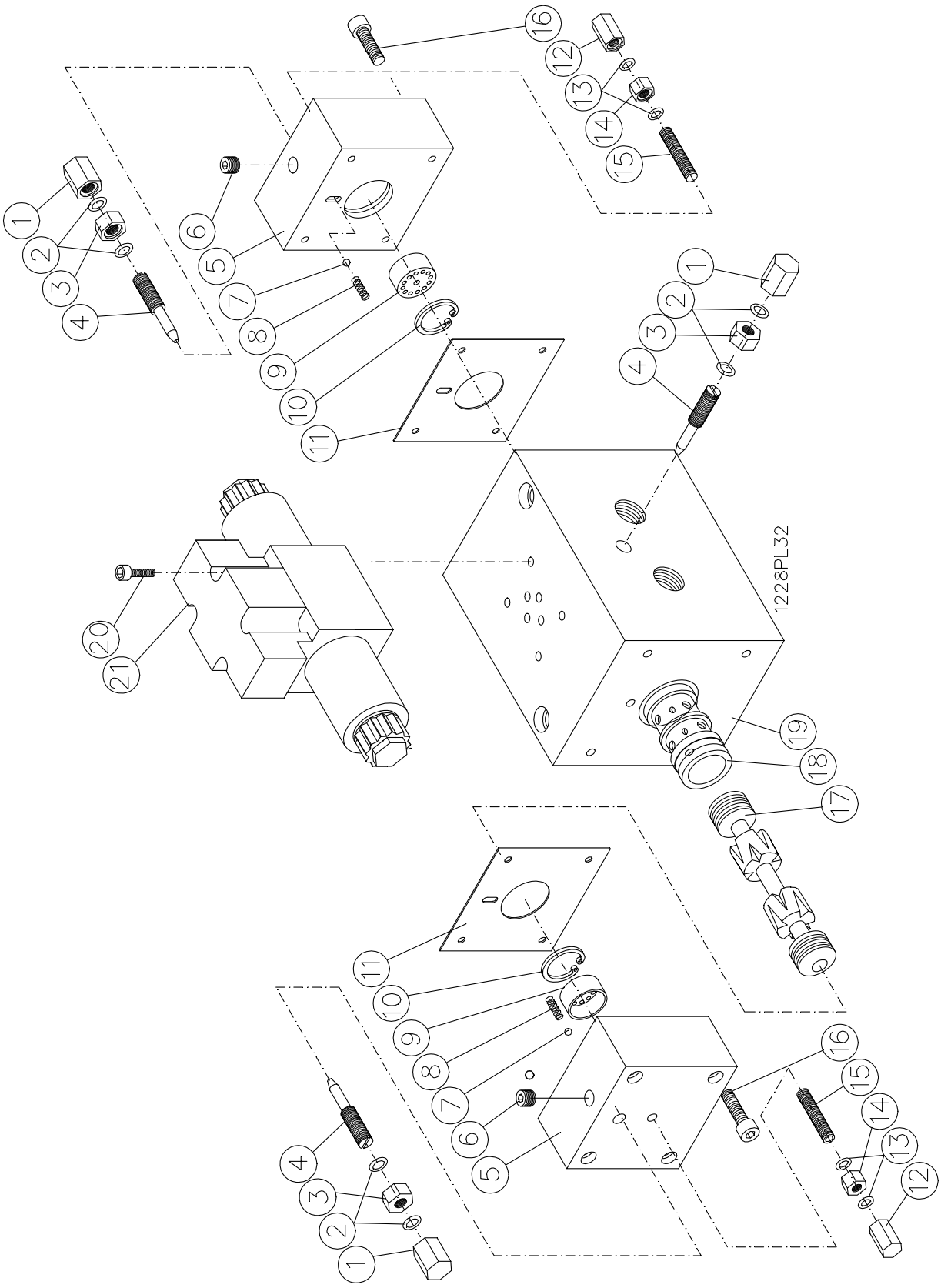


TABLE REVERSING MECHANISM (2561)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2640011005	LEAK-PROOF NUT	3	
2.		O-RING	6	P10
3.	2630013005	FIXING NUT	3	
4.	2830003005	SMALL THROTTING SHAFT	3	
5.	2010004005	SIDE COVER OF REVERSING BODY	2	
6.		HOLE PLU	2	1/8PT
7.		STEEL BALL	2	ϕ5
8.	2700008005	SPRING	2	ϕ5xϕ0.5x18L
9.	2890014005	TOP BLOCK OF REVERSING SHAFT	2	
10.		INNER RETAINING RING	2	ϕ28
11.		ASBESTOS GASKET	2	95*90*1
12.	2640012005	LEAK-PROOF NUT	2	
13		O-RING	4	P8
14.	2630016005	FIXING NUT	2	
15.		HEADLESS SCREW	2	M8*40L
16.		SOCK HEAD CAP SCREW	8	M6*40L
17.	1030067005	REVERSING SHAFT	1	
18.	1430047005	REVERSING SHAFT SLEEVE	1	
19.	2820006005	REVERSING SHAFT BODY	1	
20.		SOCK HEAD CAP SCREW	4	M5*45L
21.		SOLENOID VALVE	1	DV24V

.EC MACHINERY DIRECTIVE 89/392/EEC

PARTS LIST

PRESERVE THIS MANUAL FOR
FUTURE REFERENCE AND USE

MACHINE NAME: HORIZONTAL SURFACE GRINDING MACHINE

BRAND: ACER

MODEL: SUPRA 1 0 2 0 P D & 1 2 2 4 P D

MANUFACTURE: YA-GIN MACHINE TOOL MANUFACTURING INC.

Address: No 101, Lane 506, Send-Tso RD., Seng-Karng District, Taichung City, Taiwan

Telephone: 886-4-2520-4120

FAX.: 886-4-2520-4123

INTERNET: www.aceronline.net
www.acerlinks.com

E-mail: info@acerlinks.com
info@aceronline.net

VERSION: 1
DATE OF ISSUE : May, 2011
FILE NO.: 1020/1224 PD

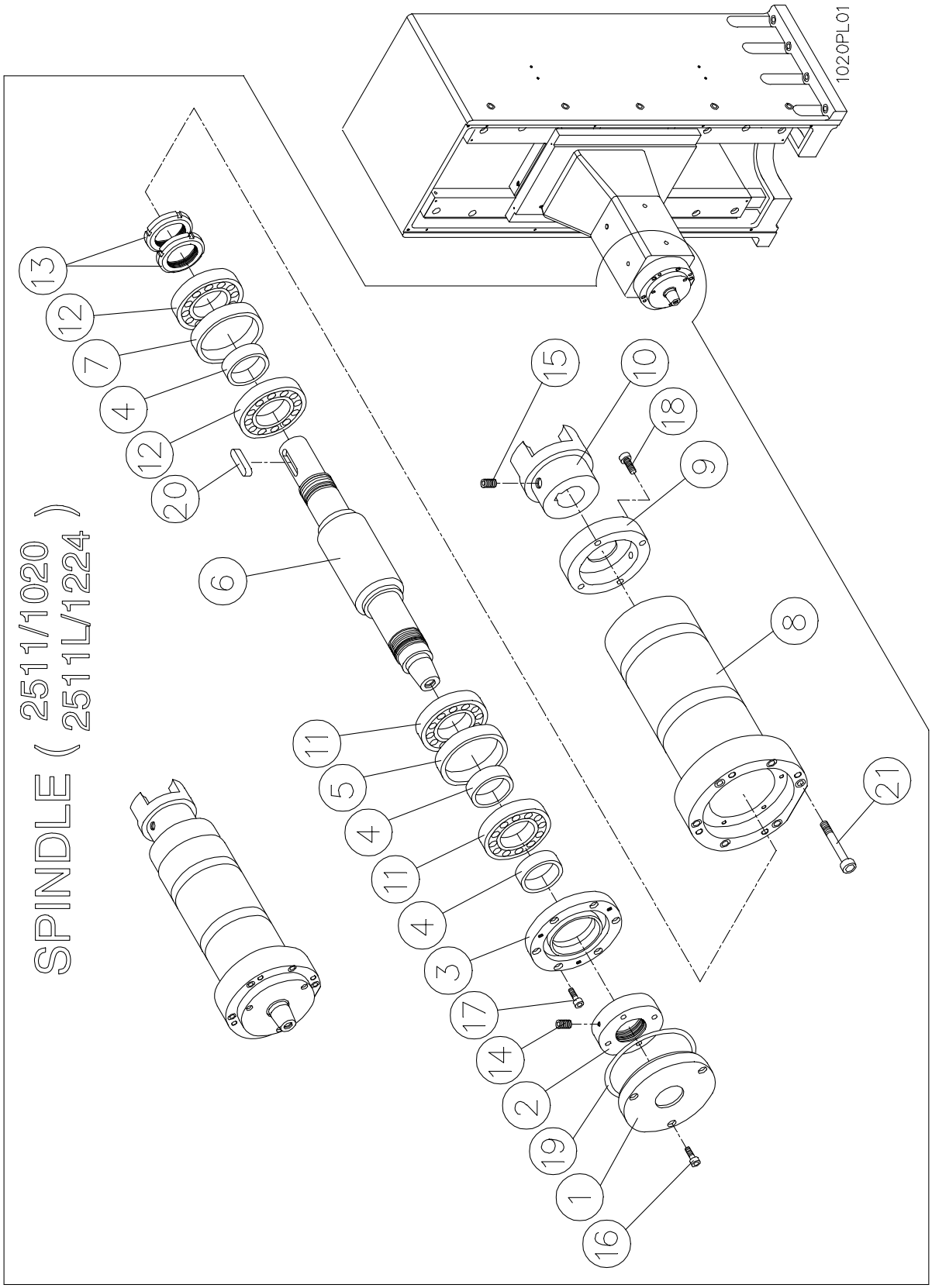
CONTENT

※ Following parts list are for many kinds of models. As there are several different specification of parts depends on different orders,plase check carefully before placing any order. And you shall be able to contact local distributor for correct parts by this way. Thank you your attention to the above.

Approved by: Checked by: Prepared by:

VERSION: 1 Date:

SPINDLE


1020PL01
SPINDLE (2511/1020)
(2511L/1224)
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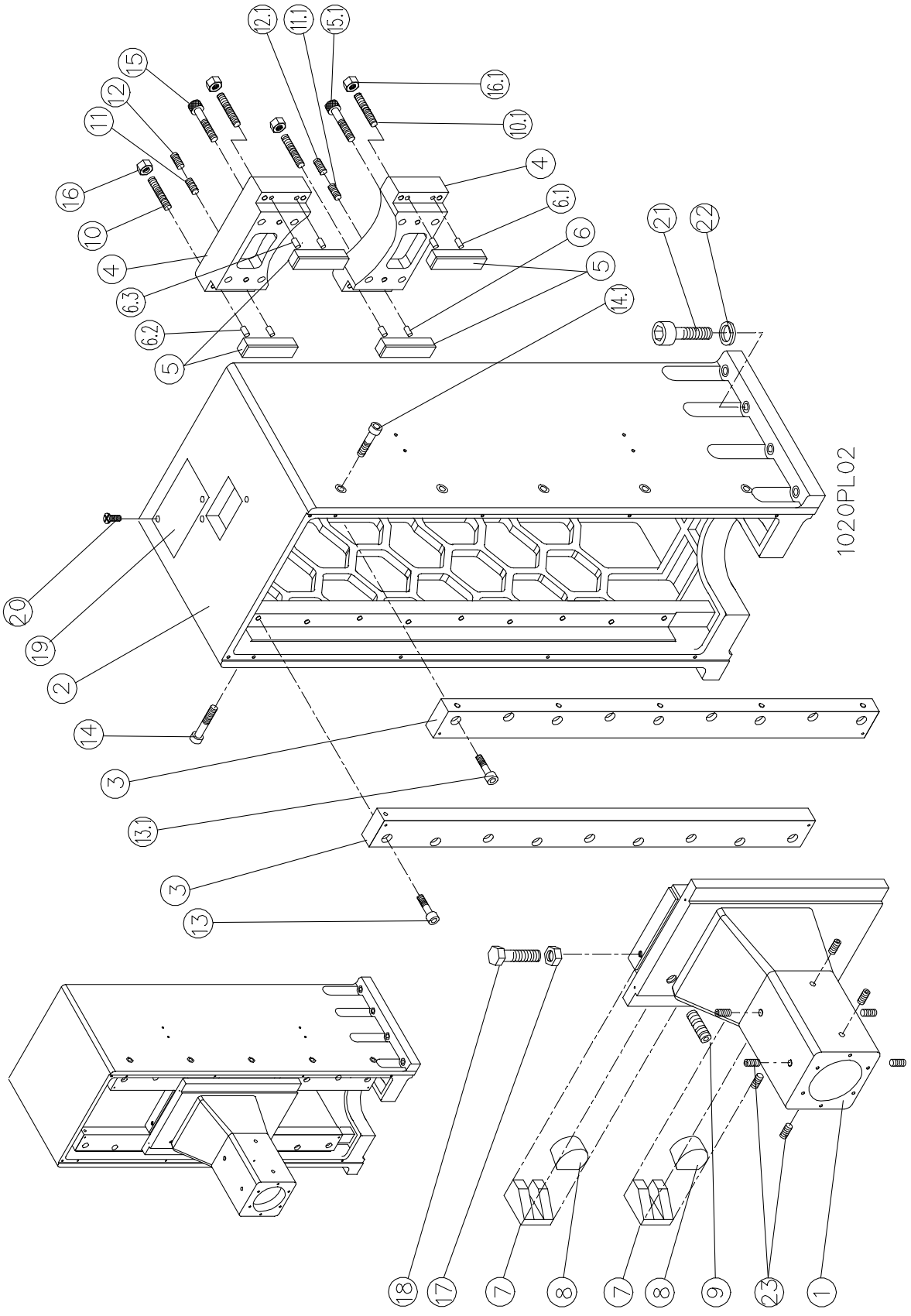
SPINDLE (2511) for 1020

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3500024005	FRONT DUST GUARD	1	
2.	2630031005	SPINDLE FRONT NUT	1	
3.	0640003005	FRONT BEARING PRESSING PLATE	1	
4.	1440020005	INNER SPACER RING	3	
5.	1440022005	FRONT BEARING OUTER SPACER RING	1	
6.	1050003005	SPINDLE	1	FOR 8" WHEEL
7.	1440024005	REAR BEARING OUTER SPACER RING	1	
8.	1430069005	SPINDLE SLEEVE	1	
9.	3500023005	REAR DUST GUARD	1	
10.	2770002005	SPINDLE COUPLING	1	
11.		BEARING	2	7207
12.		BEARING	2	7007
13.	2630033005	SPINDLE REAR NUT	2	
14.		HEADLESS SCREW	4	M6*8L
15.		HEADLESS SCREW	2	M8*10L
16.		SOCK HEAD CAP SCREW	3	M5*20L
17.		SOCK HEAD CAP SCREW	6	M5*20L
18.		SOCK HEAD CAP SCREW	4	M6*30L
19.		O-RING	1	P95
20.		SETTING KEY	1	10*8*35L
21.		SOCK HEAD SCREW	6	M6*40L

SPINDLE (2511L) for 1224

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3500055005	FRONT DUST GUARD	1	
2.	2630032005	SPINDLE FRONT NUT	1	
3.	0640007005	FRONT BEARING PRESSING PLATE	1	
4.	1440021005	INNER SPACER RING	3	
5.	1440023005	FRONT BEARING OUTER SPACER RING	1	
6.	1050005005	SPINDLE	1	
7.	1440025005	REAR BEARING OUTER SPACER RING	1	
8.	1430072005	SPINDLE SLEEVE	1	
9.	3500048005	REAR DUST GUARD	1	
10.	2770002005	SPINDLE COUPLING	1	
11.		BEARING	2	7208
12.		BEARING	2	7008
13.	2630034005	SPINDLE REAR NUT	2	
14.		HEADLESS SCREW	4	M6*8L
15.		HEADLESS SCREW	2	M8*10L
16.		SOCK HEAD CAP SCREW	3	M5*20L
17.		SOCK HEAD CAP SCREW	6	M5*20L
18.		SOCK HEAD CAP SCREW	4	M6*30L
19.		O-RING	1	P95
20.		SETTING KEY	1	10*8*35L
21.		SOCK HEAD CAP SCREW	6	M8*45L

COLUMN



COLUMN (2521) for1020

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	0106007005	SPINDLE SEAT	1	
2.	0206006005	COLUMN	1	
3.	2260016005	COLUMN RAIL	2	
4.	0640004005	SPINDLE SEAT 'S PRESSING PLATE	2	
5.	2890006005	VERTICAL BACK SLIDE PLATE	4	
6.		DOWEL PIN	2	D8*20L
6.1		DOWEL PIN	2	D8*20L
6.2		DOWEL PIN	2	D8*20L
6.3		DOWEL PIN	2	D8*20L
7.	2420020015	VERTICAL SLIDE PLATE	2	
8.	2890005005	VERTICAL SLIDE PLATE ADJUSTING BLOCK	2	
9.		HEADLESS SCREW	1	M12*25L
10.		HEADLESS SCREW	4	M10*50L
10.1		HEADLESS SCREW	4	M10*50L
11.		HEADLESS SCREW	1	M10*30L
11.1		HEADLESS SCREW	1	M10*30L
12.		HEADLESS SCREW	1	M10*10L
12.1		HEADLESS SCREW	1	M10*10L
.13.		SOCK HEAD CAP SCREW	9	M10*40L
13.1		SOCK HEAD CAP SCREW	9	M10*40L
14.		SOCK HEAD CAP SCREW	5	M10*30L
14.1		SOCK HEAD CAP SCREW	5	M10*30L
15.		SOCK HEAD CAP SCREW	4	M12*80L
15.1		SOCK HEAD CAP SCREW	4	M12*80L
16		NUT	4	M12
16.1		NUT	4	M12
17.		NUT	1	M12
18.		HEX SOCKET SCREW	1	M12*70L
19.	2000077005	BASE COVER	1	
20.		CROSS HEAD SCREW	2	M6*8L
21.		SOCK HEAD CAP SCREW	8	M16*60L
22.		SPRING WASHER	8	ϕ16
23.		HEADLESS SCREW	8	M10*16L

COLUMN (3021) for 1224

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	0106027015	SPINDLE SEAT	1	
2.	0206007005	COLUMN	1	
3.	2260017005	COLUMN RAIL	2	
4.	0640004005	SPINDLE SEAT 'S PRESSING PLATE	2	
5.	2890006005	VERTICAL BACK SLIDE PLATE	4	
6.		DOWEL PIN	2	D8*20L
6.1		DOWEL PIN	2	D8*20L
6.2		DOWEL PIN	2	D8*20L
6.3		DOWEL PIN	2	D8*20L
7.	2420020015	VERTICAL SLIDE PLATE	2	
8.	2890005005	VERTICAL SLIDE PLATE ADJUSTING BLOCK	2	
9.		HEADLESS SCREW	1	M12*25L
10.		HEADLESS SCREW	4	M10*50L
10.1		HEADLESS SCREW	4	M10*50L
11.		HEADLESS SCREW	1	M10*30L
11.1		HEADLESS SCREW	1	M10*30L
12.		HEADLESS SCREW	1	M10*10L
12.1		HEADLESS SCREW	1	M10*10L
.13.		SOCK HEAD CAP SCREW	9	M10*40L
13.1		SOCK HEAD CAP SCREW	9	M10*40L
14.		SOCK HEAD CAP SCREW	5	M10*30L
14.1		SOCK HEAD CAP SCREW	5	M10*30L
15.		SOCK HEAD CAP SCREW	4	M12*80L
15.1		SOCK HEAD CAP SCREW	4	M12*80L
16.		NUT	4	M12
16.1		NUT	4	M12
17.		NUT	1	M12
18.		HEX SOCKET SCREW	1	M12*70L
19.	2000077005	BASE COVER	1	
20.		CROSS HEAD SCREW	2	M6*8L
21.		SOCK HEAD CAP SCREW	8	M16*60L
22.		SPRING WASHER	8	ϕ16
23.		HEADLESS SCREW	8	M10*16L

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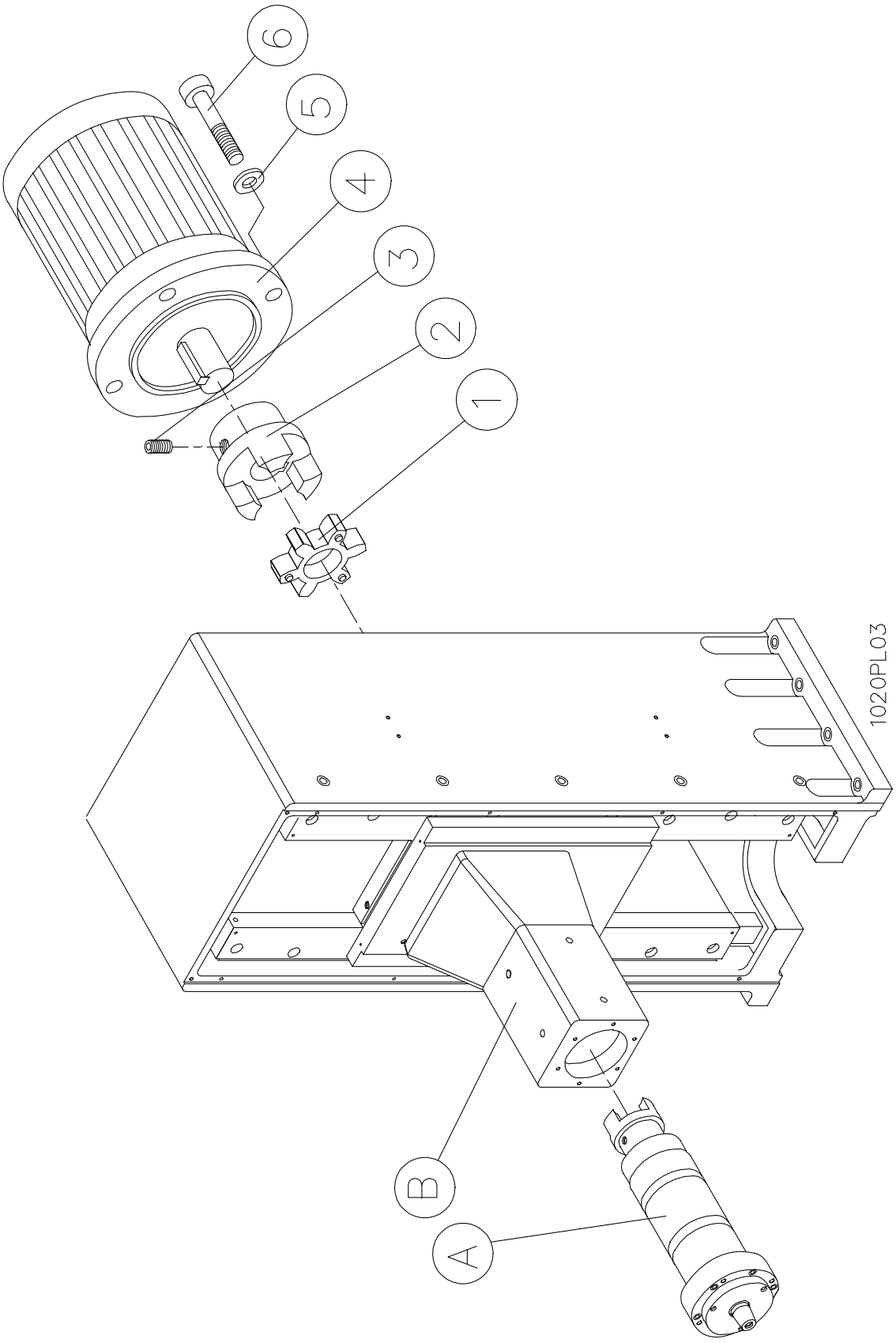
COLUMN & SPINDLE



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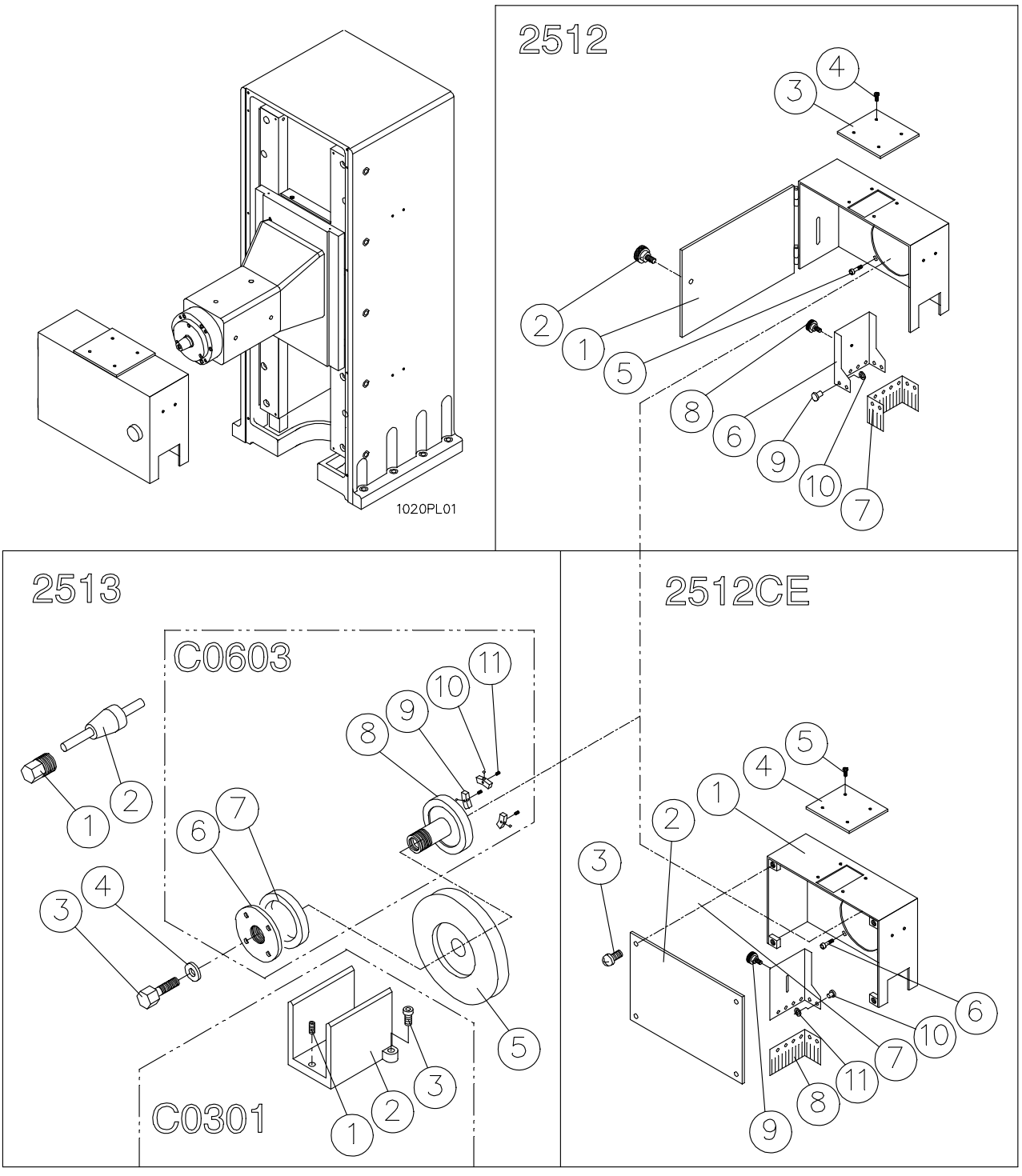
COLUMN & SPINDLE
(2510) for 8” /1020 SERIES WHEEL

NO.	PART NO.	DESCRIPTION	Q’TY	SPEC.
1.	2760005005	RUBBER COUPLING	1	
2.	2770003005	MOTOR COUPLING	1	
3.		HEADLESS SCREW	2	M8*10L
4.		SPINDLE MOTOR	1	3HP2Pxxx/xxxV
5.		SPRING WASHER	4	D10
6.		SOCK HEAD CAP SCREW	4	M10*35L
A.		SPINDLE (REF.PL-01)	1	
B.		COLUMN (REF.PL-02)	1	

COLUMN & SPINDLE
(3010) for 12”/1224 SERIES WHEEL

NO.	PART NO.	DESCRIPTION	Q’TY	SPEC.
1.	2760005005	RUBBER COUPLING	1	
2.	2770020005	MOTOR COUPLING	1	
3.		HEADLESS SCREW	2	M8*10L
4.		SPINDLE MOTOR	1	5HP4Pxxx/xxxV
5.		SPRING WASHER	4	D10
6.		SOCK HEAD CAP SCREW	4	M10*35L
A.		SPINDLE (REF.PL-01)	1	
B.		COLUMN (REF.PL-02)	1	

WHEEL GUARD & WHEEL FLANGE (1020)



WHEEL GUARD & WHEEL FLANGE (1020)

WHEEL GUARD (2512)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3900006015	GRINDING WHEEL GUARD	1	
2.	2620007015	GRINDING WHEEL GUARD BOLT	1	
3.	2620007015	GUARD PLATE	1	
4.		CROSS HEAD SCREW	2	M6*10L
5.		INNER HEX SCREW	4	M8*20L
6.	2350003005	MOVABLE GUARD SHEET	1	
7.	3850002005	DUST RUBBER PIECE	1	
8.		INNER HEX SCREW	1	M6*14L
9.		ALUMINIUM RIVET	8	D3*5L
10.		WASHER	8	M3

WHEEL GUARD (2512CE)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3900057005	WHEEL GUARD	1	
2.	3910026005	WHEEL GUARD DOOR	1	
3.		CROSS HEAD SCREW	4	M8*14L
4.	2000067005	GUARD PLATE	1	
5.		HEX HEAD SCREW	4	M6*10L
6.		INNER HEX SCREW	4	M8*20L
7.	2350003005	MOVABLE GUARD SHEET	1	
8.	3850002005	DUST RUBBER PIECE	1	
9.		INNER HEX SCREW	1	M6*14L
10.		ALUMINIUM RIVET	8	D3*5L
11.		WASHER	8	M3

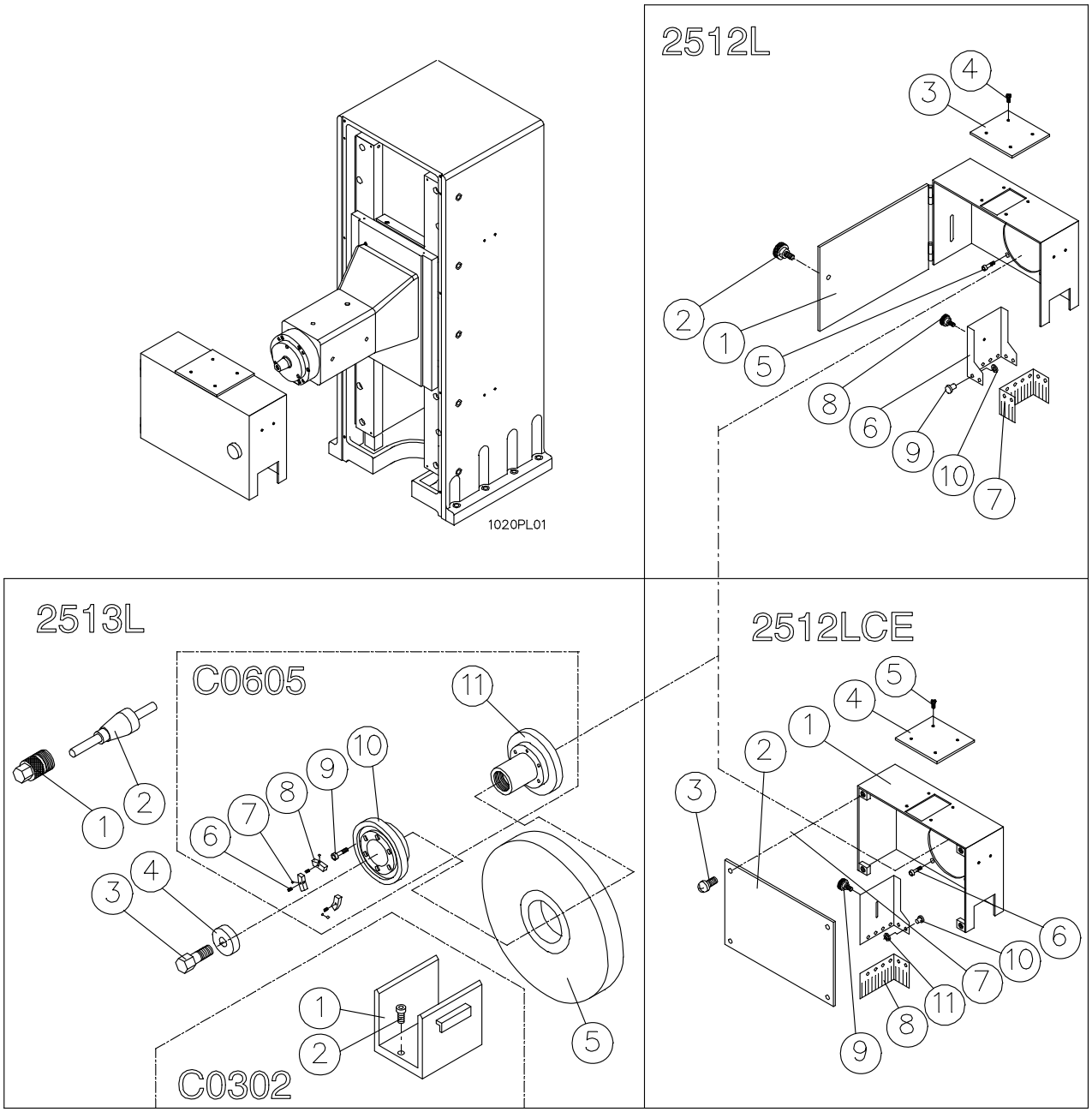
WHEEL ASSEMBLY (2513)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2630035005	WHEEL EXTRACTOR	1	
2.	1080005005	BALANCING ARBOR	1	
3.	2620006005	NUT	1	
4.	2410032005	WASHER	1	
5.		GRINDING WHEEL	1	ϕ 203* ϕ 31.75*19MM
6.	3950002015	WHEEL SETTING NUT	1	
7.	3930010005	WASHER	1	
8.	3920016005	WHEEL HUB	1	
9.	3960001005	BALANCE BLOCK	3	
10.		STEEL BALL	3	ϕ 4
11.		SET SCREW	3	M5*5L

BALANCING STAND (C0301)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		SET SCREW	1	M8*16L
2.	1000001005	BALANCING STAND	1	
3.		HEX SOCKET SCREW	2	M8*25L

WHEEL GUARD & WHEEL FLANGE (1224)



WHEEL GUARD & WHEEL FLANGE (1224)

WHEEL GUARD (2512L)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3900008015	GRINDING WHEEL GUARD	1	
2.	2620007015	GRINDING WHEEL GUARD BOLT	1	
3.	2000067005	GUARD PLATE	1	
4.		CROSS HEAD SCREW	2	M6*10L
5.		INNER HEX SCREW	4	M8*20L
6.	2350005005	MOVABLE GUARD SHEET	1	
7.	3850004005	DUST RUBBER PIECE	1	
8.		INNER HEX SCREW	1	M6*14L
9.		ALUMINIUM RIVET	8	D3*5L
10.		WASHER	8	M3

WHEEL GUARD (2512LCE)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1910002005	WHEEL GUARD	1	
2.	2000097005	WHEEL GUARD DOOR	1	
3.		CROSS HEAD SCREW	4	M8*14L
4.	2000067005	GUARD PLATE	1	
5.		HEX HEAD SCREW	4	M6*10L
6.		INNER HEX SCREW	4	M8*20L
7.	2350004005	MOVABLE GUARD SHEET	1	
8.	3850002005	DUST RUBBER PIECE	1	
9.		INNER HEX SCREW	1	M6*14L
10.		ALUMINIUM RIVET	8	D3*5L
11.		WASHER	8	M3

WHEEL ASSEMBLY (2513L)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1910002005	WHEEL EXTRACTOR	1	
2.	2000097005	BALANCING ARBOR	1	
3.	2620032005	NUT	1	
4.	2410033005	WASHER	1	
5.		12"GRINDING WHEEL	1	ϕ 305* ϕ 76.2*31.75MM
6.		STEEL BALL	3	ϕ 4
7.		SET SCREW	3	M5*5L
8.	3920016005	WHEEL HUB	3	
9.	3960004005	BALANCE BLOCK	3	
10.	3930013005	WASHER	1	
11.	3920006005	WHEEL HUB	1	

BALANCING STAND (C0302)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1000002005	BALANCING STAND	1	
2.		HEX SOCKET SCREW	3	M8*35L

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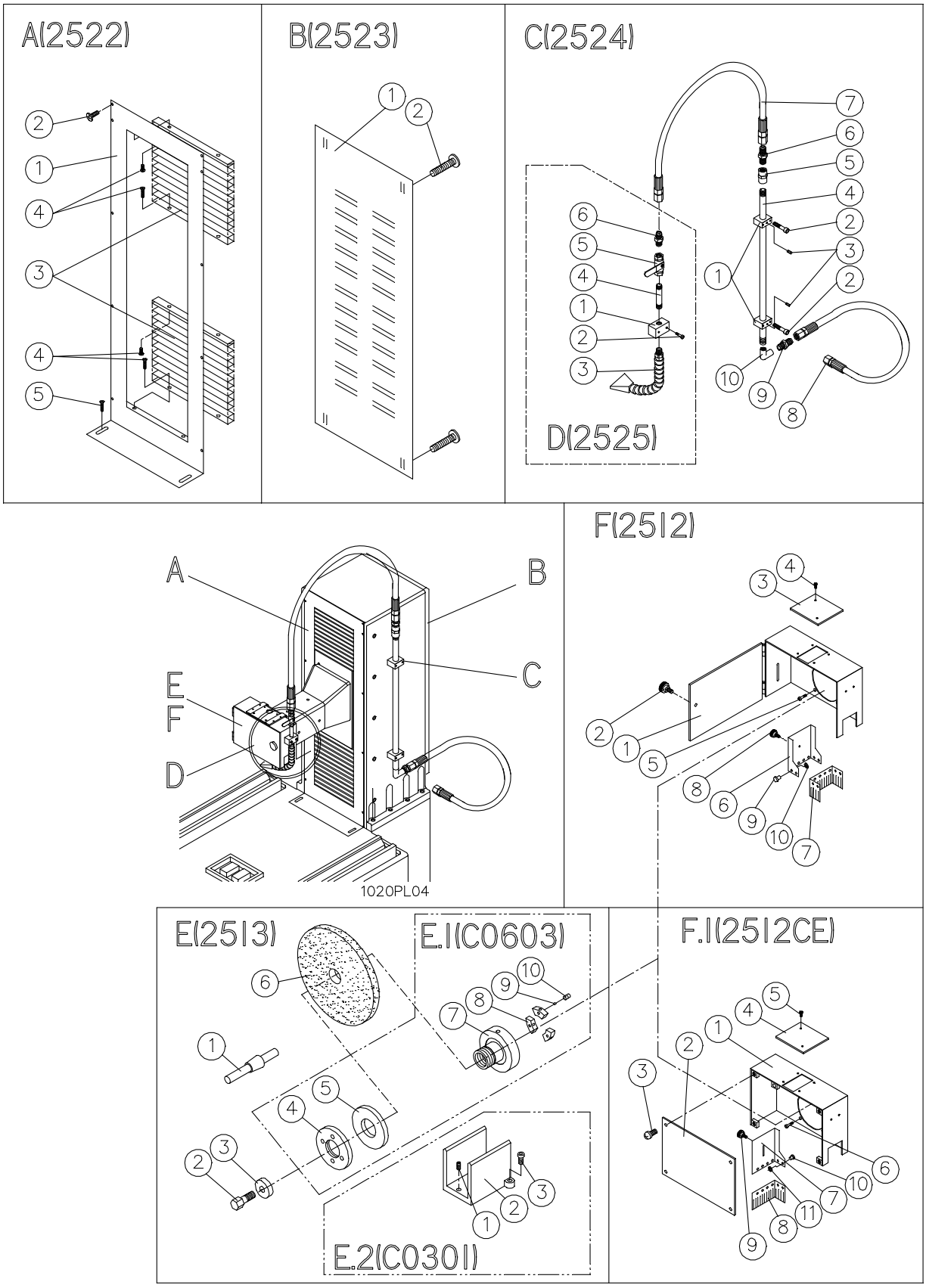
GRINDING WHEEL & COLUMN (1020)



GRINDING WHEEL & COLUMN (1020)

A: COLUMN FRONT DUST FENDER (2522)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2000071005	COLUMN FRONT FENDER	1	(2522)
2.		CROSS HEAD SCREW	10	M6*8L
3.	3480005005	COLUMN FRONT DUST SHEET	2	
4.		CROSS HEAD SCREW	8	M4*10L
5.		CROSS HEAD SCREW	2	M6*10L

B: COLUMN REAR DUST FENDER (2523/1020)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2000075005	COLUMN REAR SEALED PLATE	1	
2.		CROSS HEAD SCREW	4	M6*10L

C: WATER PIPE (2524)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2000075005	WATER PIPE'S FIXING BLOCK	2	
2.		INNER HEX SCREW	4	M6*55L
3.		INNER HEX HEADLESS SCREW	2	M6*6L
4.	1400004005	WATER PIPE	1	
5.		INSIDE THREAD STRAIGHT CONNECTION	2	1/2PT
6.		HIGH PRESSURE PIPE CONNECTION	1	1/2PT*3/8PH
7.		HIGH PRESSURE PIPE	1	3/8PH*960L
8.		HIGH PRESSURE PIPE	1	1/2PH*1200L
9.		HIGH PRESSURE PIPE CONNECTION	1	1/2PT*1/2PH
10.		INSIDE THREAD 90°CONNECTION	1	1/2PT

D. COOLANT NOZZLE SET (2525)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1830004005	WATER NOZZLE SEAT	1	
2.		INNER HEX SCREW	2	M6*12L
3.		WATER NOZZLE	1	1/2PT
4.		WATER PIPE	1	1/2PT*2"L
5.		BALL VALVE	1	1/2PT
6.		HIGH PRESSURE PIPE CONNECTION	1	1/2PT*3/8PH

E. WHEEL ASSEMBLY (2513)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1080005005	BALANCING ARBOR	1	
2.	2620006005	NUT	1	
3.	2410032005	WASHER	1	
4.		GRINDING WHEEL	1	ϕ 203* ϕ 31.75*19MM
5.	3950002015	WHEEL SETTING NUT	1	

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
6.	3930010005	WASHER	1	
7.	3920016005	WHEEL HUB	1	
8.	3960001005	BALANCE BLOCK	3	
9.		STEEL BALL	3	ϕ4
10.		SET SCREW	3	M5*5L

E.2 BALANCING STAND (C0301)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		SET SCREW	1	M8*16L
2.	1000001005	BALANCING STAND	1	
3.		HEX SOCKET SCREW	2	M8*25L

F. WHEEL GUARD (2512)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3900006015	GRINDING WHEEL GUARD	1	
2.	2620007015	GRINDING WHEEL GUARD BOLT	1	
3.	2000067005	GUARD PLATE	1	
4.		CROSS HEAD SCREW	2	M6*10L
5.		INNER HEX SCREW	4	M8*20L
6.	2350003005	MOVABLE GUARD SHEET	1	
7.	3850002005	DUST RUBBER PIECE		1
8.		INNER HEX SCREW	1	M6*14L
9.		ALUMINIUM RIVET	8	ϕ3*5L
10.		WASHER	8	ϕ3

F.1 WHEEL GUARD (2512CE)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3900057005	WHEEL GUARD	1	
2.	3910026005	WHEEL GUARD DOOR	1	
3.		CROSS HEAD SCREW	4	M8*14L
4.	2000067005	GUARD PLATE	1	
5.		HEX HEAD SCREW	4	M6*10L
6.		INNER HEX SCREW	4	M8*20L
7.	2350003005	MOVABLE GUARD SHEET	1	
8.	3850002005	DUST RUBBER PIECE	1	
9.		INNER HEX SCREW	1	M6*14L
10.		ALUMINIUM RIVET	8	ϕ3*5L
11.		WASHER	8	ϕ3

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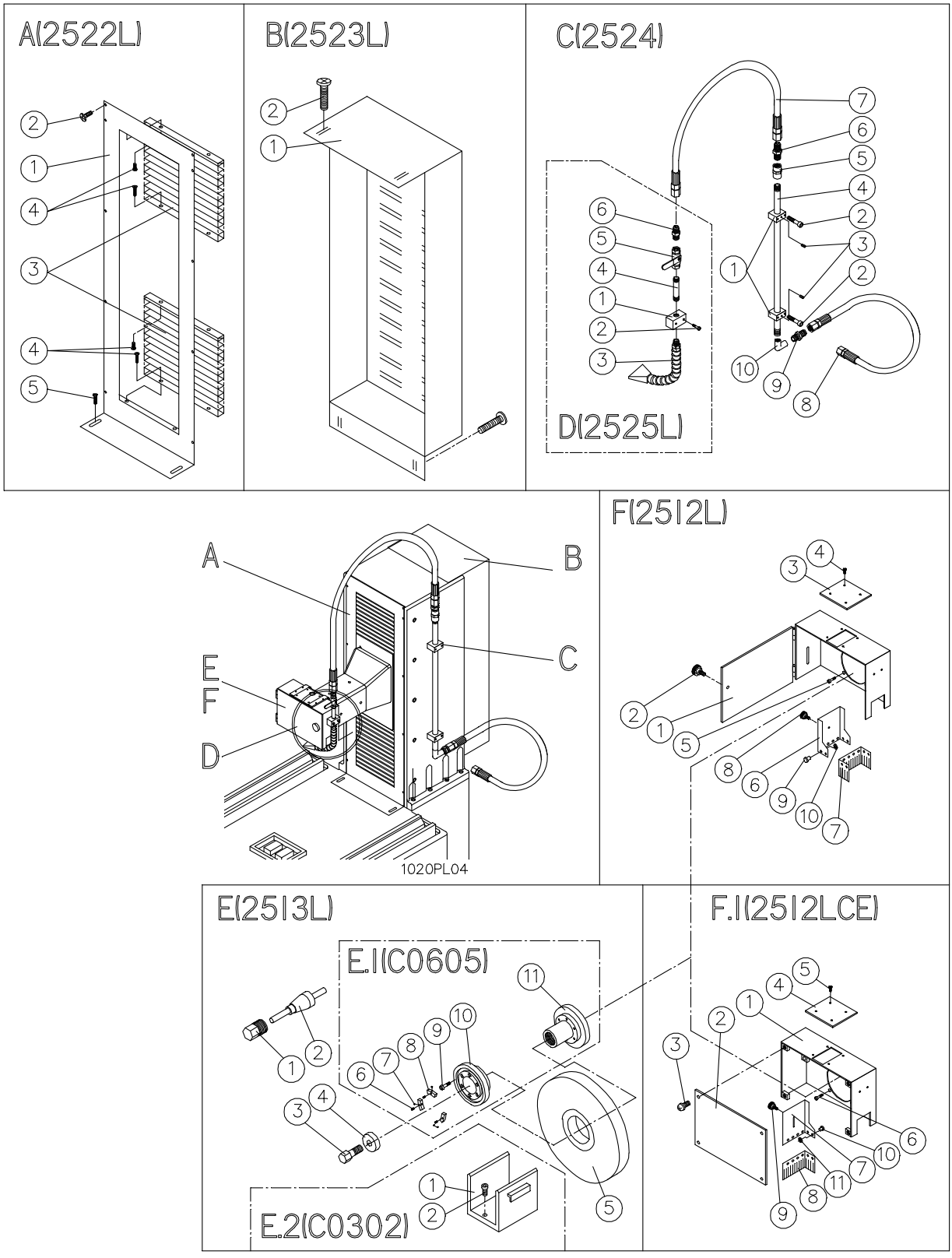
GRINDING WHEEL & COLUMN (1224)



GRINDING WHEEL & COLUMN(1224)

A: COLUMN FRONT DUST FENDER (2522L)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2000072005	COLUMN FRONT FENDER	1	(2522L)
2.		CROSS HEAD SCREW	10	M6*8L
3.	3480005005	COLUMN FRONT DUST SHEET	2	
4.		CROSS HEAD SCREW	8	M4*10L
5.		CROSS HEAD SCREW	2	M6*10L

B: COLUMN REAR DUST FENDER (2523L)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2000074005	COLUMN REAR DUST FENDER (2523L)	1	
2.		CROSS HEAD SCREW 4		M6*10L

C: WATER PIPE (2524)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2420033005	WATER PIPE'S FIXING BLOCK	2	
2.		INNER HEX SCREW	4	M6*55L
3.		INNER HEX HEADLESS SCREW	2	M6*6L
4.	1400004005	WATER PIPE	1	
5.		INSIDE THREAD STRAIGHT CONNECTION	2	1/2PT
6.		HIGH PRESSURE PIPE CONNECTION	1	1/2PT*3/8PH
7.		HIGH PRESSURE PIPE	1	3/8PH*960L
8.		HIGH PRESSURE PIPE	1	1/2PH*1200L
9.		HIGH PRESSURE PIPE CONNECTION	1	1/2PT*1/2PH
10.		INSIDE THREAD 90°CONNECTION	1	1/2PT

D. COLANT NOZZLE SET (2525L)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1830014005	WATER NOZZLE SEAT	1	
2.		INNER HEX SCREW	2	M6*12L
3.		WATER NOZZLE	1	1/2PT
4.		WATER PIPE	1	1/2PT*2"L
5.		BALL VALVE	1	1/2PT
6.		HIGH PRESSURE PIPE CONNECTION	1	1/2PT*3/8PH

E. WHEEL ASSEMBLY (2513L)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3940004005	WHEEL EXTRACTOR	1	
2.	1080007005	BALANCING ARBOR	1	
3.	2620032005	NUT	1	
4.	2410033005	WASHER	1	
5.		12"GRINDING WHEEL	1	ϕ305* ϕ76.2*31.75MM

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
6.		STEEL BALL	3	ϕ 4
7.		SET SCREW	3	M5*5L
8.	3920016005	WHEEL HUB	3	
9.	3960004005	BALANCE BLOCK	3	
10.	3930013005	WASHER	1	
11.	3920006005	WHEEL HUB	1	

E.2 BALANCING STAND (C0302)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1000002005	BALANCING STAND	1	
2.		HEX SOCKET SCREW	3	M8*35L

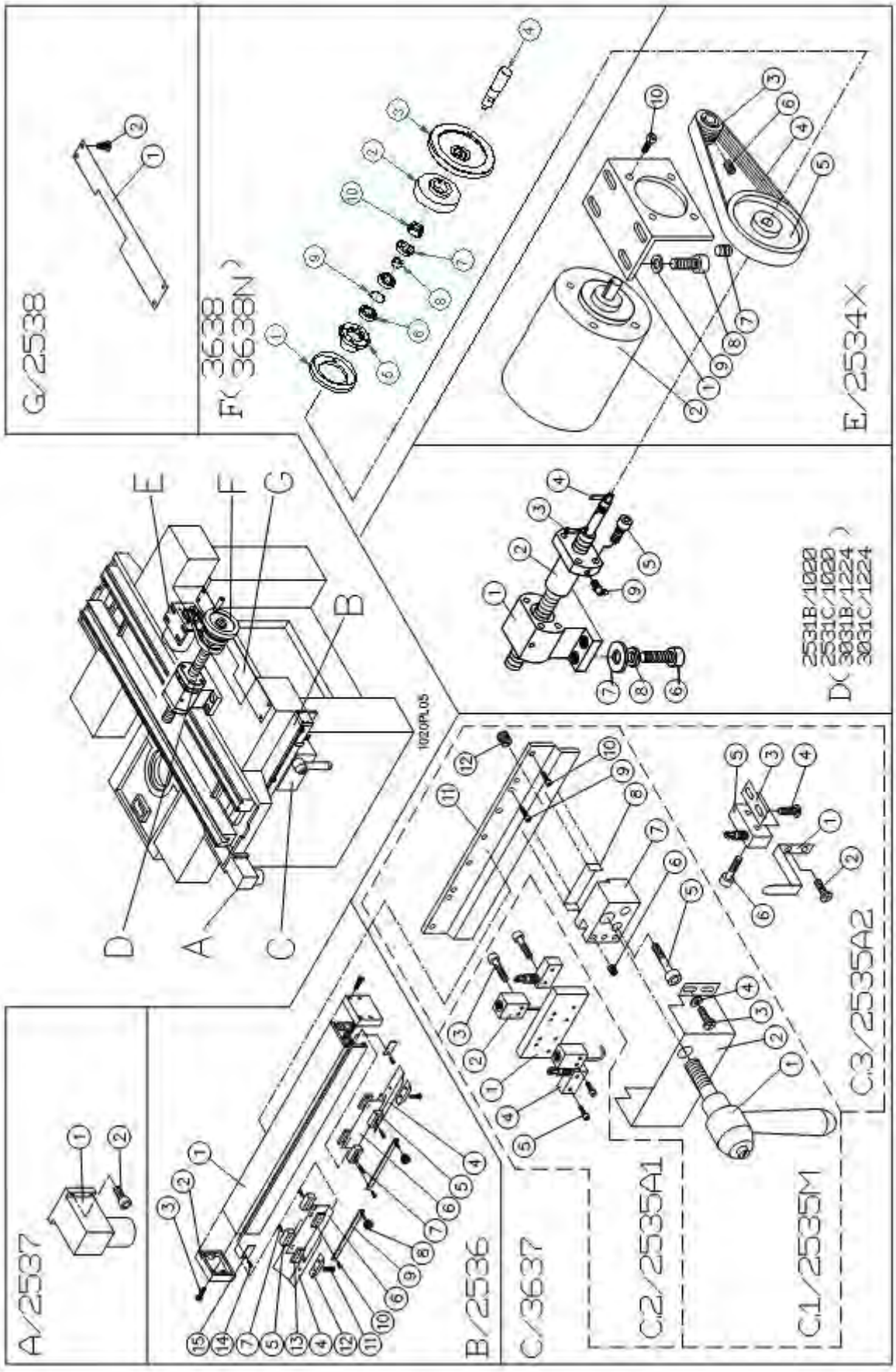
F. WHEEL GUARD (2512L)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3900008015	GRINDING WHEEL GUARD	1	
2.	2620007015	GRINDING WHEEL GUARD BOLT	1	
3.	2000067005	GUARD PLATE	1	
4.		CROSS HEAD SCREW	2	M6*10L
5.		INNER HEX SCREW	4	M8*20L
6.	2350005005	MOVABLE GUARD SHEET	1	
7.	3850004005	DUST RUBBER PIECE	1	
8.		INNER HEX SCREW	1	M6*14L
9.		ALUMINIUM RIVET	8	D3*5L
10.		WASHER	8	D3

F.1 WHEEL GUARD (2512LCE)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1910002005	WHEEL GUARD	1	
2.	2000097005	WHEEL GUARD DOOR	1	
3.		CROSS HEAD SCREW	4	M8*14L
4.	2000067005	GUARD PLATE	1	
5.		HEX HEAD SCREW	4	M6*10L
6.		INNER HEX SCREW	4	M8*20L
7.	2350004005	MOVABLE GUARD SHEET	1	
8.	3850002005	DUST RUBBER PIECE	1	
9.		INNER HEX SCREW	1	M6*14L
10.		ALUMINIUM RIVET	8	D3*5L
11.		WASHER	8	D3

SADDLE CROSSWISE DRIVE



SADDLE CROSSWISE DRIVE

A: COOLANT DRAINER (2537)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2450003005	COOLANT DRAINER	1	
2.		HEX SCREW	4	M6*16L

B. CROSSWISE SENSOR-DETECTED RAIL (2536)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2260010005	SENSOR-DETECTED RAIL	1	
2.	3870003005	SIDE COVER OF SENSOR-DETECTED RAIL	2	
3.		CROSS HEAD SCREW	8	M4*16L
4.	1740002005	INDUCTION LIMIT PLATE	2	
5.	2430003005	LOCKING BLOCK OF SENSOR-DETECTED SHEET	4	
6.	2000033005	CROSSWISE SENSOR-DETECTED SHEET	2	
7.		SOCK HEAD CAP SCREW	8	M4*14L
8.	2490033015	CLAMPING BLOCK OF SENSOR-DETECTED SHEET	2	
9.	2890017005	CROSSWISE SENSOR-DETECTED ADJUSTING BLOCK	1	
10.		CROSS HEAD SCREW	4	M4*20L
11.		CROSS HEAD SCREW	4	M4*6L
12.	2490010005	CROSSWISE LIMIT SETTING PLATE	2	
13.	2430002005	CLAMPING BLOCK OF SENSOR-DETECTED SHEET	4	
14.		CROSS HEAD SCREW	2	M4*6L
15.	2890004005	POSITIONING LIMITED PLATE	2	

C: CROSSWISE SAFETY SWITCH (3637)

C.1: CROSSWISE LOCKING DEVICE (2535M)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2620035005	CROSS LOCKING HANDLE	1	
2.	1910091015	CROSSWISE INDUCTION SWITCH PROTECTION COVER	1	
3.		CROSS HEAD SCREW	4	M5*8L
4.		WASHER	4	D5
5.		INNER HEX SCREW	2	M8*65L
6.		HEADLESS SCREW	3	M6*8L
7.	2430009005	CROSS LOCKING SOCKET	1	
8.	0640045005	CROSS LOCK CLAMPING PLATE	1	
9.		INNER HEX SCREW	2	M6*16L
10.		INNER HEX SCREW	7	M4*10L
11.	2430005015	CROSS LOCKING PLATE	1	
12.	2620016005	FRICTION SCREW	1	M12*15L

C.2: CROSSWISE PROXIMITY SWITCH (2535A1)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1720004025	CROSS PROXIMITY SWITCH SOCKET	1	PNP 5MM PL-Q5P
2.		PROXIMITY SWITCH	2	17*17*28

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
3.		CROSS HEAD SCREW	4	M3*25L
4.		LIMIT SWITCH	2	Z-15GQ22-B
5.		SOCK HEAD CAP SCREW	4	M4*25L

C.3: CROSSWISE SAFETY SWITCH (2535A2)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	0890035005	CROSS TRAVEL INDICATOR	1	
2.		SOCK HEAD CAP SCREW	2	M5*10L
3.	2420038005	SAFETY SWITCH FIXED PLATE	1	
4.		SOCK HEAD CAP SCREW	2	M5*10L
5.		LIMIT SWITCH	1	Z-15GQ22-B
6.		SOCK HEAD CAP SCREW	2	M4*25L

D: CROSSWISE SCREW SET (2531B,2531C/1020)(3031B,3031C/1224)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	0030003005	NUT SEAT	1	
2.	1120018005	CROSSWISE BALL SCREW	1	MM(2531C)
	1120019005	CROSSWISE BALL SCREW	1	INCH(2531B)
	1120025005	CROSSWISE BALL SCREW	1	MM(3031C)
	1120026005	CROSSWISE BALL SCREW	1	INCH(3031B)
3.		SETTING KEY	1	6*6*20L
4.		SETTING KEY	1	3*3*12L
5.		SOCKET SCREW	4	M6*16L
6.		SOCKET SCREW	4	M12*35L
7.		WASHER	4	D12
8.		SPRING WASHER	4	D12
9.		OIL NOZZLE	1	T13-8*1.0

E: CROSSWISE MOTOR SET (2534X)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1700034005	MOTOR FIXING PLATE	1	
2.		CROSS MOVEMENT MOTOR	1	
3.	1210035005	MOTOR PULLEY	1	
4.	F02AA55353	TIMING BELT-G	1	240J-8*20mm
5.	1210169015	PULLEY	1	
6.		SET SCREW	2	M5*6L
7.		SET SCREW	2	M6*10L
8.		HEX HEAD SCREW	4	M8*16L
9.		WASHER	4	D8
10.		HEX HEAD SCREW	4	M8*12L

F: CROSSWISE SCALE RING & HAND WHEEL (3638,3638N)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1890013005	SCALE INDICATING PLATE	1	
2.	0890031015	FEEDING SCALE RING(MM)	1	3638
	0890032015	FEEDING SCALE RING(IN)	1	3638N
3.	1260010005	CROSSWISE HAND WHEEL	1	
4.	4210004005	FOLDING HANDLE	1	
5.	0010010005	BEARING SEAT	1	
6.	B1100A7004	BEARING PUSHER	2	7004A
7.	2640008005	BEARING LOCKING NUT	1	
8.	1430026005	REAR BEARING IN SCREW	1	
9.	1440027005	BEARING SPACER	1	
10.		LOCKED NUT	1	M20x1.0P

G: CROSSWISE PROTECTION SET (2538)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1910034005	PROTECTION PLATE	1	
2.		CROSS HEAD SCREW	4	M5*8L

TABLE LONGITUDINAL DRIVE (1020)

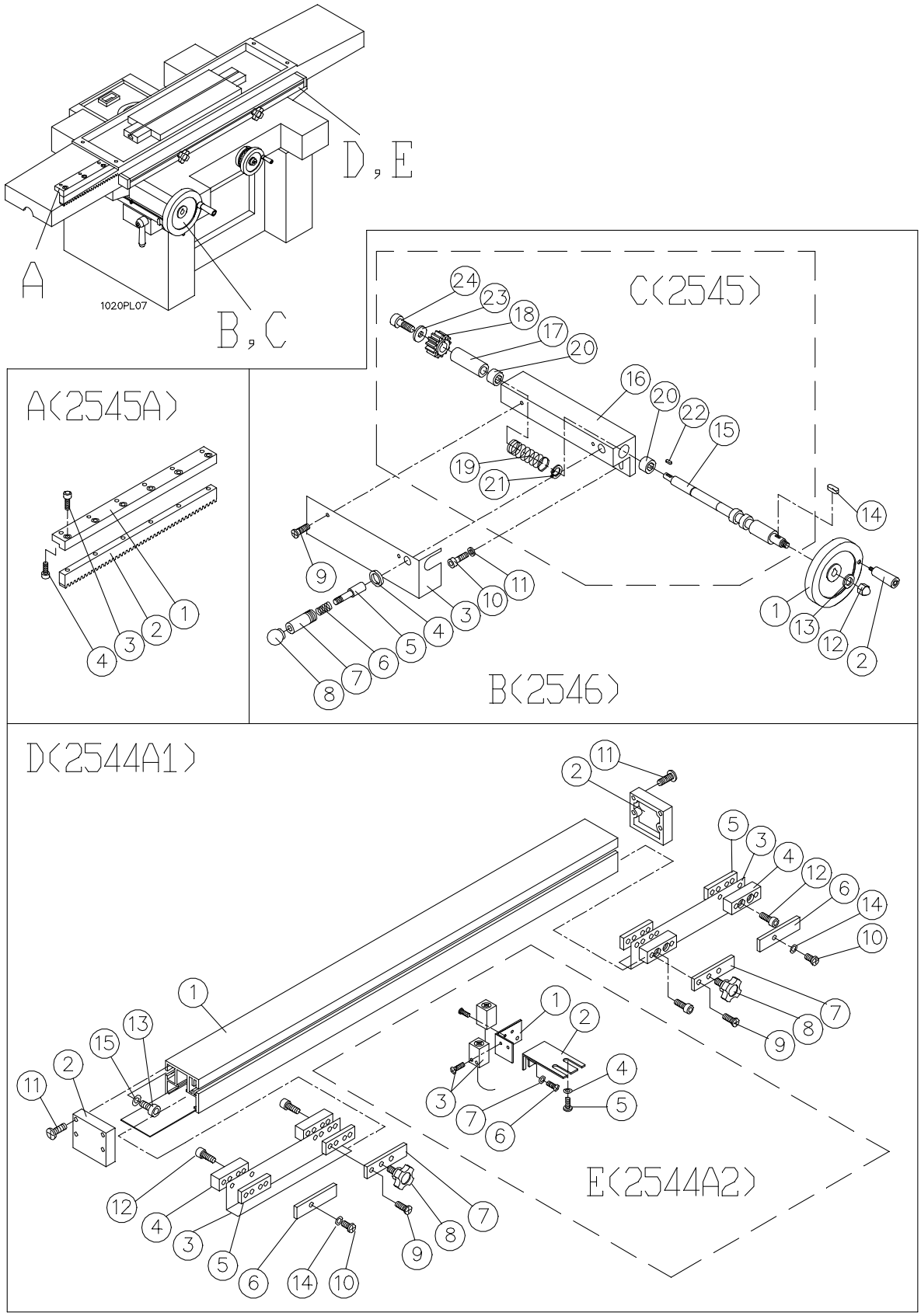


TABLE LONGITUDINAL DRIVE (1020)

A: LONGITUDINAL RACK SET (2545A)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1830018005	LONGITUDINAL RACK SEAT	1	
2.	1150002005	LONGITUDINAL RACK	1	
3.		SOCK HEAD CAP SCREW	6	M6*25L
4.		SOCK HEAD CAP SCREW	6	M6*20L

B: LONGITUDINAL HAND WHEEL SET (2546)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1260013005	HAND WHEEL	1	
2.	4210007005	HANDLE	1	
3.	1910037005	DRIVING SHAFT PROTECTION COVER	1	
4.		SEAL RING	1	ϕ12*ϕ15*3L
5.	2610005005	MOVABLE PIN	1	
6.	2700003005	COMPRESSION SPRING	1	
7.	2490003005	LOCATING SEAT	1	
8.	3870002005	PLASTIC BLACK BALL	1	
9.		CROSS HEAD SCREW	2	M6*8L
10.		INNER HEX SCREW	2	M8*20L
11.		WASHER	2	ϕ8
12.		CUP NUT	1	M12
13.		WASHER	1	ϕ12
14.		SETTING KEY	1	5*5*14L

C: LONGITUDINAL TRANSMISSION SET (2545)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
15.	1030001005	LONGITUDINAL DRIVING SHAFT	1	
16.	0050001005	LONGITUDINAL DRIVING SEAT	1	
17.	2490006005	LONGITUDINAL POSITIONING CASING	1	
18.	1200022005	LONGITUDINAL DRIVING GEAR	1	
19.		COMPRESSION SPRING	1	ϕ1.4*ϕ17.6*115mm
20.		NEEDLE BEARING	2	FJ-1712
21.		WASHER	1	C17
22.		SETTING KEY	1	4*4*12L
23.	2410024005	GEAR FIXING WASHER	1	
24.		SOCK HEAD CAP SCREW	1	M5*14L

D: LONGITUDINAL SENSOR-DETECTED SET(2544A1)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2260024005	LONGITUDINAL INDUCTION RAIL	1	
2.	3870003005	SIDE COVER OF INDUCTION RAIL	2	
3.	2000033005	LONGITUDINAL SENSOR-DETECTED SHEET	2	
4.	2430003005	LOCKING BLOCK OF SENSOR-DETECTED SHEET	4	

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
5.	2430002005	CLAMPING BLOCK OF SENSOR-DETECTED SHEET	4	
6.	2490004005	LONGITUDINAL LIMIT BLOCK	2	
7.	2890004005	LONGITUDINAL SENSOR ADJUSTING BLOCK	2	
8.	2620005005	LOBE KNOB	2	
9.		CROSS HEAD SCREW	4	M4*20L
10.		CROSS HEAD SCREW	2	M4*8L
11.		CROSS HEAD SCREW	8	M4*16L
12.		SOCK HEAD CAP SCREW	8	M5*14L
13.		SOCK HEAD CAP SCREW	2	M6*16L
14.		SOCK HEAD PLATE WASHER	2	ϕ 4
15.		SOCK HEAD PLATE WASHER	2	ϕ 6

E: PROXIMITY SWITCH (2544A2)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1810053005	FIXING PLATE	1	
2.	2890009005	ADJUSTING PLATE	1	
3.		PROXIMITY SWITCH	2	PNP 5mm(17*17*28mm)
4.		WASHER	2	ϕ 5
5.		CROSS HEAD SCREW	2	M5*10L
6.		CROSS HEAD SCREW	2	M4*6L
7.		WASHER	2	ϕ 4

TABLE LONGITUDINAL DRIVE (1224)

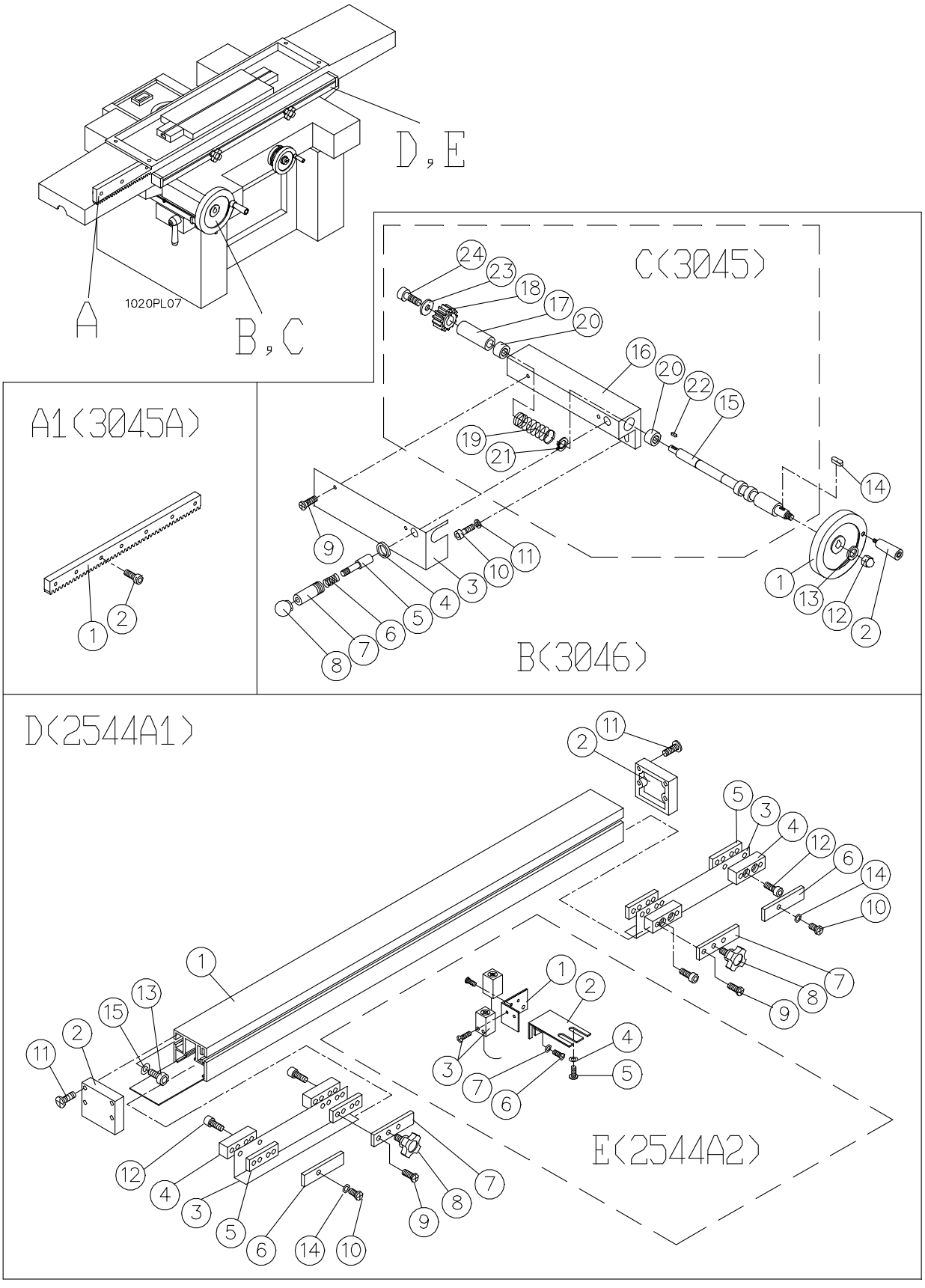


TABLE LONGITUDINAL DRIVE (1224)

A: LONGITUDINAL RACK SET (3045A)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1150004005	LONGITUDINAL RACK	1	
2.		SOCK HEAD CAP SCREW	7	M6*20L

B: LONGITUDINAL HAND WHEEL SET (3046)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1260013005	HAND WHEEL	1	
2.	4210007005	HANDLE	1	
3.	1910048005	DRIVING SHAFT PROTECTION COVER	1	
4.		SEAL RING	1	ϕ12*ϕ15*3L
5.	2610005005	MOVABLE PIN	1	
6.	2700003005	COMPRESSION SPRING	1	
7.	2490003005	LOCATING SEAT	1	
8.	3870002005	PLASTIC BLACK BALL	1	
9.		CROSS HEAD SCREW	2	M6*8L
10.		INNER HEX SCREW	2	M8*20L
11.		WASHER	2	ϕ8
12.		CUP NUT	1	M12
13.		WASHER	1	ϕ12
14.		SETTING KEY	1	5*5*14L

C: LONGITUDINAL TRANSMISSION SET (3045)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
15.	1030052005	LONGITUDINAL DRIVING SHAFT	1	
16.	0050005005	LONGITUDINAL DRIVING SEAT	1	
17.	2490006005	LONGITUDINAL POSITIONING CASING	1	
18.	1200022005	LONGITUDINAL DRIVING GEAR	1	
19.		COMPRESSION SPRING	1	ϕ1.4*ϕ17.6*115mm
20.		NEEDLE BEARING	2	FJ-1712
21.		WASHER	1	C17
22.		SETTING KEY	1	4*4*12L
23.	2410024005	GEAR FIXING WASHER	1	
24.		SOCK HEAD CAP SCREW	1	M5*14L

D: LONGITUDINAL SENSOR-DETECTED SET(2544A1)

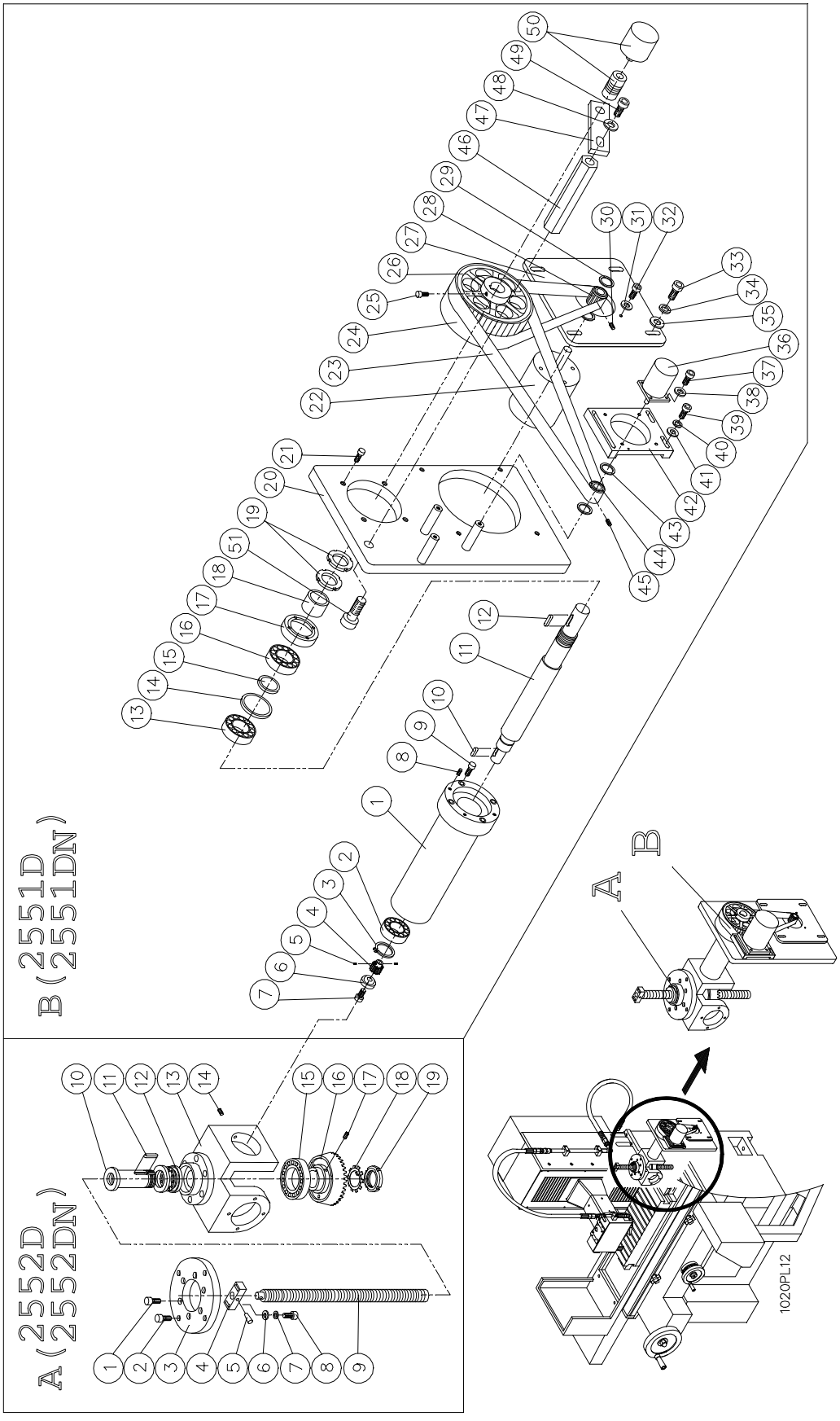
NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2260024005	LONGITUDINAL INDUCTION RAIL	1	
2.	3870003005	SIDE COVER OF INDUCTION RAIL	2	
3.	2000033005	LONGITUDINAL SENSOR-DETECTED SHEET	2	
4.	2430003005	LOCKING BLOCK OF SENSOR-DETECTED SHEET	4	
5.	2430002005	CLAMPING BLOCK OF SENSOR-DETECTED SHEET	4	

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
6.	2490004005	LONGITUDINAL LIMIT BLOCK	2	
7.	2890004005	LONGITUDINAL SENSOR ADJUSTING BLOCK	2	
8.	2620005005	LOBE KNOB	2	
9.		CROSS HEAD SCREW	4	M4*20L
10.		CROSS HEAD SCREW	2	M4*8L
11.		CROSS HEAD SCREW	8	M4*16L
12.		SOCK HEAD CAP SCREW	8	M5*14L
13.		SOCK HEAD CAP SCREW	2	M6*16L
14.		SOCK HEAD PLATE WASHER	2	ϕ 4
15.		SOCK HEAD PLATE WASHER	2	ϕ 6

E: PROXIMITY SWITCH (2544A2)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1810053005	FIXING PLATE	1	
2.	2890009005	ADJUSTING PLATE	1	
3.		PROXIMITY SWITCH	2	PNP 5mm(17*17*28mm)
4.		WASHER	2	ϕ 5
5.		CROSS HEAD SCREW	2	M5*10L
6.		CROSS HEAD SCREW	2	M4*6L
7.		WASHER	2	ϕ 4

VERTICAL FEED



VERTICAL FEED

A: VERTICAL LEADSCREW ASSEMBLY (2552D&2552DN)

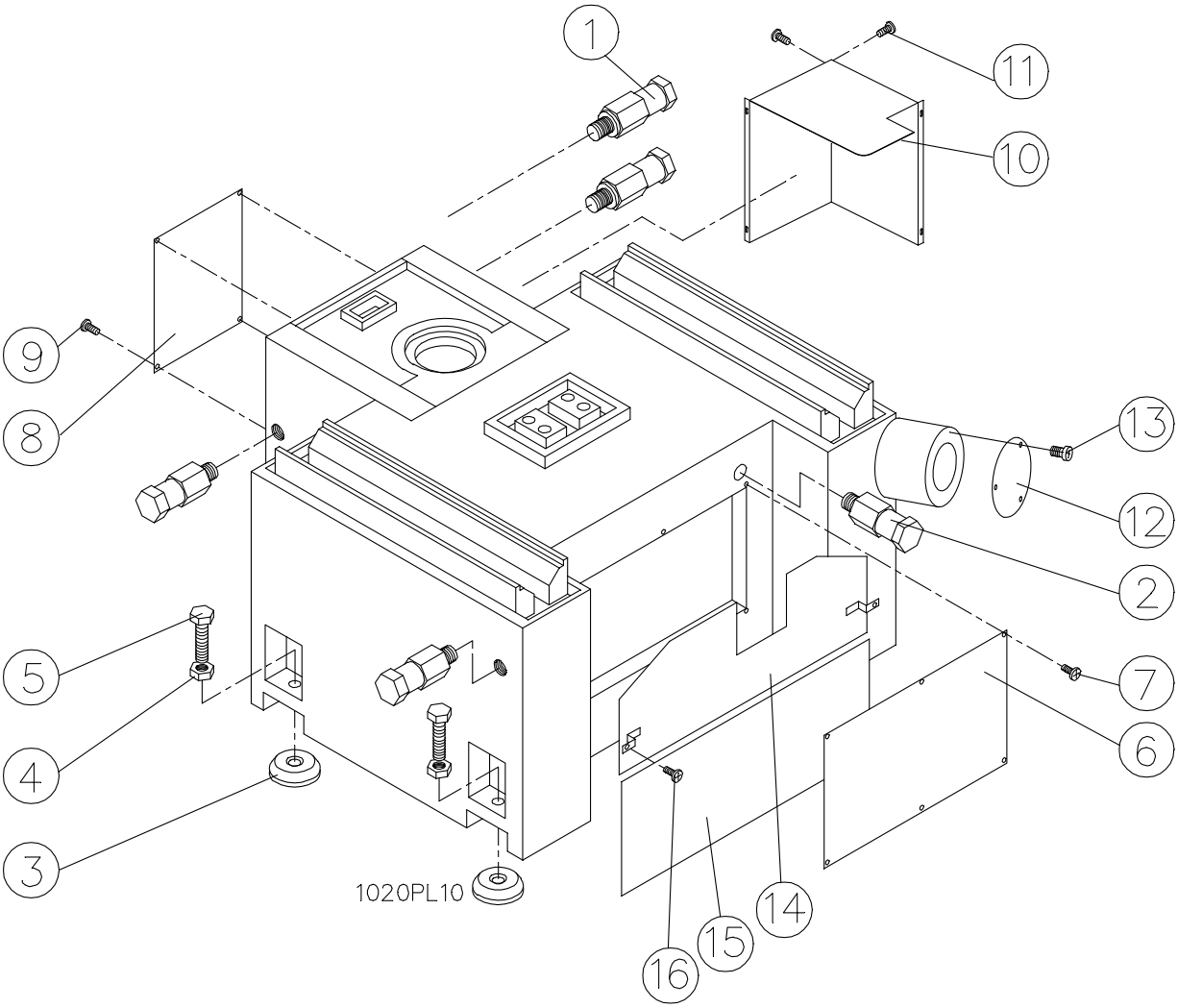
NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		HEADLESS SCREW	6	M10x25L
2.		HEADLESS SCREW	4	M6x25L
3.	2420027005	FIXING PLATE OF ELEVATING NUT	1	
4.	1830033005	FIXING SEAT OF SCREW SLEEVE	1	
5.		TAPER PIN	1	#4*30L
6.		WASHER	2	ϕ8
7.		SPRING WASHER	2	ϕ8
8.		HEADLESS SCREW	2	M8x40L
9.	1130005005	HEIGHTENING ELEVATING SCREW	1	(2552D)
	1130006005	HEIGHTENING ELEVATING SCREW	1	(2552DN)
10.	2630047005	ELEVATING NUT	1	(2552D)
	2630048005	ELEVATING NUT	1	(2552DN)
11.		DOUBLE HEAD FLATE KEY	1	8*7*30mm
12.	0010014005	THRUST BEARING	1	51109
13.	1800065005	FIXING SEAT OF ELEVATING GEAR	1	
14.		CROSS HEAD SCREW	1	
15.		BEARING	1	6012
16.	1200032005	RIGHT SPIRAL BIG GEAR	1	(2552D)
	1200033005	RIGHT SPIRAL BIG GEAR	1	(2552DN)
17.		HEADLESS SCREW	1	M6*10L
18.		OUTER RING	1	
19.	2630049005	LOCKING NUT	1	

B: VERTICAL TRANSMITTING ASSEMBLY (2551D&2551DN)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1430033005	SUB SHAFT SLEEVE	1	
2.		BEARING	1	6205ZZ
3.		OUTER RING	1	C25
4.	1200034005	LEFT SPIRAL PINION	1	(2551D)
	1200035005	LEFT SPIRAL PINION	1	(2551DN)
5.		HEADLESS SCREW	1	M6*20L
6.	2410049005	WASHER	1	
7.		SOCK HEAD CAP SCREW	2	M8*22L
8.		HEADLESS SCREW	1	M6*20L
9.		SOCK HEAD CAP SCREW	1	M6*35L
10.		DOUBLE HEAD FLATE KEY	1	6*3.5*20L
11.	1030029005	DRIVING SHAFT	1	
12.		DOUBLE HEAD FLATE KEY	1	8*4*20L
13.		BEARING	1	6006ZZ
14.	1440002005	BEARING WASHER	1	
15.	1440001005	BEARING WASHER	1	
NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.

16.		BEARING	1	6006ZZ
17.	2630001005	NUT	1	
18.	1430035005	BEARING NUTS	1	
19.		NUT	2	AN04
20.	1700007005	MOTOR FIXING PLATE	1	
21.		SOCK HEAD CAP SCREW	1	M6*12L
22.		BEARING		
23.	0010014005	BEARING SEAT		
24.		HEADLESS SCREW		
25.	4300004005	AC MOTOR	1	
26.		PLASTIC STEEL WIRE TOOTH-FORM BELT	1	T5*144T*25mm
27.		PLASTIC STEEL WIRE TOOTH-FORM BELT	1	T5*112T*18mm
28.		SOCK HEAD CAP SCREW	2	
29.	1210028005	DRIVER PULLEY	1	
30.	1700021005	MOTOR FIXED PLATE	1	
31.	1210031015	ELEVATING RAPID DRIVING PULLEY	1	
32.		WASHER	2	
33.		HEADLESS SCREW	2	M5*5L
34.		WASHER	4	ϕ6
35.		SOCK HEAD CAP SCREW	4	M6*16L
36.		SOCK HEAD CAP SCREW	4	M8*25L
37.		SPRING WASHER	4	ϕ8
38.		WASHER	4	ϕ8
39.		SINGLE SHAFT STEPPING MOTOR	1	
40.		SOCK HEAD CAP SCREW	4	M6*16L
41.		WASHER	4	ϕ6
42.		SOCK HEAD CAP SCREW	4	M6*25L
43.		SPRING WASHER	4	ϕ6
44.		WASHER	4	ϕ6
45.	1700013005	MOTOR FIXED PLATE	1	
46.	2490027005	WASHER	2	
47.	1210030005	ELEVATING RAPID DRIVING PULLEY	1	
48.		HEADLESS SCREW	2	M5*5L
49.	1020005005	FIXED PLATE SUPPORT	1	
50.	1810107005	ENCODER FIXED PLATE	1	
51.		WASHER	1	ϕ8
52.		HEX HAND SCREW	1	M8*20L
53.		ENCODER	1	
54.		HEX HAND SCREW	1	M8*35L

LIFTING STRUCTURE



LIFTING STRUCTURE

EYE BOLT SET (2554)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2620009005	HANGING SCREW	4	
2.	2620010005	HANGING SCREW	1	

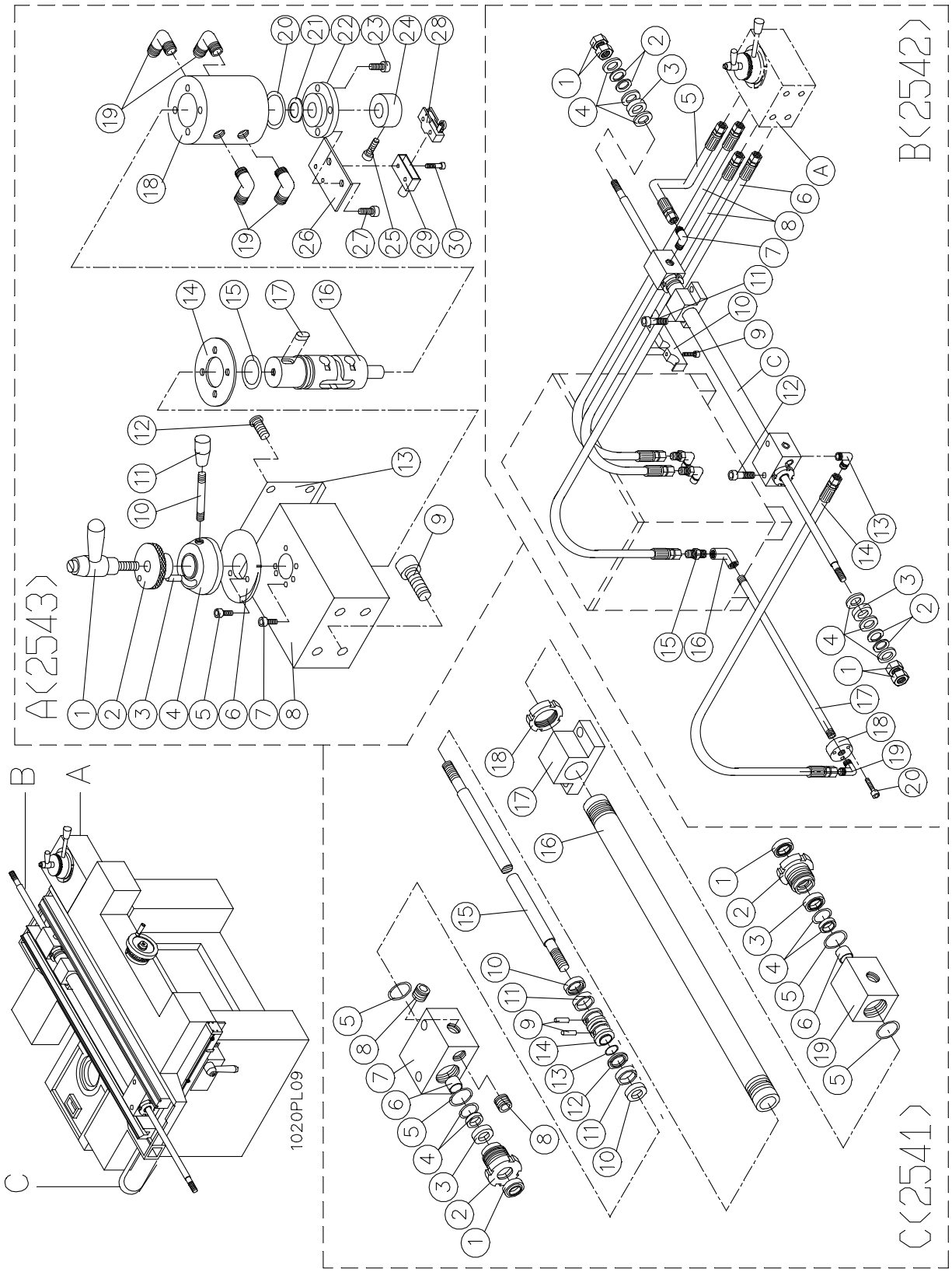
LEVELING SCREW SET (2555)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
3.	2410008005	CROSS HEAD SCREW	5	
4.		HEX NUT	5	M22
5.	2620027005	FLAT-REGULATING SCREW	5	M22*P2.5*105L

BASE ACCESSORY SET (2556B)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
6.	2000079005	BASE FRONT SEALED COVER	1	
7.		SOCKET SCREW	4	M8*10L
8.	2000102005	BASE REAR SEALED SCREW	1	
9.		SOCKET SCREW	4	M6*10L
10.	1910039005	PROTECT COVER	1	
11.		SOCKET SCREW	3	M6*10L
12.	2000147005	COLUMN SIDE PLATE	1	
13.		SOCKET SCREW	3	M5*10L
14.	2400012005	BASE OIL PLATE	1	
15.	2400013005	BASE OIL PLATE	1	
16.		HEADLESS SCREW	2	M6*20L

LONGITUDINAL HYDRAULIC SYSTEM (254C/1020)



LONGITUDINAL HYDRAULIC SYSTEM (254C/1020)

A: LONGITUDINAL THROTTLING VALVE (2543)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		FIXED HANDLE	1	M6
2.	2490007015	FLOW CONTROL KNOB	1	
3.		PIN	1	D8*50L
4.	1720002015	FLOW SWITCH	1	
5.		SOCKET SCREW	2	M6*10L
6.	3080037005	THROTTLING VALVE PANEL	1	
7.		SOCKET SCREW	4	M6*20L
8.	1820005005	THROTTLING VALVE SEAT	1	
9.		SOCKET SCREW	4	M8*20L
10.	4210013015	THROTTLING HANDLE BAR	1	
11.	4210011005	THROTTLING HANDLE HEAD	1	
12.		CROSS HEAD SCREW	4	M5*8L
13.	2000107005	THROTTLING SEAT REAR COVER	1	
14.	2000082005	UPPER COVER PLATE OF THROTTLING SEAT	1	
15.		O-RING	1	P42
16.	2830002005	THROTTLING VALVE SHAFT	1	
17.		DOUBLE HEAD FLAT KEY	1	6*6*10L
18.	2820002005	THROTTLING VALVE BODY	1	
19.		HIGH PRESSURE PIPE 90°CONNECTION	4	1/2PT*1/2PH
20.		O-RING	1	P48
21.		DISC WASHER	1	ϕ 14.3
22.	2020006005	THROTTLING VALVE REAR COVER	1	
23.		SOCKET SCREW	2	M5*15L
24.	2420117005	CROSSWISE SETTING BLOCK	1	
25.		SOCKET SCREW	1	M6*15L
26.	1810058005	SAFETY SWITCH SEAT	1	
27.		SOCKET SCREW	2	M5*15L
28.		SAFETY SWITCH	1	Z15GW2B
29.		LIMIT SWITCH COVER	1	CB-1
30.		SOCKET SCREW	2	M4*25L

B: HYDRAULIC PIPING (2542/1020)

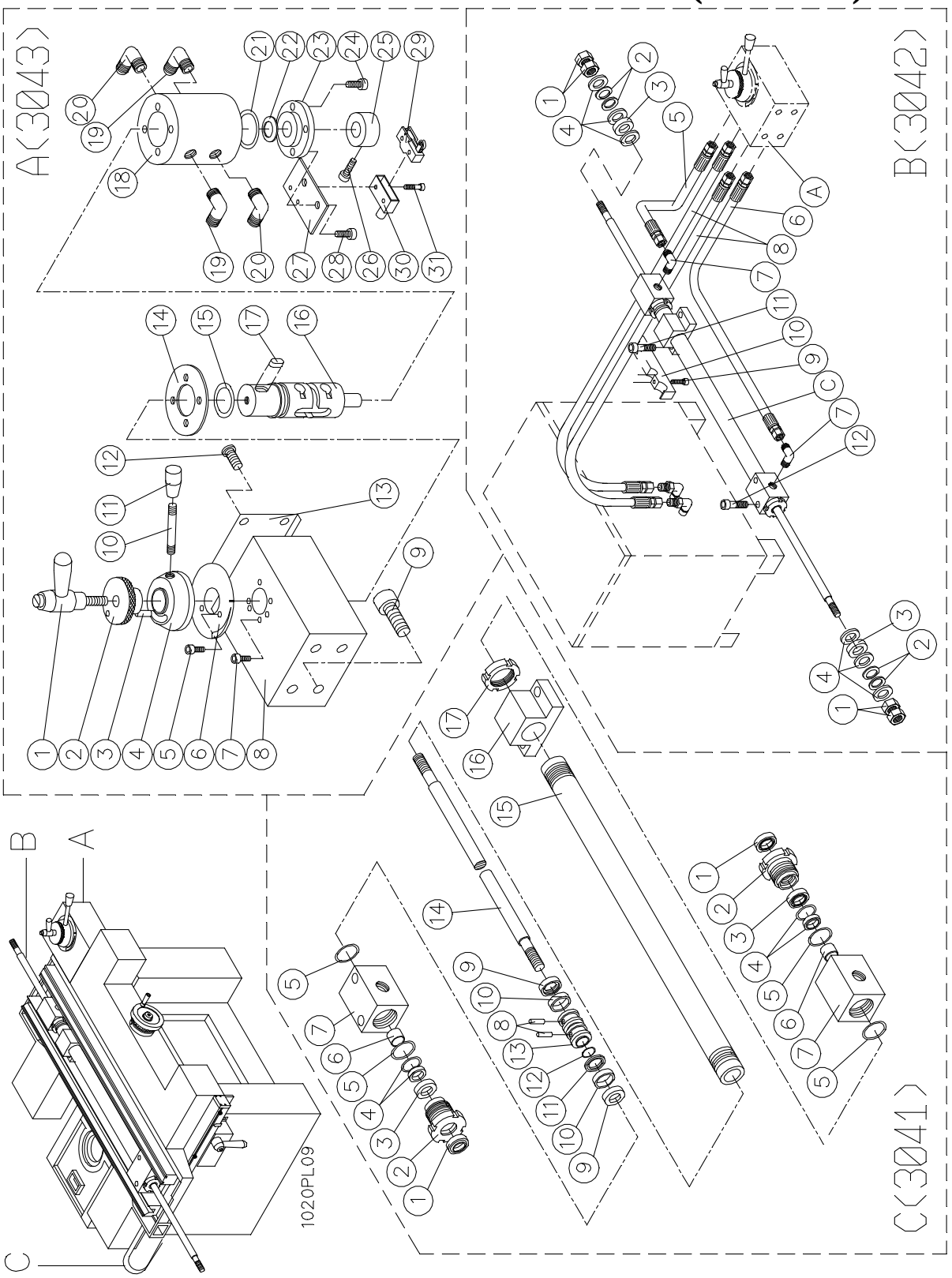
NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		HEX SOCKET NUT	4	M16
2.		DISC WASHER	4	D16*D32*1.5T
3.	2410036005	RECOIL CUSHION	2	
4.	2410034005	WASHER	6	
5.		HIGH PRESSURE PIPE	1	1/2PH*460L
6.		HIGH PRESSURE PIPE	1	1/2PH*1610L
7.		HIGH PRESSURE PIPE 90°CONNECTION	1	3/8PT*1/2PH
8.		HIGH PRESSURE PIPE	2	1/2PH*1610L
9.		SOCKET SCREW	2	M6*30L

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
10.	0640011005	FIXED OIL PIPE SOCKET	1	
11.		SOCKET SCREW	2	M8*35L
12.		SOCKET SCREW	2	M8*65L
13.		HIGH PRESSURE PIPE 90°CONNECTION	1	3/8PT*3/8PH*40L
14.		HIGH PRESSURE PIPE	1	3/8PH*1460L
15.		HIGH PRESSURE PIPE CONNECTION	1	1/2PH*1/2PT
16.		PIPE ELBOW	1	1/2PT*1/2PT
17.		OIL PIPE	1	
18.	2420021005	HIGH PRESSURE PIPE CONNECTION BOARD	1	
19.		HIGH PRESSURE PIPE 90°CONNECTION	1	1/2PT*3/8PH
20.		SOCKET SCREW	3	M6*30L

C: LONGITUDINAL HYDRAULIC CYLINDER SET (2541/1020)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		DUST RING	2	DU18
2.	1830023005	OIL SEAL SEAT	2	
3.		OIL SEAL	2	UHS 18
4.		OIL SEAL	2	GSW 18
5.		O-RING	4	P-38
6.		LUBRICATING BEARING	2	DU18*10L
7.	2910012005	LEFT HYDRAULIC CYLINDER TOP HEAD	1	
8.		HOLE PLUG	2	1/2"PT
9.		TAPER PIN	2	#5*25L
10.		ANTI-COLLISION SLEEVE	2	
11.		ANTI-COLLISION RING	2	WRS-8
12.		OIL SEAL	1	GSP-32
13.		O-RING	1	P18
14.	2920006015	PISTON	1	
15.	2790006005	PISTON ROD	1	
16.	2800005005	HYDRAULIC PIPE	1	
17.	1800021005	FIXING RING OF HYDRAULIC CYLINDER	1	
18.	2630040005	LOCK NUT	1	AN08
19.	2910014005	RIGHT HYDRAULIC CYLINDER TOP HEAD	1	

LONGITUDINAL HYDRAULIC SYSTEM (304C/1224)



LONGITUDINAL HYDRAULIC SYSTEM (304C/1224)

A: LONGITUDINAL THROTTLING VALVE (3043)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		FIXED HANDLE	1	M6
2.	2490007015	FLOW CONTROL KNOB	1	
3.		PIN	1	D8*50L
4.	1720002015	FLOW SWITCH	1	
5.		SOCKET SCREW	2	M6*10L
6.	3080037005	THROTTLING VALVE PANEL	1	
7.		SOCKET SCREW	4	M6*20L
8.	1820005005	THROTTLING VALVE SEAT	1	
9.		SOCKET SCREW	4	M8*20L
10.	4210013015	THROTTLING HANDLE BAR	1	
11.	4210011005	THROTTLING HANDLE HEAD	1	
12.		CROSS HEAD SCREW	4	M5*8L
13.	2000107005	THROTTING SEAT REAR COVER	1	
14.	2000082005	UPPER COVER PLATE OF THROTTLING SEAT	1	
15.		O-RING	1	P42
16.	2830002005	THROTTLING VALVE SHAFT	1	
17.		DOUBLE HEAD FLAT KEY	1	6*6*10L
18.	2820002005	THROTTLING VALVE BODY	1	
19.		HIGH PRESSURE PIPE 90°CONNECTION	4	1/2PT*1/2PH
20.		HIGH PRESSURE PIPE 90°CONNECTION	4	1/2PT*3/4PH
21.		O-RING	1	P48
22.		DISC WASHER	1	D14
23.	2020006005	THROTTLING VALVE REAR COVER	1	
24.		SOCKET SCREW	2	M5*15L
25.	2420117005	CROSSWISE SETTING BLOCK	1	
26.		SOCKET SCREW	1	M6*15L
27.	1810058005	SAFETY SWITCH SEAT	1	
28.		SOCKET SCREW	2	M5*15L
29.		SAFETY SWITCH	1	Z15GW2B
30.		SAFETY SWITCH COVER	1	CB-1
31.		SOCKET SCREW	2	M4*25L

B: HYDRAULIC PIPING (3042)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		HEX SOCKET NUT	4	M16
2.		DISC WASHER	4	D16*D32*1.5T
3.	2410036005	RECOIL CUSHION	2	
4.	2410034005	WASHER	6	
5.		HIGH PRESSURE PIPE	1	1/2PH*460L
6.		HIGH PRESSURE PIPE	2	1/2PH*1610L
7.		HIGH PRESSURE PIPE 90°CONNECTION	2	3/8PT*1/2PH
8.		HIGH PRESSURE PIPE	1	1/2PH*1250L

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
9.		SOCKET SCREW	2	M6*35L
10.	0640011005	HIGH PRESSURE PIPE CONNECTION	1	
11.		SOCKET SCREW	2	M8*35L
12.		CROSS HEAD SCREW	2	M8*65L

C: LONGITUDINAL HYDRAULIC CYLINDER SET (3041/1224)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		DUST RING	2	DU18
2.	1830023005	OIL SEAL SEAT	2	
3.		OIL SEAL	2	UHS 18
4.		OIL SEAL	2	GSW 18
5.		O-RING	4	P-38
6.		LUBRICATING BEARING	2	DU18*10L
7.	2910012005	LEFT HYDRAULIC CYLINDER TOP HEAD	2	
8.		TAPER PIN	2	#5*25L
9.		WEAR RING	2	
10.		OIL SEAL	2	WRS-8
11.		OIL SEAL	1	GSP-32
12.		O-RING	1	P18
13.	2920006015	PISTON	1	
14.	2790009005	PISTON ROD	1	
15.	2800007005	HYDRAULIC CYLINDER TUBE		
16.	1800021005	HYDRAULIC FIXED RING	1	
17.		LOCK NUT	1	AN08

TABLE REVERSING MECHANISM (3661)

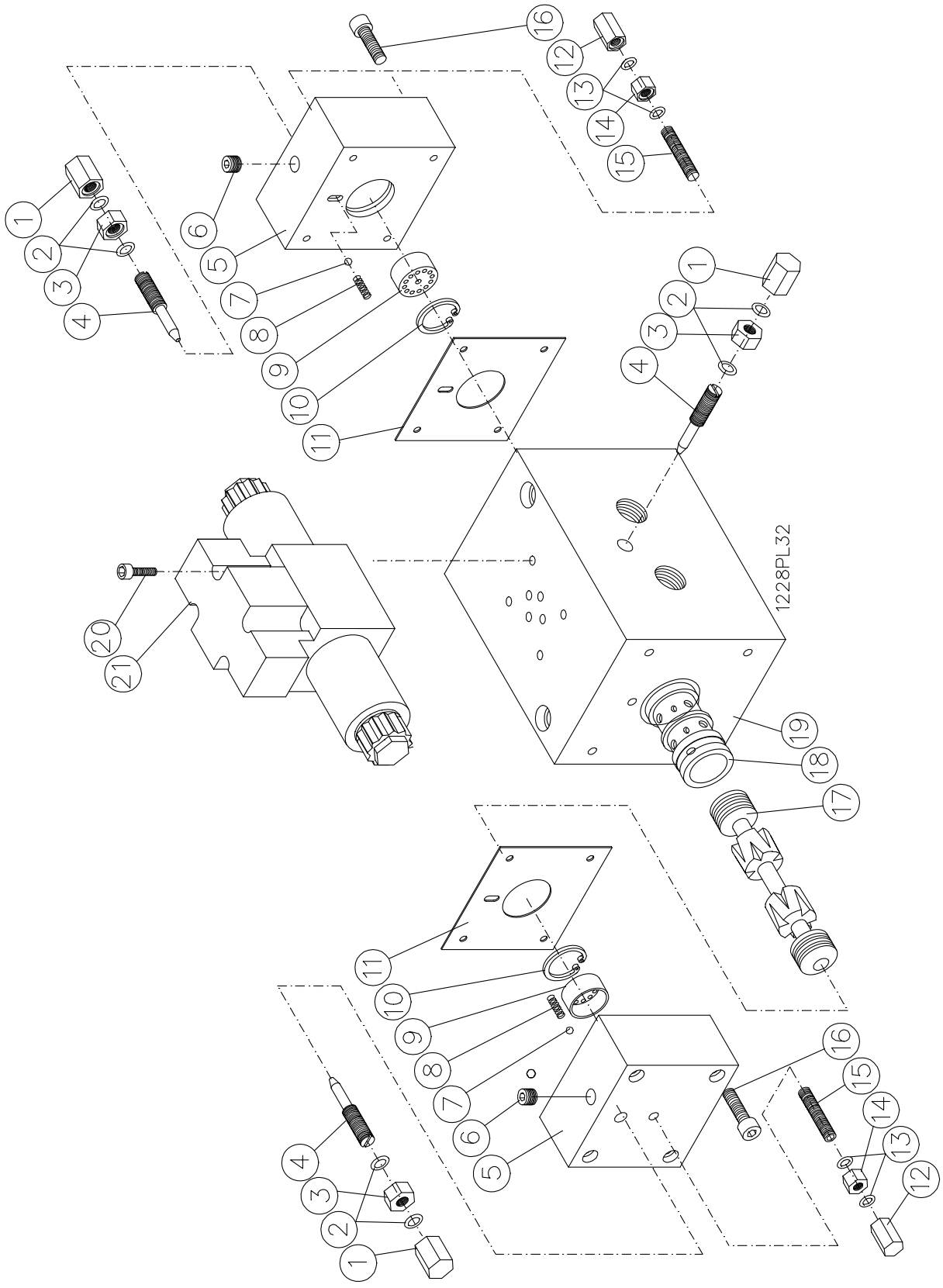
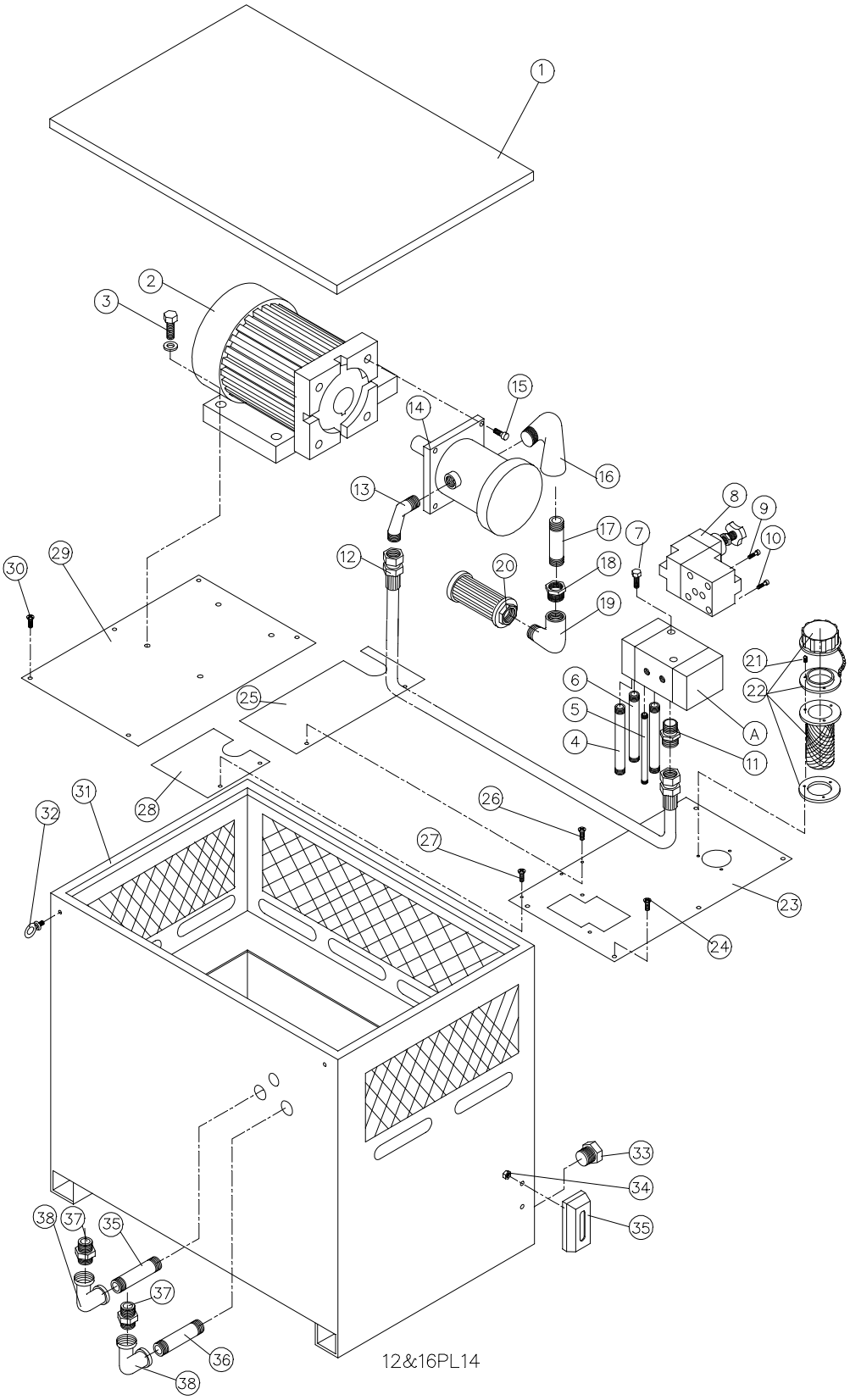


TABLE REVERSING MECHANISM (3661)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2640011005	LEAK-PROOF NUT	3	
2.		O-RING	6	P10
3.	2630013005	FIXING NUT	3	
4.	2830003005	SMALL THROTTING SHAFT	3	
5.	2010004005	SIDE COVER OF REVERSING BODY	2	
6.		HOLE PLUG	2	1/8PT
7.		STEEL BALL	2	ϕ 5
8.	2700008005	SPRING	2	
9.	2890014005	TOP BLOCK OF REVERSING SHAFT	2	
10.		INNER RETAINING RING	2	ϕ 28
11.		ASBESTOS GASKET	1	95*90*1
12.	2640012005	LEAK-PROOF NUT	2	
13		O-RING	4	P8
14.	2630016005	FIXING NUT	2	
15.		HEADLESS SCREW	2	M8*40L
16.		SOCK HEAD CAP SCREW	8	M6*45L
17.	1030067005	REVERSING SHAFT	1	
18.	1430047005	REVERSING SHAFT SLEEVE	1	
19.	2820003005	REVERSING SHAFT BODY	1	
20.		SOCK HEAD CAP SCREW	4	M5*45L
21.		SOLENOID VALVE	1	DV24V

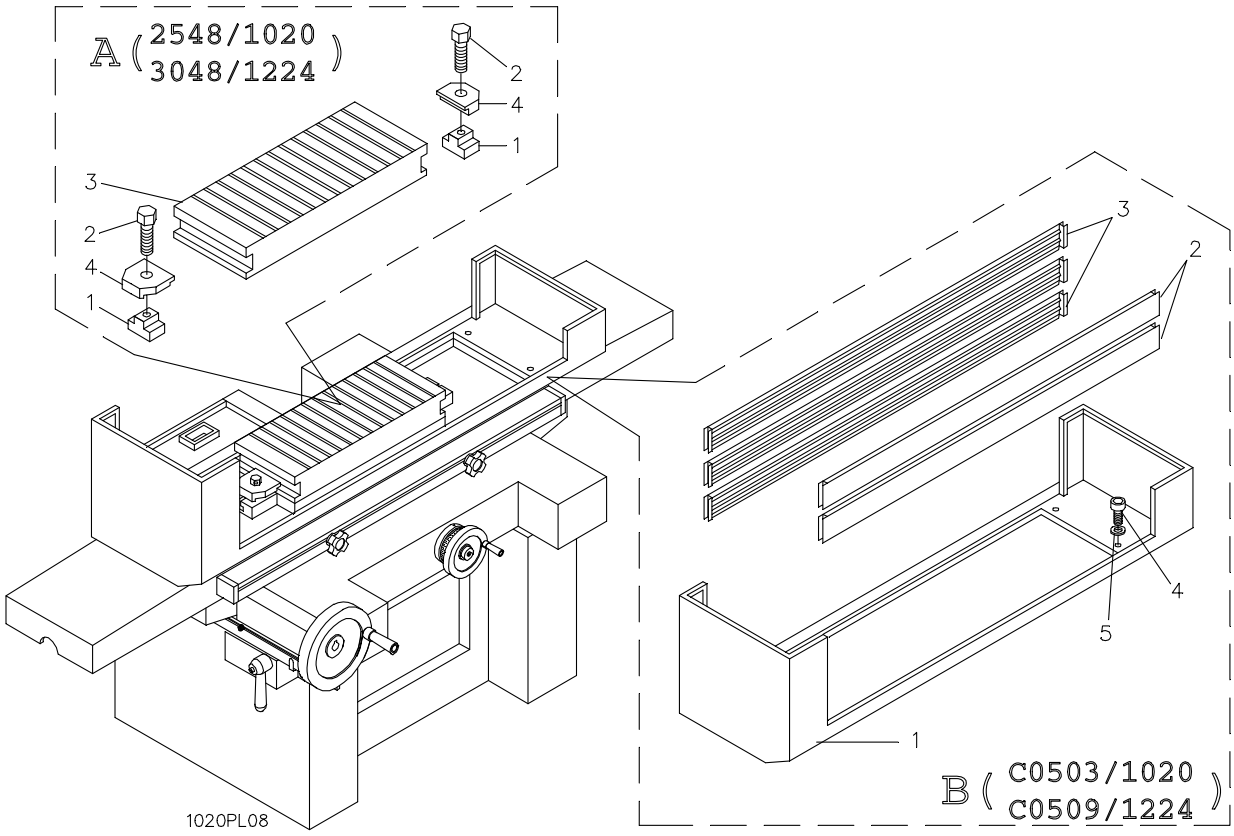
HYDRAULIC TANK SYSTEM (256)



HYDRAULIC TANK SYSTEM (256)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1910068005	UPPER PROTECTION COVER OF OIL TANK	1	
2.		HYDRAULIC MOTOR	1	2HP6P
3.		HEX SOCKET SCREW	4	M10*20L
4.		STRAIGHT CONNECTION PIPE	1	1/2 PT*6"L
5.		STRAIGHT CONNECTION PIPE	1	1/8 PT*6"L
6.		STRAIGHT CONNECTION PIPE	2	3/8 PT*6"L
7.		SOCK HEAD CAP SCREW	2	M8x110L
8		PRESSURE-REGULATING VALVE	1	1/2"
9.		SOCK HEAD CAP SCREW	2	M16*90L
10.		SOCK HEAD CAP SCREW	2	M16x70L
11.		PIPE ELBOW	1	3/4"PTx3/4"PH
12.		HIGH PRESSURE PIPE	1	3/4"*570L
13.		HIGH PRESSURE PIPE CONNECTION	1	3/4"PT*3/4"PH
14.		HYDRAULIC PUMP	1	30CC/
15.		SOCK HEAD CAP SCREW	4	M10*30L
16.		PIPE ELBOW	1	1PT
17.		STRAIGHT CONNECTION PIPE	1	1" PTx5"L
18.		TRANSFER CONNECTION	1	1PTx1.5PT
19.		PIPE ELBOW	1	1.5"PT
20.		OIL FILTER	1	1.5" PT
21.		CROSS HEAD SCREW	3	3/16"W*0.5"L
22.		OIL-FEEDING FILTER	1	50
23.	2420030005	DIRECTIONAL VALVE FIXED PLATE	1	
24.		SOCK HEAD CAP SCREW	4	M6x15L
25.	2000108005	OIL TANK SUB-COER	1	
26.		CROSS HEAD SCREW	2	M6x15L
27.		CROSS HEAD SCREW	2	M6x15L
28.	2000110005	OIL TANK SUB-COVER B	1	
29.	1810069005	FIXING PLATE	1	
30.		CROSS HEAD SCREW	5	M6x15L
31.	3230002015	OIL TANK	1	
32.		HANGING RING	4	5/16"W
33.		HOLE PLUG	2	1/2PT
34.		NUT	2	
35.		OIL LEVER GAME	1	3"
36.		STRAIGHT PIPE CONNECTION	2	1/2"PT*3.5"L
37.		HIGH PRESSURE PIPE CONNECTION	2	1/2"PT*3/4"PH
38.		PIPE ELBOW	2	1/2"PT

CHUCK & SPLASH GUARD



CHUCK & SPLASH GUARD

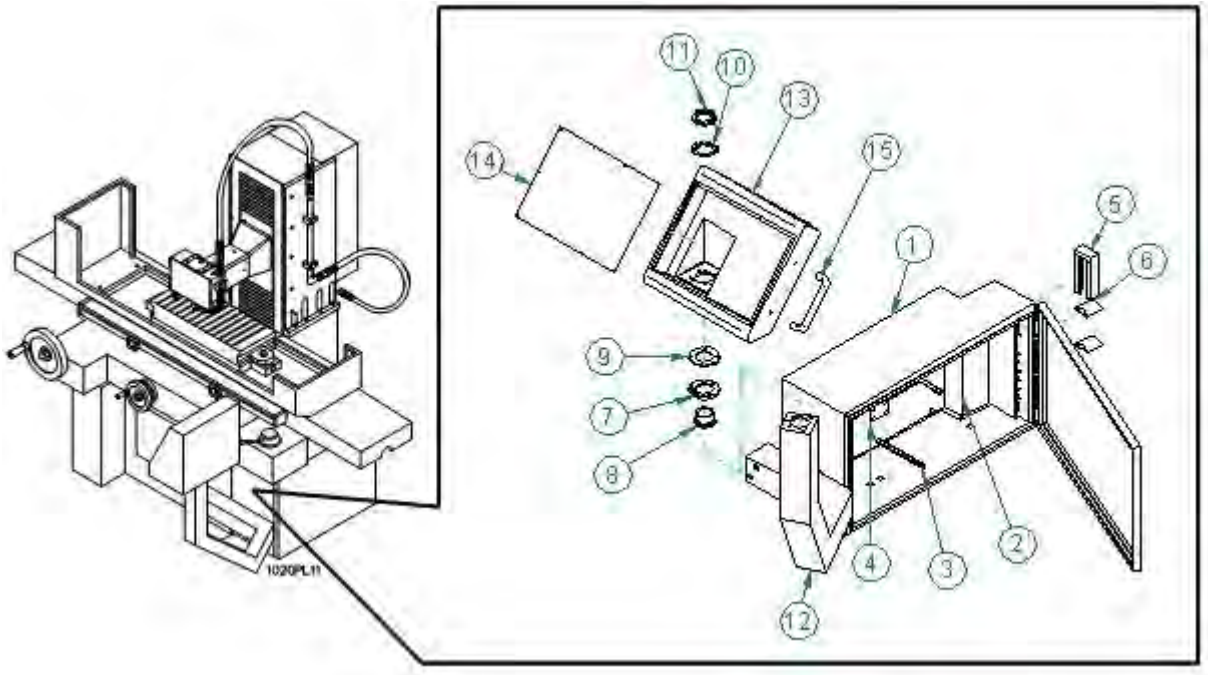
A: CHUCK (2548/1020,3048/1224) OPTIONAL

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2630046005	T-NUT	2	
2.		HEXAGON HEAD SCREW	2	M12*55L
3.		CHUCK(250*500MM)	1	2548
3.		CHUCK(300*600MM)	1	3048
4.		CHUCK FIXING BLOCK	2	

B: SPLASH GUARD (C0503/1020,C0509/1224) OPTIONAL

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3520104005	SPLASH GUARD	1	C0503
1.	3520016005	SPLASH GUARD	1	C0509
2.	2350006005	FRONT WATER-PROOF MOVABLE PLATE	2	C0503
2.	2350011005	FRONT WATER-PROOF MOVABLE PLATE	2	C0509
3.	2350008005	WATER PROOF MOVABLE PLATE	3	C0503
3.	2350013005	WATER PROOF MOVABLE PLATE	3	C0509
4.		SOCK HEAD CAP SCREW	4	M8*20L
5.		WASHER	4	D8

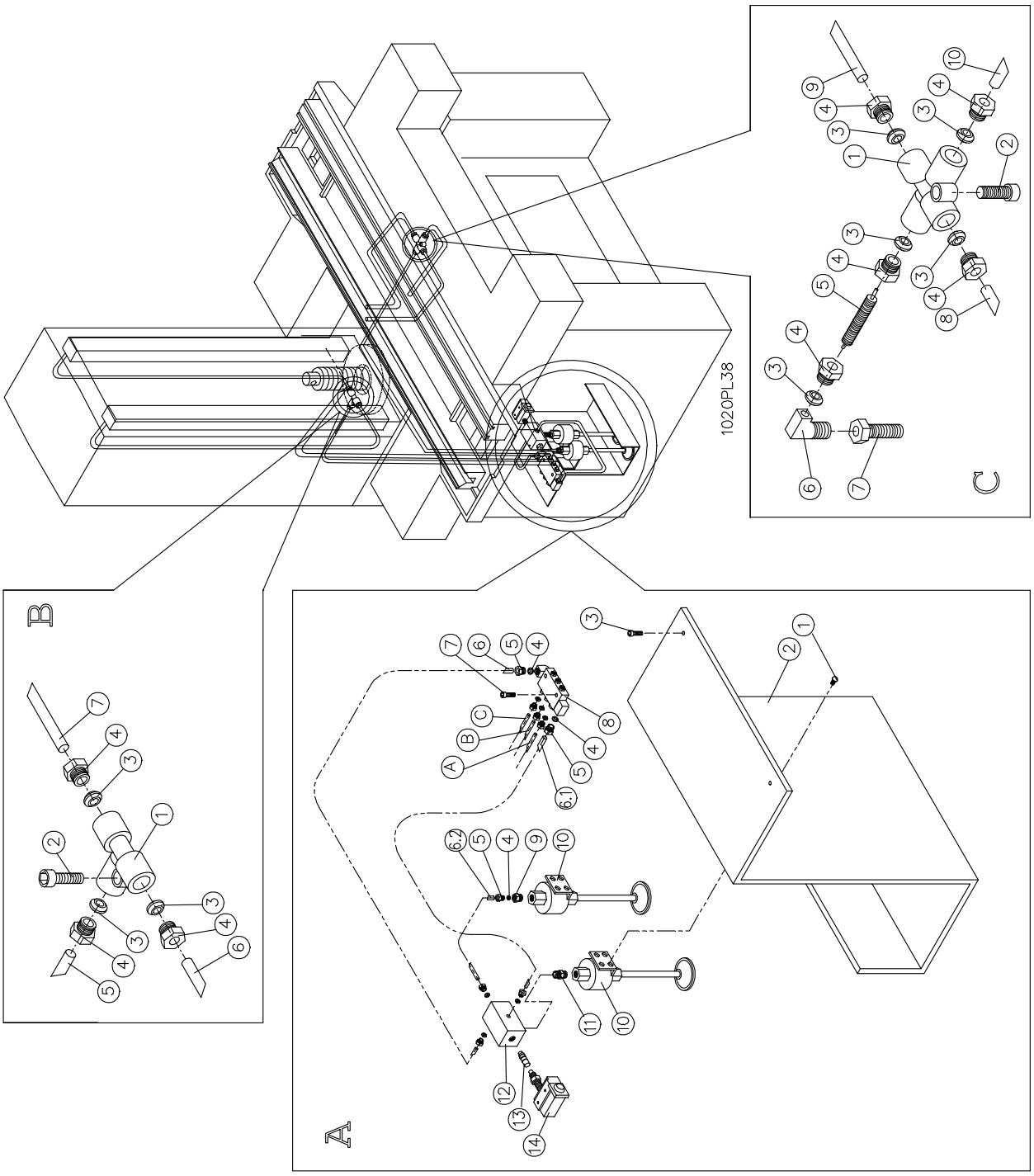
ELECTRICAL AND CONTROL BOX



ELECTRICAL AND CONTROL BOX

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3000012005	ELECTRICAL BOX	1	
2.	3030067005	SPLASH COVER	1	
3.	1440034005	SEPARATION POLE IN ELECTRICAL PLATE	1	
4.	2410060005	CUSHION PAD IN COVER	1	
5.	3520070005	WATER PROOF COVER IN WIRING JUNCTION	1	
6.	3520011005	WATER PROOF COVER IN ELECTRICAL PLATE	1	
7.	0640044005	CROSS AXIS CLAMP	1	
8.	3130011005	CROSS AXIS IN CONTROL BOX	1	
9.	2420035005	FIXED PLATE IN CROSS AXIS	1	
10	A18BA0AW12	LOCKED WASHER	1	AW12
11.	A12000AN12	LOCKED NUT	1	AN12
12.	3090005015	ARM	1	
13.	3050075035	ELECTRICAL BOX	1	
14.		PD CONTROL PANEL	1	
15.	J091UAGS20	HANDLE	1	

LUBRICATION SYSTEM (258)



LUBRICATION SYSTEM (258)

A:

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		SOCK HEAD CAP SCREW	2	M6x10L
2.	1820023005	PUMP FIXED STAND	1	
3.		SOCK HEAD CAP SCREW	2	M6x10L
4.		COMPRESSION SLEEVE	3	PB-6
5.		COMPRESSION BUSHING	3	PA-6
6.		ALUMINIUM TUBING	1	ϕ 6
6.1.		ALUMINIUM TUBING	1	ϕ 6
6.2.		ALUMINIUM TUBING	1	ϕ 6
7.		SOCK HEAD CAP SCREW	2	M4x20L
8.		AB TYPE OIL REGULATING MANIFOLD	1	
9.		STRAIGHT ADAPTER	1	PD601
10.		PUMP	2	
11.		NIPPLES	1	1/8PT
12.	1730001005	SENSOR FIXED SUPPORT	1	
13	2250071005	SENSOR SLIDING STEM	1	
14.		SENSOR	1	TZ-7310
A.		LUBRIATED FOR VERTICAL SLIDEWAY	1	
B.		LUBRIATED FOR VERTICAL SCREW & GEAR	1	
C.		LUBRIATED FOR TABLE & SADDLE SLIDEWAY	1	

B:

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		JUNCTION 3-WAY	1	PKD-4
2.		SOCK HEAD CAP SCREW	1	M5x20L
3.		COMPRESSION SLEEVE	3	PB-4
4.		COMPRESSION BUSHING	3	PA-4
5.		ALUMINIUM TUBING	1	ϕ 4
6.		ALUMINIUM TUBING	1	ϕ 4
7.		ALUMINIUM TUBING	1	ϕ 4

C:

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		JUNCTION 4-WAY	1	PJD-4
2.		SOCK HEAD CAP SCREW	1	M5x20L
3.		COMPRESSION SLEEVE	5	PB-4
4.		COMPRESSION BUSHING	5	PA-4
5.		HOSE ASSEMBLY	1	ϕ 4x400L
6.		ELBOW CONNECTOR 90°	1	PH-202
7.		FIXED JOINT BOLT	1	PM-104-1
8.		ALUMINIUM TUBING	1	ϕ 4

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
9.		ALUMINIUM TUBING	1	ϕ 4
10.		ALUMINIUM TUBING	1	ϕ 4

.EC MACHINERY DIRECTIVE 89/392/EEC

PARTS LIST

PRESERVE THIS MANUAL FOR
FUTURE REFERENCE AND USE

MACHINE NAME: HORIZONTAL SURFACE GRINDING MACHINE

BRAND: ACER

MODEL:1428PD, 1436PD
1632PD, 1640PD

MANUFACTURE: YA-GIN MACHINE TOOL MANUFACTURING INC.

ADDRESS: NO. 101, LANE 506, SEN-TSO RD., SENG-KARNG DISTRICT, TAICHUNG CITY, TAIWAN

TELEPHONE: 886-4-2520-4120

FAX.:886-4-2520-4123

INTERNET: www.aceronline.net
www.acerlinks.com

E-mail: info@aceronline.net
info@acerlinks.com

VERSION: 1
DATE OF ISSUE : May,2011
FILE NO.: 14&16PD

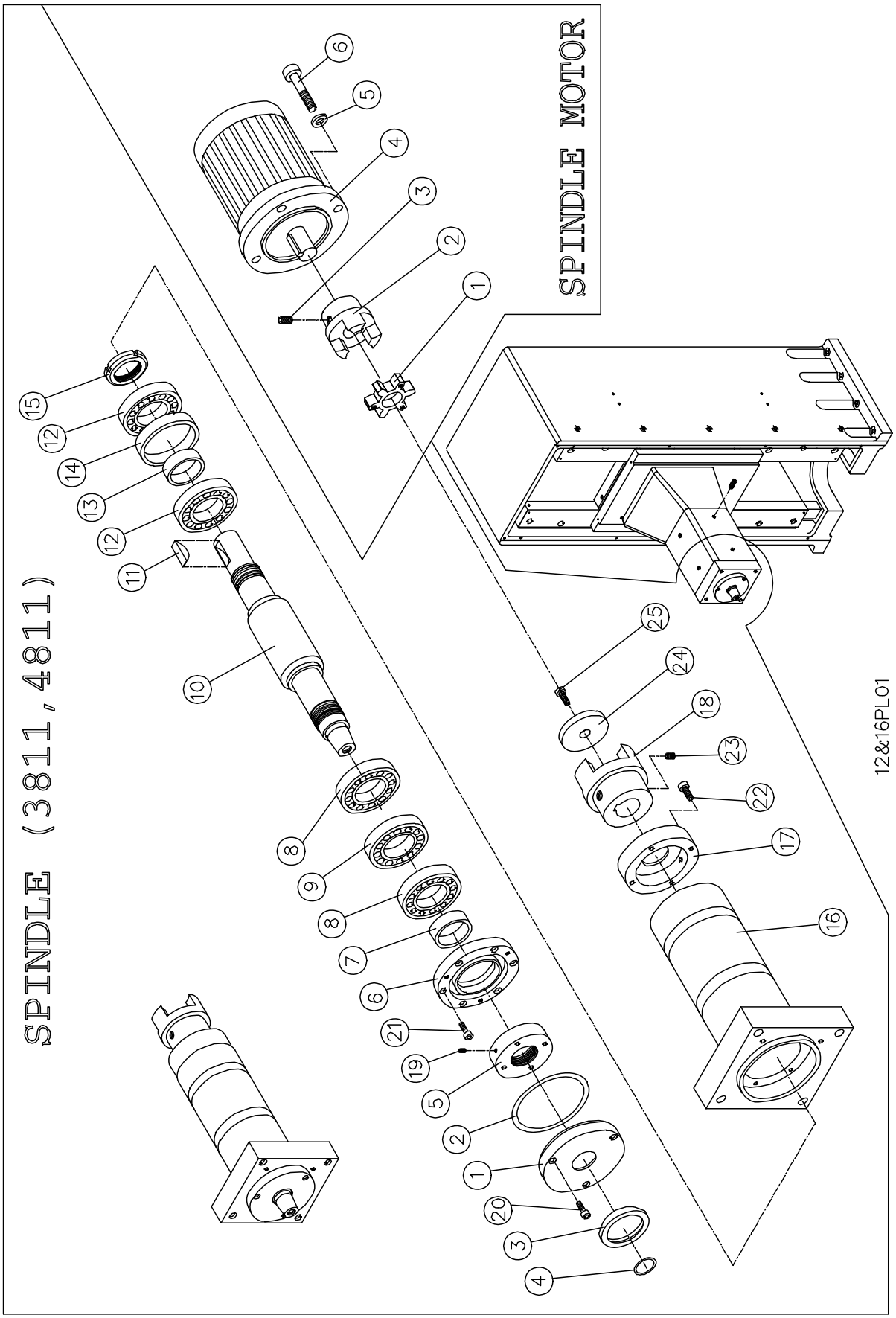
CONTENT

※ Following parts list are for many kinds of models. As there are several different specification of parts depends on different orders,plase check carefully before placing any order. And you shall be able to contact local distributor for correct parts by this way. Thank you your attention to the above.

Approved by: Checked by: Prepared by:

VERSION: 1 Date:

SPINDLE



SPINDLE (3811/14) (4811/16)

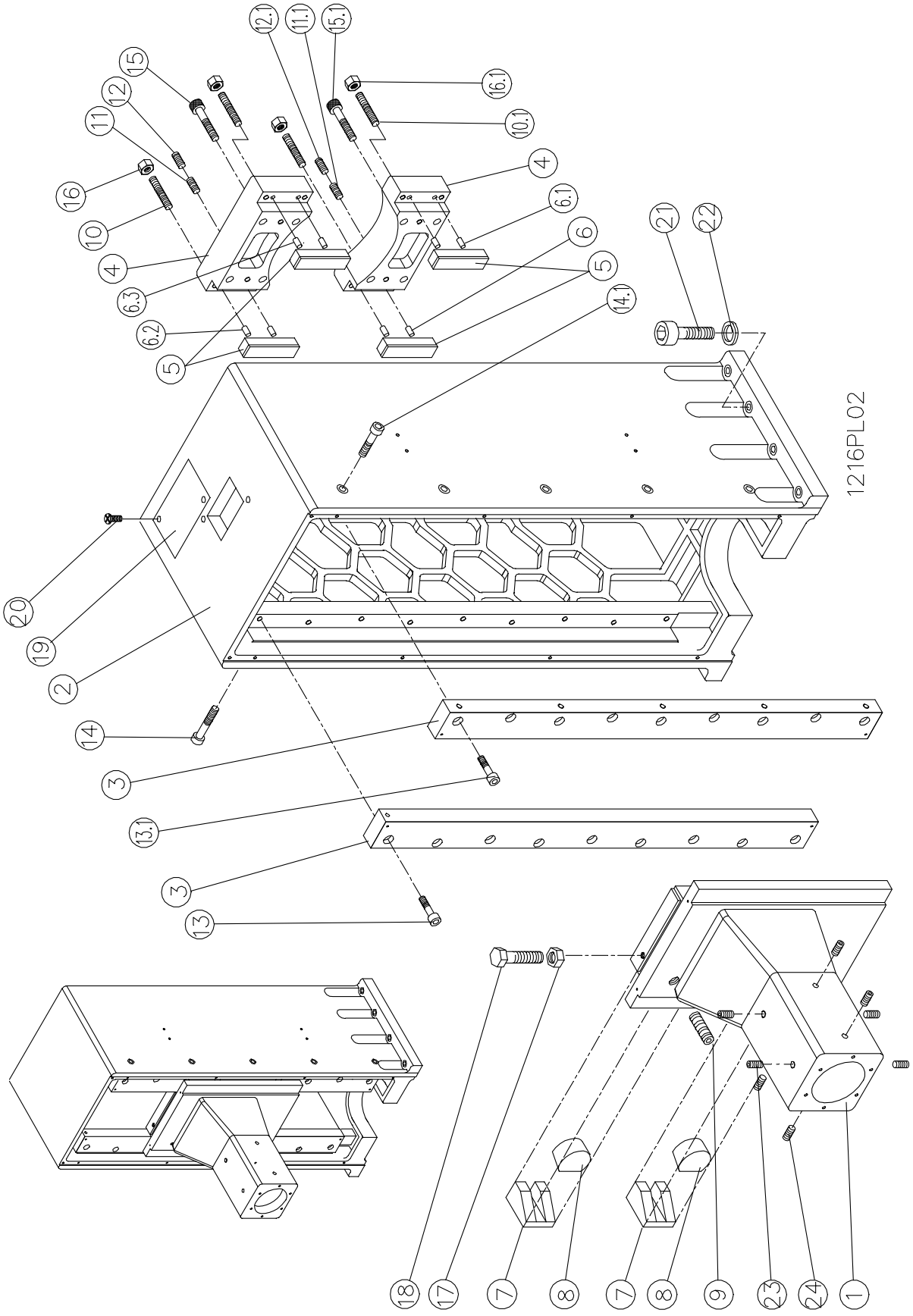
NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3500056015	FRONT DUST GUARD	1	
2.		O-RING	1	P120
3	3520068005	WATER PIPE	1	
4		O-RING	1	P45
5.	2630052005	SPINDLE FRONT NUT	1	
6.	0640021005	FRONT BEARING PRESSING PLATE	1	
7.	1460009005	SPACR RING	1	
8.		BEARING	2	7210 P4
9.		BEARING	1	NU21OWCC P6
10.	1050010005	SPINDLE	1	(3811/12)
	1050018005	SPINDLE	1	(4811/16)
11.		SETTING KEY	2	R16x10L
12.		BEARING	2	7210 P5
13	1440030005	INNER SPACER RING	1	
14.	1440032005	REAR BRARING OUTER SPACER RING	1	
15.	2630053005	SPINDLE REAR NUT	2	AN16
16.	1430048005	SPINDLE SLEEVE	1	(3811/12
	1430051005	SPINDLE SLEEVE	1	(4811/16)
17.	3500026005	REAR DUST GUARD	1	
18.	2770004005	SPINDLE COUPLING	1	
19.		HEADLESS SCREW	2	M6x8L
20.		SOCK HEAD CAP SCREW	3	M6x25L
21.		SOCK HEAD CAP SCREW	6	M6x25L
22.		SOCK HEAD CAP SCREW	4	M6x30L
23.		HEADLESS SCREW	2	M8x10L
24.	2410054005	WASHER	1	
25.		SOCK HEAD CAP SCREW	1	M12x30L

SPINDLE MOTOR

STANDARD 5HP xxx/xxx V

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2760008005	RUBBER COUPLING	1	
2.	2770029005	MOTOR COUPLING	1	
3.		HEADLESS SCREW	2	M8*10L
4.	5HP4PXXX/XXXV	SPINDLE MOTOR	1	5HP
5.		SPRING WASHER	4	ϕ 12
6.		SOCK HEAD CAP SCREW	4	M12x40L

COLUMN (3821,3821H/14SERIES,4821,4821H/16SERIES)

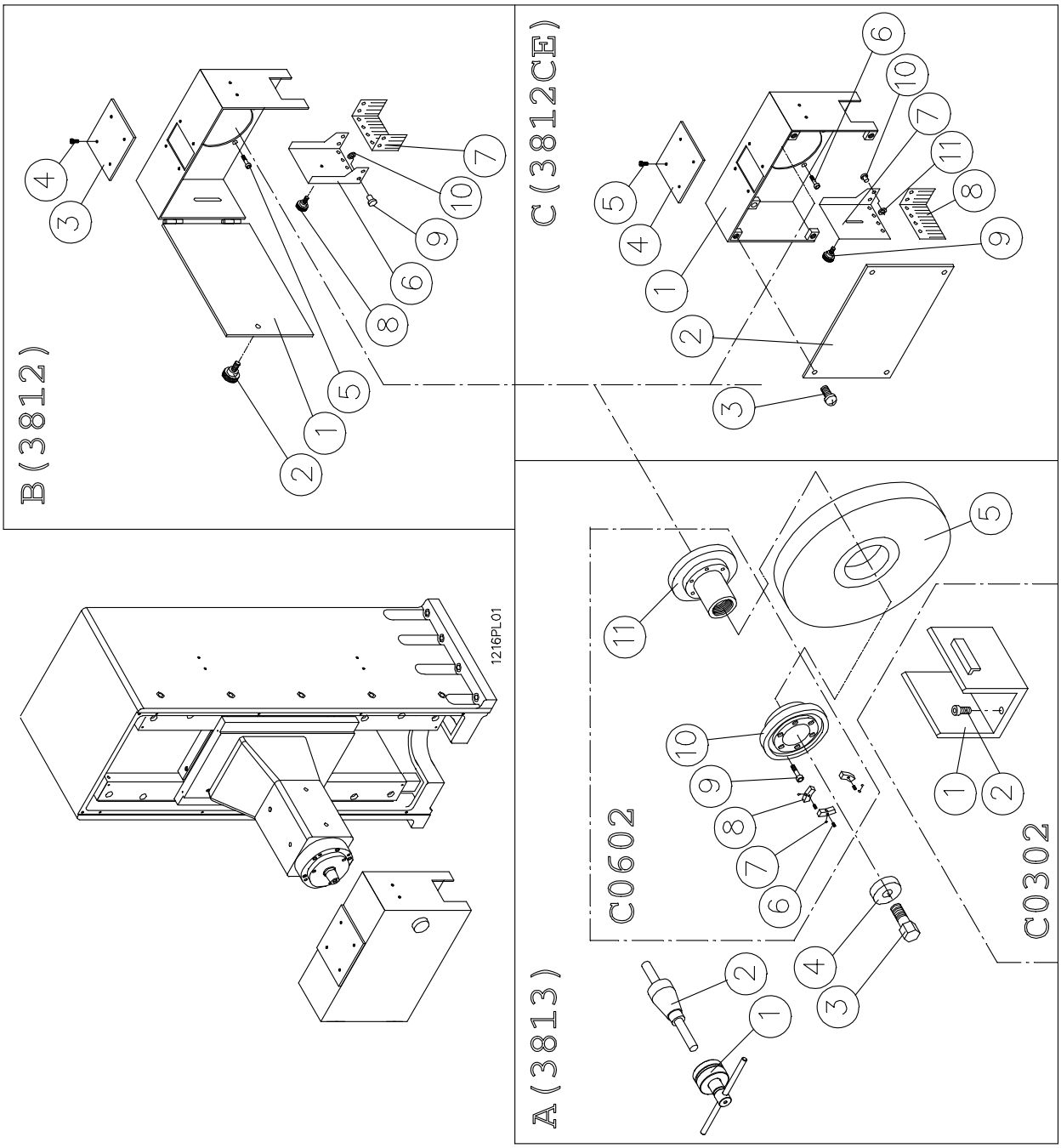


COLUMN (3821,3821H/14, 16SERIES)

(3821, 4821 STANDARD COLUMN/3821H, 4821H HIGH COLUMN)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	0106010005	SPINDLE SEAT	1	
	0106017005	SPINDLE SEAT	1	(4821)
2.	0206010005	STANDARD COLUMN	1	(3821)
	0206011005	HIGH COLUMN	1	(3821H)
3.	2260028005	STANDARD COLUMN RAIL	2	(3821)
	2260028005	HIGH COLUMN RAIL	2	(3821H)
4.	0640002005	SPINDLE SEAT 'S PRESSING PLATE	2	
5.	2890006005	VERTICAL BACK SLIDE PLATE	4	
6.		DOWEL PIN	2	D8x20L
6.1		DOWEL PIN	2	D8x20L
6.2		DOWEL PIN	2	D8x20L
6.3		DOWEL PIN	2	D8x20L
7.	2420034005	VERTICAL SLIDE PLATE	2	
8.	2890005005	VERTICAL SLIDE PLATE ADJUSTING BLOCK	2	
9.		HEADLESS SCREW	1	M12x25L
10.		HEADLESS SCREW	4	M10x70L
10.1		HEADLESS SCREW	4	M10x70L
11.		HEADLESS SCREW	1	M10x30L
11.1		HEADLESS SCREW	1	M10x30L
12.		HEADLESS SCREW	1	M10x10L
12.1		HEADLESS SCREW	1	M10x10L
13.		SOCK HEAD CAP SCREW	9	M10x60L(3821)
		SOCK HEAD CAP SCREW	9	M10x60L(3821H)
13.1.		SOCK HEAD CAP SCREW	9	M10x60L(3821)
		SOCK HEAD CAP SCREW	9	M10x60L(3821H)
14.		SOCK HEAD CAP SCREW	5	M10x40L(3821)
		SOCK HEAD CAP SCREW	5	M10x40L(3821H)
14.1.		SOCK HEAD CAP SCREW	5	M10x40L(3821)
		SOCK HEAD CAP SCREW	5	M10x40L(3821H)
15.		SOCK HEAD CAP SCREW	4	M12x100L
15.1		SOCK HEAD CAP SCREW	4	M12x100L
16		NUT	4	M10
16.1		NUT	4	M10
17.		NUT	1	M12
18.		HEX SOCKET SCREW	1	M12*70L
19.	2000077005	BASE COVER	1	
20.		HEX SOCKET SCREW	2	M6*8L
21.		SOCK HEAD CAP SCREW	8	M16*65L
22.		SPRING WASHER	8	ϕ 16
23.		HEADLESS SCREW	2	M10*30L
24.		HEADLESS SCREW	6	M10*16L

WHEEL GUARD & WHEEL FLANGE



WHEEL GUARD & WHEEL FLANGE

A: GRINDING WHEEL (3813)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3940003005	WHEEL EXTRACT SCREW & NUT	1	
2.	1080008005	BALANCING ARBOR	1	
3.	2620013005	LOCK BOLT	1	
4.	2410056005	WASHER	1	
5.		12" GRINDING WHEEL	1	355x127x50MM

FLANGE (C0602):

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
6.		HEADLESS SCREW	3	M5x5L
7.		STEEL BALL	3	D4
8.	3960002005	BALANCE BLOCK	3	
9.		INNER HEX SCREW	6	M6x50L
10.	3930016005	GRINDING WHEEL PRESSING PLATE	1	
11.	3920017005	GRINDING WHEEL HUB	1	

BALANCING STAND (C0302):

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1000002005	BALANCING STAND	1	
2.		HEX HEAD SCREW	3	M8x18L

B: WHEEL GUARD (3812)

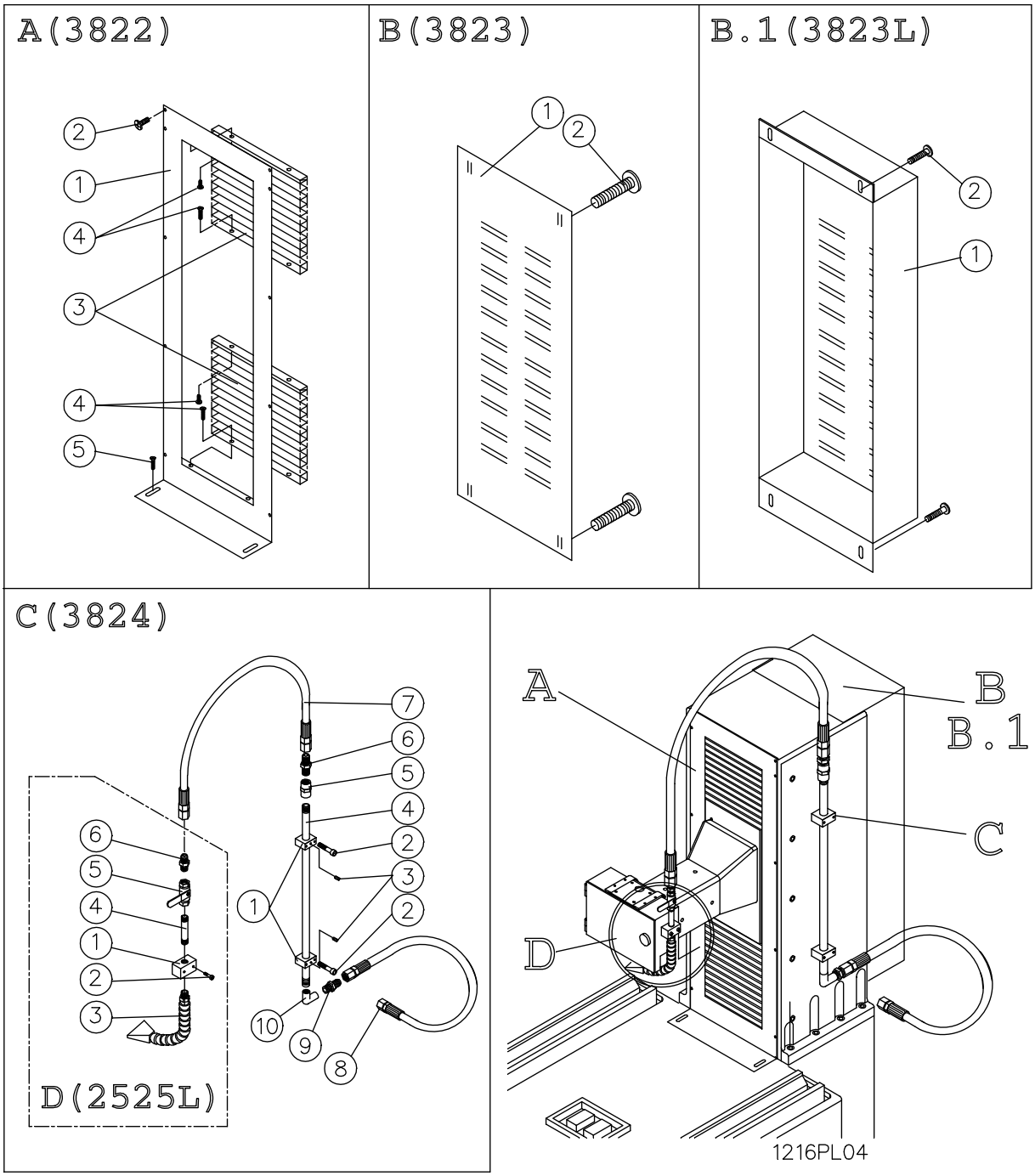
NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3900012005	WHEEL GUARD	1	
2.	2620014005	WHEEL GUARD BOLT	1	
3.	2000114005	MOVABLE GUARD PLATE	1	
4.		CROSS HEAD SCREW	4	M6x8L
5.		INNER HEX SCREW	4	M8x20L
6.	2350018005	SPLASH GUARD	1	
7.	3850005005	DUST RUBBER PIECE	1	
8.		INNER HEX SCREW	1	M6x14L
9.		ALUMINIUM RIVET	8	D3x5L
10.		WASHER	8	M3

C: WHEEL GUARD (3812E)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3900030005	WHEEL GUARD	1	
2.	3910001005	WHEEL GUARD PLATE	1	
3.		CROSS HEAD SCREW	4	M8x14L
4.	2000114005	MOVABLE GUARD PLATE	1	
5.		CROSS HEAD SCREW	4	M6x8L
6.		HEX HEAD SCREW	4	M8x20L

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
7.	2350019005	SPLASH GUARD	1	
8.	3850005005	DUST RUBBER PIECE	1	
9.		INNER HEX SCREW	1	M6x14L
10.		ALUMINIUM RIVET	8	D3x5L
11.		WASHER	8	M3

DUST GUARD & WATER PIPE SYSTEM



DUST GUARD & WATER PIPE SYSTEM

A: COLUMN FRONT DUST FENDER (3822)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1910076015	STANDARD COLUMN FRONT FENDER	1	
2.		CROSS HEAD SCREW	10	M6x8L
3.	3520028005	COLUMN FRONT DUST SHEET	2	
4.		CROSS HEAD SCREW	8	M4x10L
5.		CROSS HEAD SCREW	2	M6x8L

B: COLUMN REAR DUST FENDER (3823)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2000115005	COLUMN REAR SEALED PLATE	1	FOR 5HP MOTOR
2.		CROSS HEAD SCREW	4	M6x10L

B.1: COLUMN REAR DUST FENDER (3823L)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2000116005	COLUMN REAR SEALED PLATE	1	FOR 7.5,10HP MOTOR
2.		CROSS HEAD SCREW	4	M6x10L

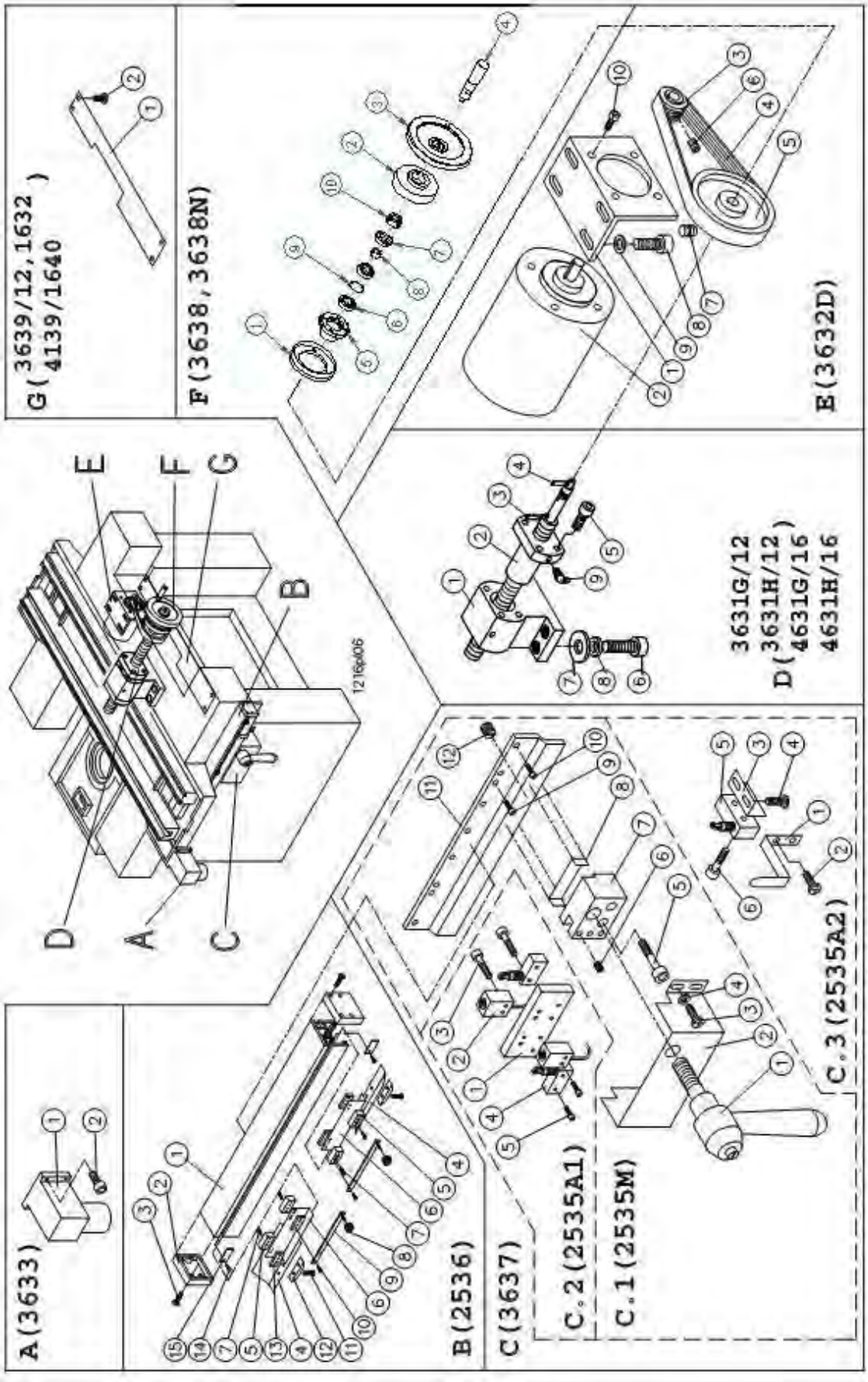
C: WATER PIPE (3824)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2420033005	WATER PIPE'S FIXING BLOCK	2	
2.		INNER HEX SCREW	4	M6x55L
3.		INNER HEX HEADLESS SCREW	2	M6x6L
4.	1400004005	WATER PIPE	1	
5.		INSIDE THREAD STRAIGHT CONNECTION	2	1/2PT
6.		HIGH PRESSURE PIPE CONNECTION	1	1/2PTx1/2PH
7.		HIGH PRESSURE PIPE	1	1/2PTx1310L
8.		HIGH PRESSURE PIPE	1	1/2PHx1000L
9.		HIGH PRESSURE PIPE CONNECTION	1	1/2PTx1/2PH
10.		INSIDE THREAD 90°CONNECTION	1	1/2PT

D: COOLANT NOZZLE SET (2525L)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1830014005	WATER NOZZLE SEAT	1	
2.		HEX HEAD SCREW	2	M6x12L
3.		WATER NOZZLE	2	1/2PT
4.		WATER PIPE	1	1/2PTx2"L
5.		BALL VALVE	1	1/2PT
6.		HIGH PRESSURE PIPE CONNECTION	1	1/2PTx3/8PH

SADDLE CROSSWISE DRIVE



SADDLE CROSSWISE DRIVE

A: COOLANT DRAINER (3633)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2450003005	COOLANT DRAINER	1	
2.		HEX SCREW	4	M6x16L

B. CROSSWISE SENSOR-DETECTED RAIL (2536)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2260010005	SENSOR-DETECTED RAIL	1	
2.	3870003005	SIDE COVER OF SENSOR-DETECTED RAIL	2	
3.		CROSS HEAD SCREW	8	M4*16L
4.	1740002005	INDUCTION LIMIT PLATE	2	
5.	2430003005	LOCKING BLOCK OF SENSOR-DETECTED SHEET	4	
6.	2000033005	CROSSWISE SENSOR-DETECTED SHEET	2	
7.		SOCK HEAD CAP SCREW	8	M4*14L
8.	2490033015	CLAMPING BLOCK OF SENSOR-DETECTED SHEET	2	
9.	2890017005	CROSSWISE SENSOR-DETECTED ADJUSTING BLOCK	1	
10.		CROSS HEAD SCREW	4	M4*20L
11.		CROSS HEAD SCREW	4	M4*6L
12.	2490010005	CROSSWISE LIMIT SETTING PLATE	2	
13.	2430002005	CLAMPING BLOCK OF SENSOR-DETECTED SHEET	4	
14.		CROSS HEAD SCREW	2	M4*6L
15.	2890004005	POSITIONING LIMITED PLATE	2	

C: CROSSWISE SAFETY SWITCH (3637)

C.1: CROSSWISE LOCKING DEVICE (2535M)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2620035005	CROSS LOCKING HANDLE	1	
2.	1910091015	CROSSWISE INDUCTION SWITCH PROTECTION COVER	1	
3.		CROSS HEAD SCREW	4	M5*8L
4.		WASHER	4	D5
5.		INNER HEX SCREW	4	M8*65L
6.		HEADLESS SCREW	3	M6*8L
7.	2430009005	CROSS LOCKING SOCKET	1	
8.	0640045005	CROSS LOCK CLAMPING PLATE	1	
9.		INNER HEX SCREW	4	M6*16L
10.		INNER HEX SCREW	5	M4*10L
11.	2430005015	CROSS LOCKING PLATE	1	
12.	2620016005	FRICTION SCREW	1	M12*15L

C.2: CROSSWISE PROXIMITY SWITCH (2535A1)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1720004025	CROSS PROXIMITY SWITCH SOCKET	1	PNP 5MM PL-Q5P
2.		PROXIMITY SWITCH	2	17*17*28

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
3.		CROSS HEAD SCREW	4	M3*25L
4.		LIMIT SWITCH	2	Z-15GQ22-B
5.		SOCK HEAD CAP SCREW	4	M4*25L

C.3: CROSSWISE SAFETY SWITCH (2535A2)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	0890035005	CROSS TRAVEL INDICATOR	1	
2.		SOCK HEAD CAP SCREW	2	M5*10L
3.	2420038005	SAFETY SWITCH FIXED PLATE	1	
4.		SOCK HEAD CAP SCREW	2	M5*10L
5.		LIMIT SWITCH	1	Z-15GQ22-B
6.		SOCK HEAD CAP SCREW	2	M4*25L

D: CROSSWISE SCREW SET FOR 14(3631G/3631H)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	0030003005	NUT SEAT	1	
2.	1120040005	CROSSWISE BALL SCREW	1	(3631G)
	1120042005	CROSSWISE BALL SCREW	1	(3631H)
3.		SETTING KEY	1	6*6*20L
4.		SETTING KEY	1	3*3*12L
5.		SOCKET SCREW	4	M6*16L
6.		SOCKET SCREW	4	M12*35L
7.		WASHER	4	D12
8.		SPRING WASHER	4	D12
9.		GREASE FILLING HOLE	1	

CROSSWISE SCREW SET FOR 16(4631G/4631H)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	0030003005	NUT SEAT	1	
2.	1120052005	CROSSWISE BALL SCREW	1	(4631G)
	1120054005	CROSSWISE BALL SCREW	1	(4631H)
3.		SETTING KEY	1	6*6*20L
4.		SETTING KEY	1	3*3*12L
5.		SOCKET SCREW	4	M6*16L
6.		SOCKET SCREW	4	M12*35L
7.		WASHER	4	D12
8.		SPRING WASHER	4	D12
9.		GREASE FILLING HOLE	1	

E: CROSSWISE MOTOR SET (3632X)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1700039005	MOTOR FIXING PLATE IN CROSS MOVEMENT MOTOR	1	
2.		AC MOTOR	1	AM-370
3.	1210035005	MOTOR PULLEY	1	
4.	F02AA55353	TIMING BELT-G	1	HTD-5M535x20m/m

5.	210169015	MOTOR PULLEY IN CROSS MOVEMENT MOTOR	1

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
6.		SET SCREW	2	M5*6L
7.		HEX HEAD SCREW	4	M8*16L
9.		WASHER	4	D8
10.		HEX HEAD SCREW	4	M8*12L

F: CROSSWISE SCALE RING & HAND WHEEL (3638/3638N)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1890013005	SCALE INDICATING PLATE	1	
2.	0890031015	FEEDING SCALE RING(MM)	1	3638
	0890032015	FEEDING SCALE RING(INCH)	1	3638N
3.	1260010005	CROSSWISE HAND WHEEL	1	
4.	4210004005	FOLDING HANDLE	1	
5.	0010010005	BEARING SEAT	1	
6.	B1100A7004	BEARING PUSHER	2	7004A
7.	2640008005	BEARING LOCKING NUT	1	
8.	1430026005	REAR BEARING IN SCREW	1	
9.	1440027005	BEARING SPACER	1	
10.		LOCKED NUT	1	M20x1.0P

G: CROSSWISE PROTECTION SET (3639/14,1632)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1910051005	PROTECTION PLATE	1	1228,1232,1632
2.		CROSS HEAD SCREW	6	M5x8L

CROSSWISE PROTECTION SET (4139/1640)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1910087005	PROTECTION PLATE	1	1640
2.		CROSS HEAD SCREW	6	M5x8L

TABLE LONGITUDINAL DRIVE (1428)

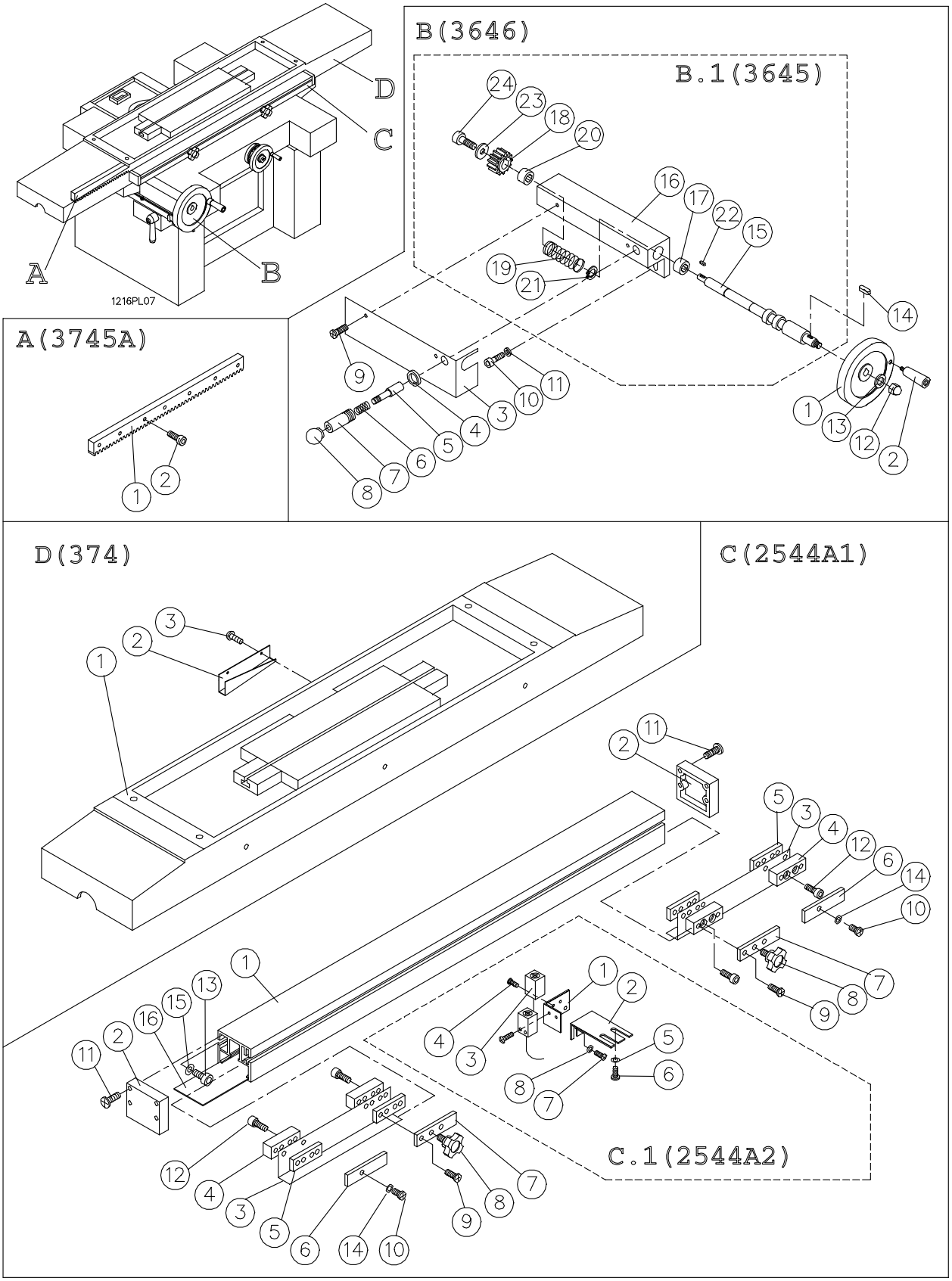


TABLE LONGITUDINAL DRIVE (1428)

A: LONGITUDINAL RACK SET (3745A)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1150006005	LONGITUDINAL RACK	1	
2.		SOCK HEAD CAP SCREW	7	M6x20L

B: LONGITUDINAL HAND WHEEL SET (3646)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1260013005	HAND WHEEL	1	
2.	4210007005	HANDLE	1	
3.	1910065005	DRIVING SHAFT PROTECTION COVER	1	
4.		SEAL RING	1	ϕ12xϕ15x3L
5.	2610006005	MOVABLE PIN	1	
6.	2700003005	COMPRESSION SPRING	1	
7.	2490003005	LOCATING SEAT	1	
8.	3870002005	PLASTIC BLACK BALL	1	
9.		CROSS HEAD SCREW	2	M6x8L
10.		INNER HEX SCREW	2	M8x20L
11.		WASHER	2	ϕ8
12.		CUP NUT	5	5x12L
13.		WASHER	2	ϕ12
14.		SETTING KEY	1	

B.1: LONGITUDINAL TRANSMISSION SET (3645)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
15.	1030059005	LONGITUDINAL DRIVING SHAFT	1	
16.	0050006005	LONGITUDINAL DRIVING SEAT	1	
17.		NEEDLE BEARING	1	FJ-1712
18.	1200022005	LONGITUDINAL DRIVING GEAR	1	
19.		COMPRESSION SPRING	1	
20.		NEEDLE BEARING	1	RLM1416
21.		C-SHAPE RING	1	C17
22.		SETTING KEY	1	4x12L
23.	2410024005	GEAR FIXING WASHER	1	
24.		SOCK HEAD CAP SCREW	1	M5x14L

C: LONGITUDINAL SENSOR-DETECTED SET (2544A1)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2260024005	LONGITUDINAL INDUCTION RAIL	1	
2.	3870003005	SIDE COVER OF INDUCTION RAIL	2	
3.	2000033005	LONGITUDINAL SENSOR-DETECTED SHEET	2	
4.	2430003005	LOCKING BLOCK OF SENSOR-DETECTED SHEET	4	
5.	2430002005	CLAMPING BLOCK OF SENSOR-DETECTED SHEET	4	
6.	2490004005	LONGITUDINAL LIMIT BLOCK	2	

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
7.	2890004005	LONGITUDINAL SENSOR ADJUSTING BLOCK	2	
8.	2620005005	LOBE KNOB	2	
9.		CROSS HEAD SCREW	4	M4x20L
10.		CROSS HEAD SCREW	2	M4x8L
11.		CROSS HEAD SCREW	8	M4x16L
12.		SOCK HEAD CAP SCREW	8	M5x14L
13.		SOCK HEAD CAP SCREW	2	M6x16L
14.		SOCK HEAD PLATE WASHER	2	D4
15.		SOCK HEAD PLATE WASHER	2	D6
16.	3500015005	DUST CONTROL BOARD	1	

C.1: PROXIMITY SWITCH (2544A2)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1810053005	FIXING PLATE	1	
2.	2890009005	ADJUSTING PLATE	1	
3.		PROXIMITY SWITCH	2	PNP 5MM (17*17*28MM)
4.		WASHER	2	D5
5.		CROSS HEAD SCREW	2	M5x10L
6.		CROSS HEAD SCREW	2	M4x6L
7.		WASHER	2	D4

D: TABLE SET (374)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	0506032015	TABLE	1	
2.	3520064005	ANTI-WATER PLATE	1	
3.		CROSS HEAD SCREW	2	M4x8L

TABLE LONGITUDINAL DRIVE (1436/1632/1640)

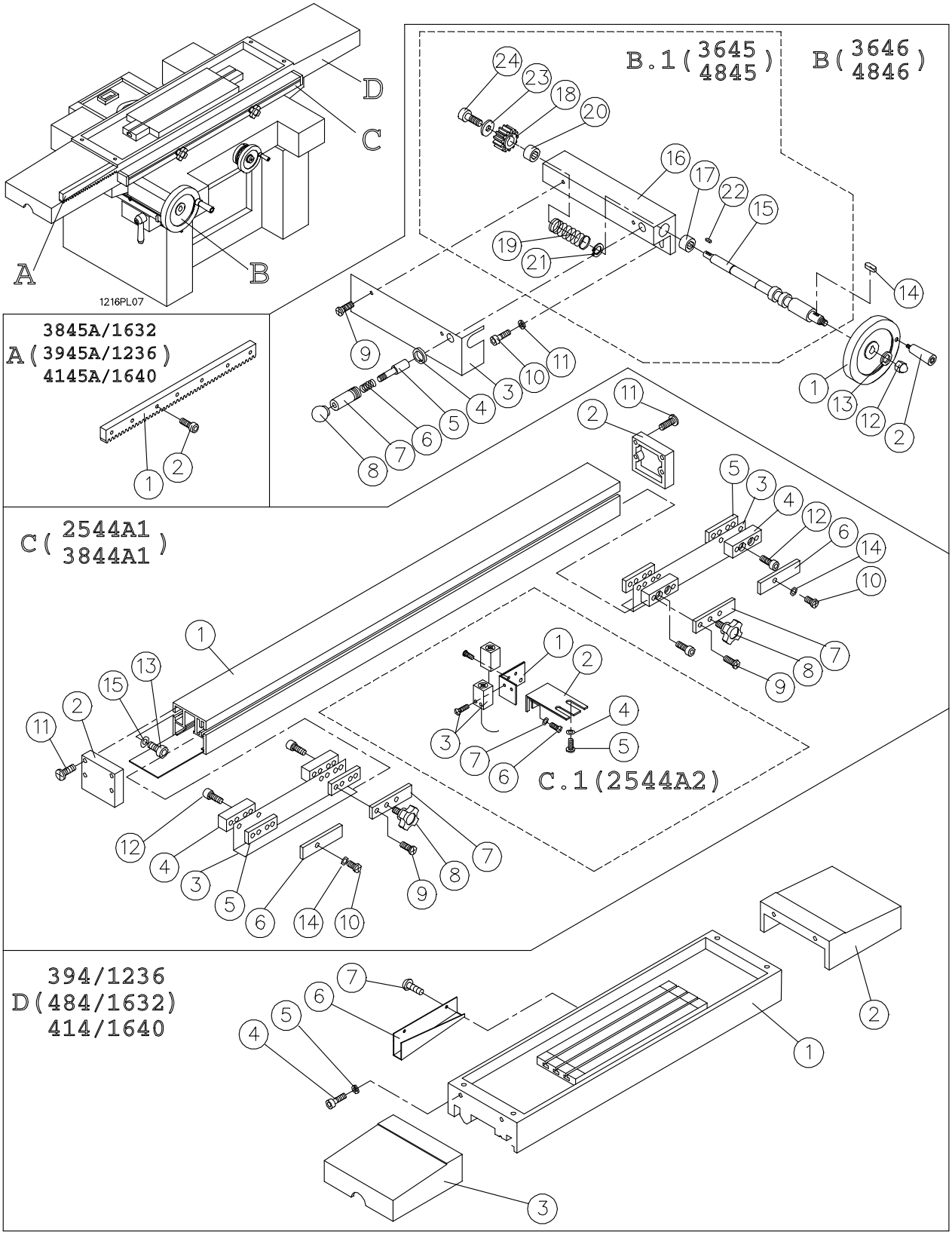


TABLE LONGITUDINAL DRIVE (1436/1632/1640)

A: LONGITUDINAL RACK SET (3845A/1632)(3945A/1436)(4545A/1640)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1150008005	LONGITUDINAL RACK	1	(3845A)
	1150010005	LONGITUDINAL RACK	1	(3945A)
	1150011005	LONGITUDINAL RACK	1	(4545A)
2.		SOCK HEAD CAP SCREW	7	M6x20L

B: LONGITUDINAL HAND WHEEL SET (3646/14)(4846/16)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1260013005	HAND WHEEL	1	
2.	4210007005	HANDLE	1	
3.	1910065005	DRIVING SHAFT PROTECTION COVER	1	12 SERIES
	1910092005	DRIVING SHAFT PROTECTION COVER	1	16 SERIES
4.		SEAL RING	1	ϕ12xϕ15x3L
5.	2610006005	MOVABLE PIN	1	
6.	2700003005	COMPRESSION SPRING	1	
7.	2490003005	LOCATING SEAT	1	
8.	3870002005	PLASTIC BLACK BALL	1	
9.		CROSS HEAD SCREW	2	M6x8L
10.		INNER HEX SCREW	2	M8x20L
11.		WASHER	2	ϕ8
12.		CUP NUT	5	5x12L
13.		WASHER	2	ϕ12
14.		SETTING KEY	1	

B.1: LONGITUDINAL TRANSMISSION SET (3645/14)(4845/16)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
15.	1030059005	LONGITUDINAL DRIVING SHAFT	1	(3645)
1030078005		LONGITUDINAL DRIVING SHAFT	1	(4845)
16.	0050006005	LONGITUDINAL DRIVING SEAT	1	(3645)
	0050020005	LONGITUDINAL DRIVING SEAT	1	(4845)
17.		NEEDLE BEARING	1	FJ-1712
18.	1200022005	LONGITUDINAL DRIVING GEAR	1	
19.		COMPRESSION SPRING	1	
20.		NEEDLE BEARING	1	RLM1416
21.		C-SHAPE RING	1	C17
22.		SETTING KEY	1	4x12L
23.	2410024005	GEAR FIXING WASHER	1	
24.		SOCK HEAD CAP SCREW	1	M5x14L

C: LONGITUDINAL SENSOR-DETECTED SET (2544A1/3844A1)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2260033005	LONGITUDINAL INDUCTION RAIL	1	
2.	3870003005	SIDE COVER OF INDUCTION RAIL	2	
3.	2000033005	LONGITUDINAL SENSOR-DETECTED SHEET	2	
4.	2430003005	LOCKING BLOCK OF SENSOR-DETECTED SHEET	4	
5.	2430002005	CLAMPING BLOCK OF SENSOR-DETECTED SHEET	4	
6.	2490004005	LONGITUDINAL LIMIT BLOCK	2	
7.	2890004005	LONGITUDINAL SENSOR ADJUSTING BLOCK	2	
8.	2620005005	LOBE KNOB	2	
9.		CROSS HEAD SCREW	4	M4x20L
10.		CROSS HEAD SCREW	2	M4x8L
11.		CROSS HEAD SCREW	8	M4x16L
12.		SOCK HEAD CAP SCREW	8	M5x14L
13.		SOCK HEAD CAP SCREW	2	M6x16L
14.		SOCK HEAD PLATE WASHER	2	D4
15.		SOCK HEAD PLATE WASHER	2	D6

C.1: PROXIMITY SWITCH (2544A2)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1810053005	FIXING PLATE	1	
2.	2890009005	ADJUSTING PLATE	1	
3.		PROXIMITY SWITCH	2	PNP 5MM (17*17*28MM)
4.		WASHER	2	D5
5.		CROSS HEAD SCREW	2	M5x10L
6.		CROSS HEAD SCREW	2	M4x6L
7.		WASHER	2	D4

D: TABLE SET (394/1436)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	0506038005	TABLE	1	
2.	1930018005	RIGHT-END COVER	1	
3.	1930017005	LEFT-END COVER	1	
4.		CROSS HEAD SCREW	6	M8x30L
5.		WASHER	6	D4
6.	3520064005	ANTI-WATER PLATE	1	
7.		CROSS HEAD SCREW	2	M4x8L

TABLE SET (484/1632)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	0506048015	TABLE	1	
2.	1930024005	RIGHT-END COVER	1	
3.	1930026005	LEFT-END COVER	1	
4.		CROSS HEAD SCREW	6	M8x30L
5.		WASHER	6	D4

6.	520064005	ANTI-WATER PLATE	1	

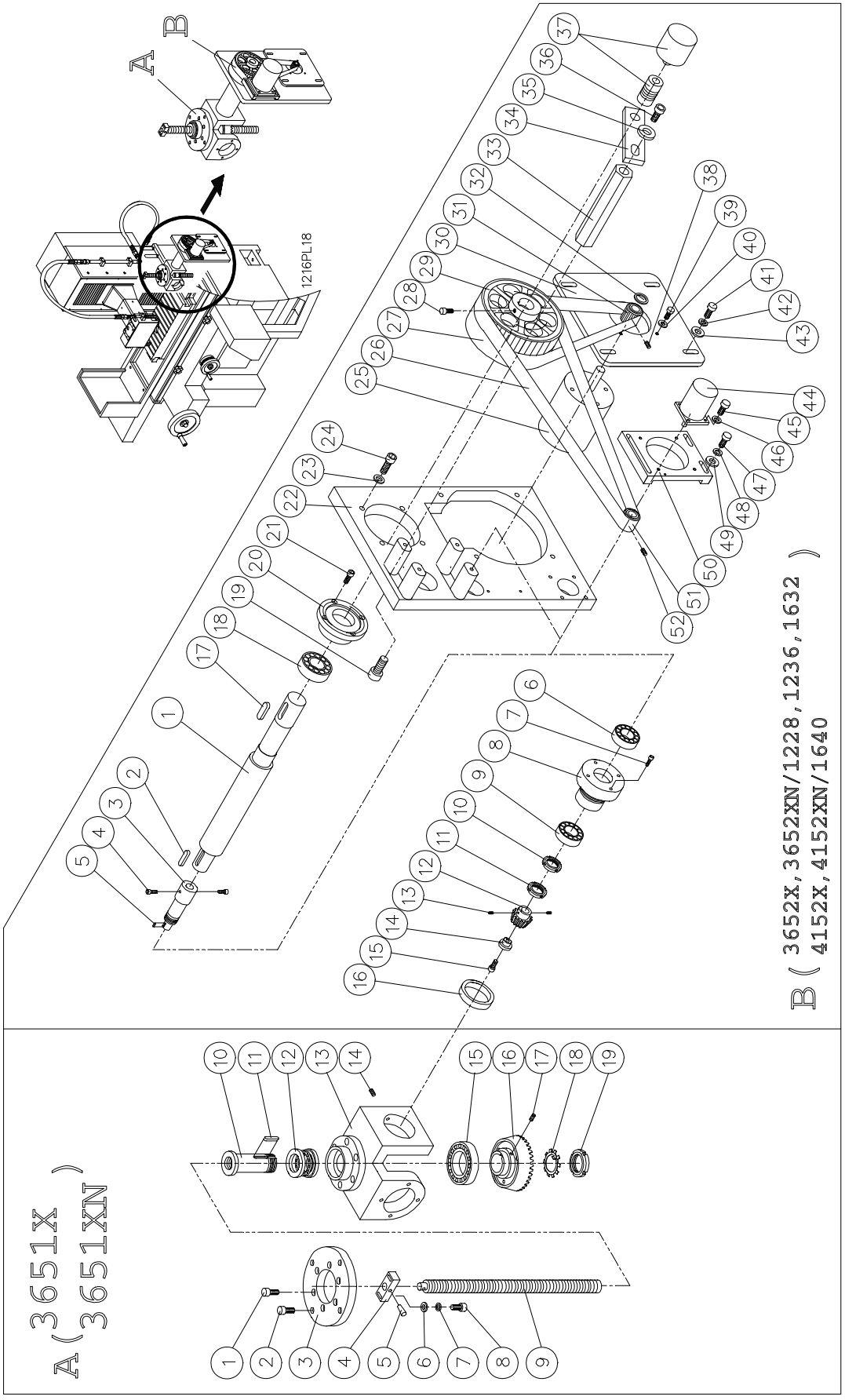
NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
7.		CROSS HEAD SCREW	2	M4x8L

TABLE SET (414/1640)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	0506040015	TABLE	1	
2.	1930021005	RIGHT-END COVER	1	
3.	1930019005	LEFT-END COVER	1	
4.		CROSS HEAD SCREW	6	M8x30L
5.		WASHER	6	D4
6.	3520064005	ANTI-WATER PLATE	1	
7.		CROSS HEAD SCREW	2	M4x8L

–

VERTICAL FEED



VERTICAL FEED

A: VERTICAL LEADSCREW SET (3651X,3651XN)

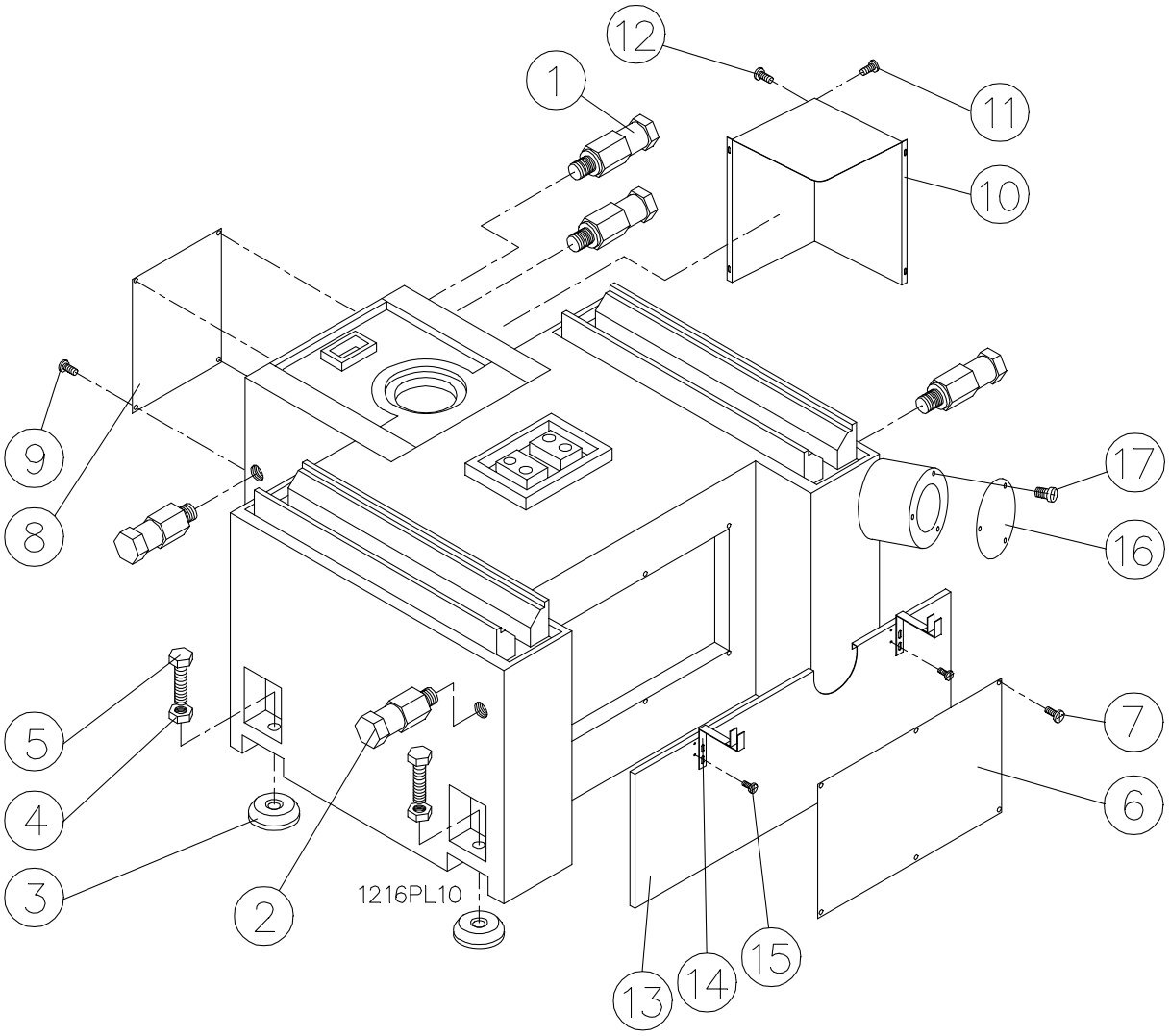
NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		HEX HEAD SCREW	6	M10x20L
2.		HEX HEAD SCREW	4	M6x25L
3.	2420027005	FIXING PLATE OF ELEVATING NUT	1	
4.	830033005	FIXING SEAT OF SCREW SLEEVE	1	
5.		TAPER PIN	1	#5x38L
6.		SPRING WASHER	2	ϕ 8
7.		WASHER	2	ϕ 8
8.		HEX HEAD SCREW	2	M8x35L
9.	1130009005	STANDARD ELEVATING SCREW(MM)	1	
	1130010005	STANDARD ELEVATING SCREW(INCH)	1	
10.	2630047005	ELEVATING NUT	1	
	2630048005	ELEVATING NUT	1	
11.		DOUBLE HEAD FLATE KEY	1	8x7x30L
12.	0010014005	THRUST BEARING	1	51109
13.	1800019005	FIXING SEAT OF ELEVATING GEAR	1	
14.		SET SCREW	1	M10x10L
15.		BEARING	1	6212
16.	1200032005	RIGHT SPIRAL BIG GEAR(MM)	1	(3651X)
	1200033005	RIGHT SPIRAL BIG GEAR(INCH)	1	(3651XN)
17.		HEADLESS SCREW	2	M6x10L
18.	A18BA0AW09	OUTER RING	1	AW09
19.	A12000AN09	LOCKING NUT	1	AN09

B: VERTICAL TRANSMITTING SET (3652X,3652XN/1428,1436,1632)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1030065005	DRIVING SHAFT	1	(3652D,3652ND)
	1030077005	DRIVING SHAFT	1	(4152D,4152ND)
2.		DOUBLE HEAD FLATE KEY	1	6x6x25L
3.	1030005005	PINION DRIVING SHAFT	2	
4.		HEADLESS SCREW	2	M6x12L
5.		DOUBLE HEAD FLATE KEY	2	6x6x25L
6.		BEARING	2	6202
7.		SOCK HEAD CAP SCREW	8	M6x50L
8.	0010018005	BEARING SEAT	1	
9.		BEARING	2	6202
10.		NUT	1	AN04
11.		NUT	1	AN04
12.	1200034005	LEFT SPIRAL PINION (MM)	2	(3652X)
	1200035005	LEFT SPIRAL PINION (INCH)	2	(3652XN)
13.		HEADLESS SCREW	4	M6x8L
14.		BEARING	1	6212
15.		SOCK HEAD CAP SCREW	2	M8x30L

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
16.	2630050005	REGULATING NUT	2	
17.		DOUBLE HEAD FLATE KEY	2	6x6x25L
18.		BEARING	1	6205
19.		HEX HEAD SCREW	1	M8x35L
20.	0010014005	REAR BEARING SEAT	1	
21.		SOCK HEAD CAP SCREW	4	M6x30L
22.	1700043005	MOTOR FIXING PLATE	1	
23.		SPRING WASHER	1	ϕ8
24.		HEX HAND SCREW	1	M8*30L
25.	4300002005	AC MOTOR	1	1/4PH6P
26.		PLASTIC STEEL WIRE TOOTH-FORM BELT	1	T5x122Tx18mm
27.		PLASTIC STEEL WIRE TOOTH-FORM BELT	1	T5x144Tx25mm
28.		SOCK HEAD CAP SCREW	2	M6x15L
29.	1210028005	DRIVER PULLEY	1	
30.	1700044005	MOTOR FIXING PLATE	1	
31.	1210044005	ELEVATING	1	
32.	2490027005	WASHER	2	
33.	1020005005	FIXED PLATE SUPPORT	1	
34.	1810107005	ENCODER FIXED PLATE		1
35.		WASHER	1	ϕ8
36.		HEX HAND SCREW	1	M8*20L
37.		ENCODER	1	
38.		SET SCREW	2	M5x5L
39.		HEX HAND SCREW	1	M8*20L
40.		SPRING WASHER	1	ϕ8
41.		SOCK HEAD CAP SCREW	4	M8x25L
42.		SPRING WASHER	1	ϕ8
43.		WASHER	1	ϕ8
44.	4300003005	STEPPING MOTOR(PK299-01A)	1	
45.		SOCK HEAD CAP SCREW	4	M5x18L
46.		SPRING WASHE	1	ϕ5
47.		SOCK HEAD CAP SCREW	4	M6x30L
48.		SPRING WASHE	1	ϕ6
49.		WASHE	1	ϕ6
50.	1700013005	MOTOR FIXED PLATE	1	
51.	1210031015	ELEVATING RAPID DRIVING PULLEY	2	
52.		CROSS HEAD CAP SCREW	2	M5x5L

LIFTING STRUCTURE (1428,1436,1632,1640)(PD)



LIFTING STRUCTURE (1428,1436,1632)(PD)

EYE BOLT SET (3654)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2620011005	HANGING SCREW	4	
2.	2620012005	HANGING SCREW	1	

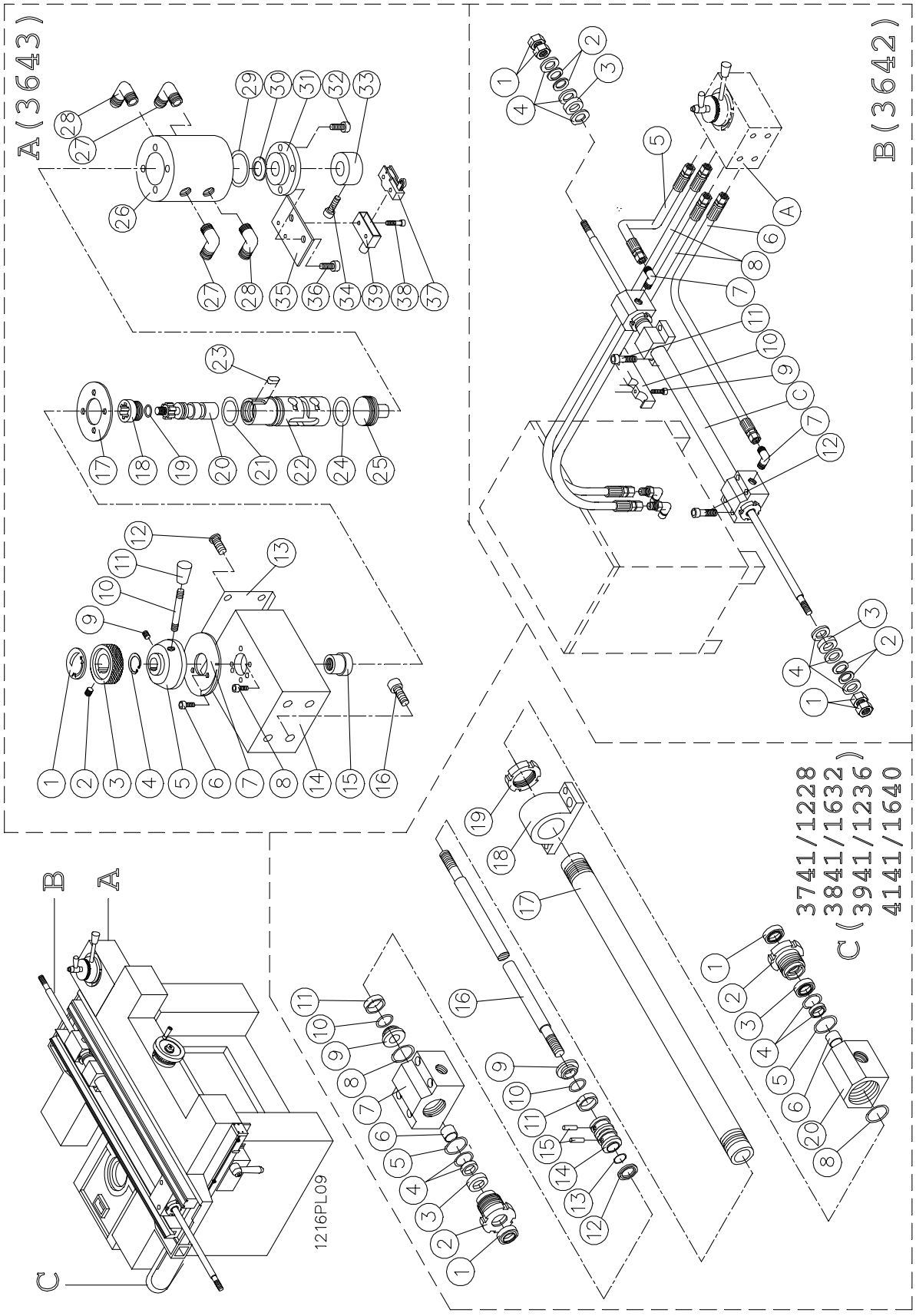
LEVELING SCREW SET (3655)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
5.	2410008005	SOCK HEAD CAP SCREW	5	
6.		HEX NUT	5	M22
7.	2620027005	FLAT-REGULATING SCREW	5	M22*105L

BASE COVER UNIT (3656A/1428,1436)(4656A/1632) (4156A/1640)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
6.	2000101005	BASE FRONT SEALED COVER	1	
7.		SOCKET SCREW	8	M6x10L
8.	2000102005	BASE REAR SEALED SCREW	1	
9.		SOCKET SCREW	4	M6x10L
10.	3880003005	PROTECT COVER	1	(3656)
	3880004005	PROTECT COVER	1	(4656A)
	3880005005	PROTECT COVER	1	(4156A)
11.		SOCKET SCREW	2	M6x6L
12.		SOCKET SCREW	2	M6x6L
13.	1440028005	BASE OIL PLATE	1	
14.	2420029005	INSIDE FIXED DIVIDER	2	
15.		SOCK HEAD CAP SCREW	4	M5x8L
16.	2000147005	COLUMN SIDE PLATE	1	
17.		CROSS HEAD SCREW	3	M5*10L

LONGITUDINAL HYDRAULIC SYSTEM



LONGITUDINAL HYDRAULIC SYSTEM

A: LONGITUDINAL THROTTLING VALVE(3643)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3700549005	FLOW CONTROL NAME PLATE	1	
2.		HEADLESS SCREW	1	M6x6L
3.	3130008015	FLOW CONTROL KNOB	1	
4.		INNER RETAINING RING	1	ϕ 42
5.	1720003015	FLOW SWITCH	1	
6.		SOCK HEAD CAP SCREW	2	M6x12L
7.	3080037005	THROTTLING VALVE PANEL	1	
8.		SOCK HEAD CAP SCREW	4	M6x20L
9.		HEADLESS SCREW	1	M6x6L
10.	4210013015	THROTTLING HANDLE BAR	1	
11.	4210011005	THROTTLING HANDLE HEAD	1	
12.		CROSS HEAD SCREW	4	M5x12L
13.	2000083005	THROTTLING SEAT REAR COVER	1	
14.	1820005005	THROTTLING VALVE SEAT	1	
15.	2630051005	FLOW CONTROL NUT	1	
16.		SOCK HEAD CAP SCREW	4	M8x20L
17.	2000082005	UPPER COVER PLATE OF THROTTLING SEAT	1	
18.	1430015005	INSIDE HEXAGONAL SHAFT SLEEVE	1	
19		O-RING	1	P22
20.	1030071005	THROTTLING ARBOR	1	
21.		O-RING	1	P42
22.		DOUBLE HEAD FLAT KEY	1	6x6x10L
23.	1030018015	THROTTLING VALVE SHAFT	1	
24.		O-RING	1	P26
25.	1030070005	SWITCH SHAFT OF THROTTLING VALVE	1	
26.	2820002005	THROTTLING VALVE BODY	1	
27.		HIGH PRESSURE PIPE 90°CONNECTION	2	1/2PTx3/4H
28.		HIGH PRESSURE PIPE 90°CONNECTION	2	1/2PTx1/2H
29		O-RING	1	P48
30.		DISC WASHER	1	d14xD28x1.5T
31.	2020006005	THROTTLING VALVE REAR COVER	1	
32.		SOCK HEAD CAP SCREW	2	M5x14L
33.	2420117005	CROSSWISE SETTING BLOCK	1	
34.		CROSS HEAD SCREW	2	M4x25L
35.	1810058005	SAFETY SWITCH SEAT	1	
36.		SOCK HEAD CAP SCREW	2	M5x14L
37.		SAFETY SWITCH	1	Z-15GW2-B
38.		SOCK HEAD CAP SCREW	1	M4x25L
39.		LIMIT SWITCH COVER	1	CB-1

B: HYDRAULIC PIPING (3642)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		HEX SOCKET NUT	4	M16
2.		DISC WASHER	4	D16xD32x1.5T
3.	2410043005	WASHER	2	
4.	2410045005	RECOIL CUSHION	6	
5.		HIGH PRESSURE PIPE(1/2"PHx510L)	1	1228
		HIGH PRESSURE PIPE(1/2"PHx520L)	1	1236,1632
		HIGH PRESSURE PIPE(1/2"PHx550L)	1	1640
6.		HIGH PRESSURE PIPE(1/2"PHx1400L)	1	1228
		HIGH PRESSURE PIPE(1/2"PHx1490L)	1	1236,1632
		HIGH PRESSURE PIPE(1/2"PHx1750L)	1	1640
7.		HIGH PRESSURE PIPE 90°CONNECTION	2	1/2"PTx1/2"PH
8.		HIGH PRESSURE PIPE(3/4"PHx1750L)	2	1228,1236
		HIGH PRESSURE PIPE(3/4"PHx1830L)	2	1632,1640
9.		SOCKET SCREW	2	M6x30L
10.	0640017005	HIGH PRESSURE PIPE CONNECTION	1	
11.		SOCKET SCREW	2	M8x35L
12.		SOCKET SCREW	4	M8x55L

C: LONGITUDINAL HYDRAULIC CYLINDER SET (3741/1428)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		DUST RING	2	DH22.4
2.	1830029005	OIL SEAL SEAT	2	
3.		OIL SEAL	2	UHS 22.4
4.		OIL SEAL	2	GSW22.4x30x5
5.		O-RING	2	P42
6.		BEARING	2	DU1810
7.	2910002005	LEFT HYDRAULIC CYLINDER TOP HEAD	1	
8.		O-RING	2	P50
9.	2560005005	ANTI-COLLISION SLEEVE	2	
10.		O-RING	2	P30
11.		TURCITE-B	2	10x125L
12.		OIL SEAL	1	GSP45x35x4
13.		O-RING	1	P22.4
14.	2920004015	PISTON	1	
15.		TAPER PIN	2	#5x38L
16.	2790013005	PISTON ROD	1	
17.	2800011005	HYDRAULIC PIPE	1	
18.	1800029005	FIXING RING OF HYDRAULIC CYLINDER	1	
19.	2630045005	LOCK NUT	1	
20.	2910003015	RIGHT HYDRAULIC CYLINDER TOP HEAD	1	

LONGITUDINAL HYDRAULIC CYLINDER SET (3841/1632)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		DUST RING	2	DH22.4
2.	1830029005	OIL SEAL SEAT	2	
3.		OIL SEAL	2	UHS 22.4
4.		OIL SEAL	2	GSW22.4x30x5
5.		O-RING	2	P42
6.		BEARING	2	DU1810
7.	2910002005	LEFT HYDRAULIC CYLINDER TOP HEAD	1	
8.		O-RING	2	P50
9.	2560005005	ANTI-COLLISION SLEEVE	2	
10.		O-RING	2	P30
11.		TURCITE-B	2	10x125L
12.		OIL SEAL	1	GSP45x35x4
13.		O-RING	1	P22.4
14.	2920004015	PISTON	1	
15.		TAPER PIN	2	#5x38L
16.	2790013005	PISTON ROD	1	1632
17.	2800011005	HYDRAULIC PIPE	1	1632
18.	1800029005	FIXING RING OF HYDRAULIC CYLINDER	1	
19.	2630045005	LOCK NUT	1	
20.	2910003015	RIGHT HYDRAULIC CYLINDER TOP HEAD	1	

LONGITUDINAL HYDRAULIC CYLINDER SET (3941/1436)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		DUST RING	2	DH22.4
2.	1830029005	OIL SEAL SEAT	2	
3.		OIL SEAL	2	UHS 22.4
4.		OIL SEAL	2	GSW22.4x30x5
5.		O-RING	2	P42
6.		BEARING	2	DU1810
7.	2910002005	LEFT HYDRAULIC CYLINDER TOP HEAD	1	
8.		O-RING	2	P50
9.	2560005005	ANTI-COLLISION SLEEVE	2	
10.		O-RING	2	P30
11.		TURCITE-B	2	10x125L
12.		OIL SEAL	1	GSP45x35x4
13.		O-RING	1	P22.4
14.	2920004015	PISTON	1	
15.		TAPER PIN	2	#5x38L
16.	2790016005	PISTON ROD	1	1236
17.	2800014005	HYDRAULIC PIPE	1	1236
18.	1800029005	FIXING RING OF HYDRAULIC CYLINDER	1	
19.	2630045005	LOCK NUT	1	
20.	2910003015	RIGHT HYDRAULIC CYLINDER TOP HEAD	1	

LONGITUDINAL HYDRAULIC CYLINDER SET (4141/1640)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		DUST RING	2	DH22.4
2.	1830029005	OIL SEAL SEAT	2	
3.		OIL SEAL	2	UHS 22.4
4.		OIL SEAL	2	GSW22.4x30x5
5.		O-RING	2	P42
6.		BEARING	2	DU1810
7.	2910002005	LEFT HYDRAULIC CYLINDER TOP HEAD	1	
8.		O-RING	2	P50
9.	2560005005	ANTI-COLLISION SLEEVE	2	
10.		O-RING	2	P30
11.		TURCITE-B	2	10x125L
12.		OIL SEAL	1	GSP45x35x4
13.		O-RING	1	P22.4
14.	2920004015	PISTON	1	
15.		TAPER PIN	2	#5x38L
16.	2790018005	PISTON ROD	1	1640
17.	2800016005	HYDRAULIC PIPE	1	1640
18.	1800029005	FIXING RING OF HYDRAULIC CYLINDER	1	
19.	2630045005	LOCK NUT	1	
20.	2910003015	RIGHT HYDRAULIC CYLINDER TOP HEAD	1	

TABLE REVERSING MECHANISM (3661)

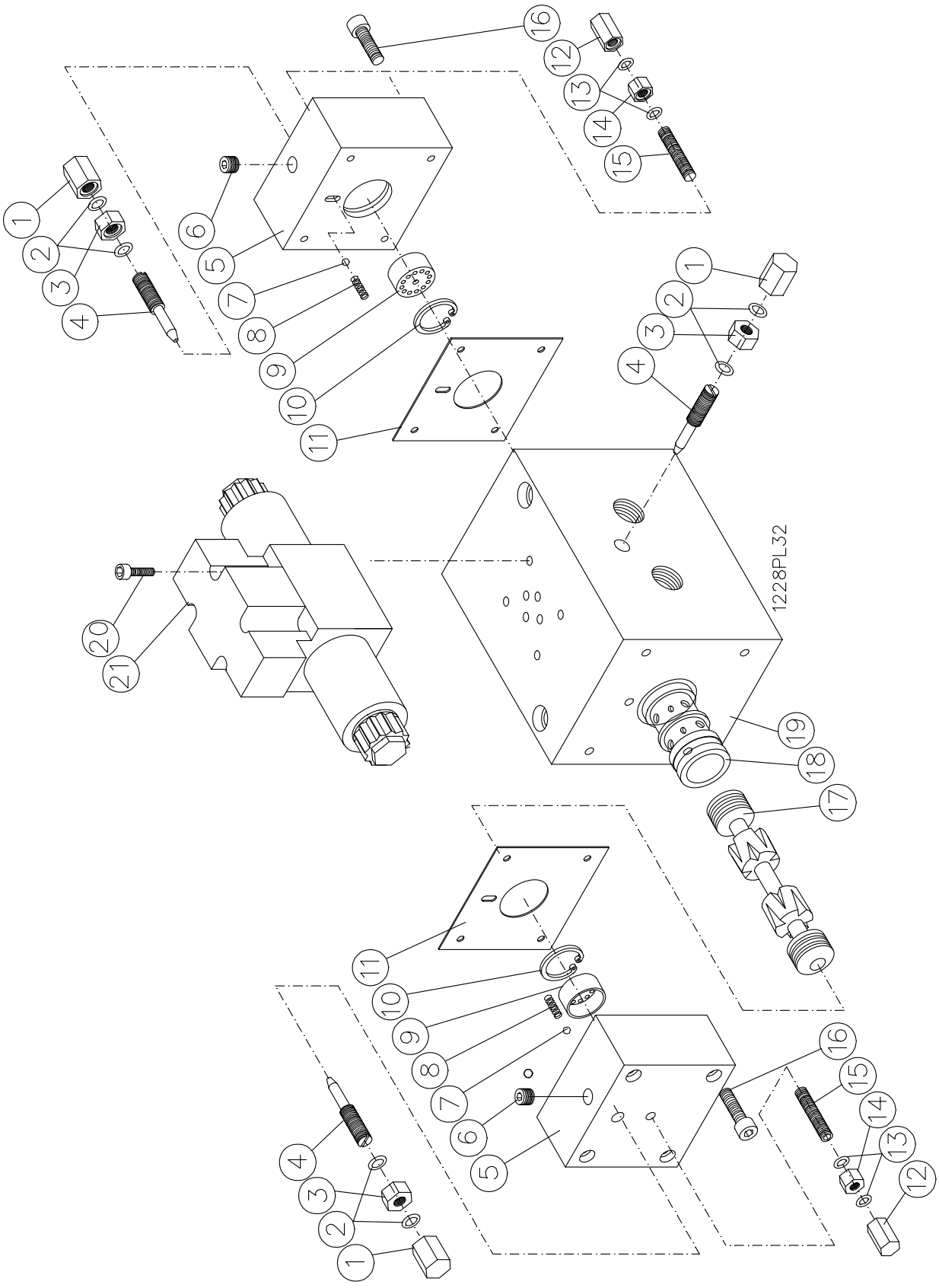
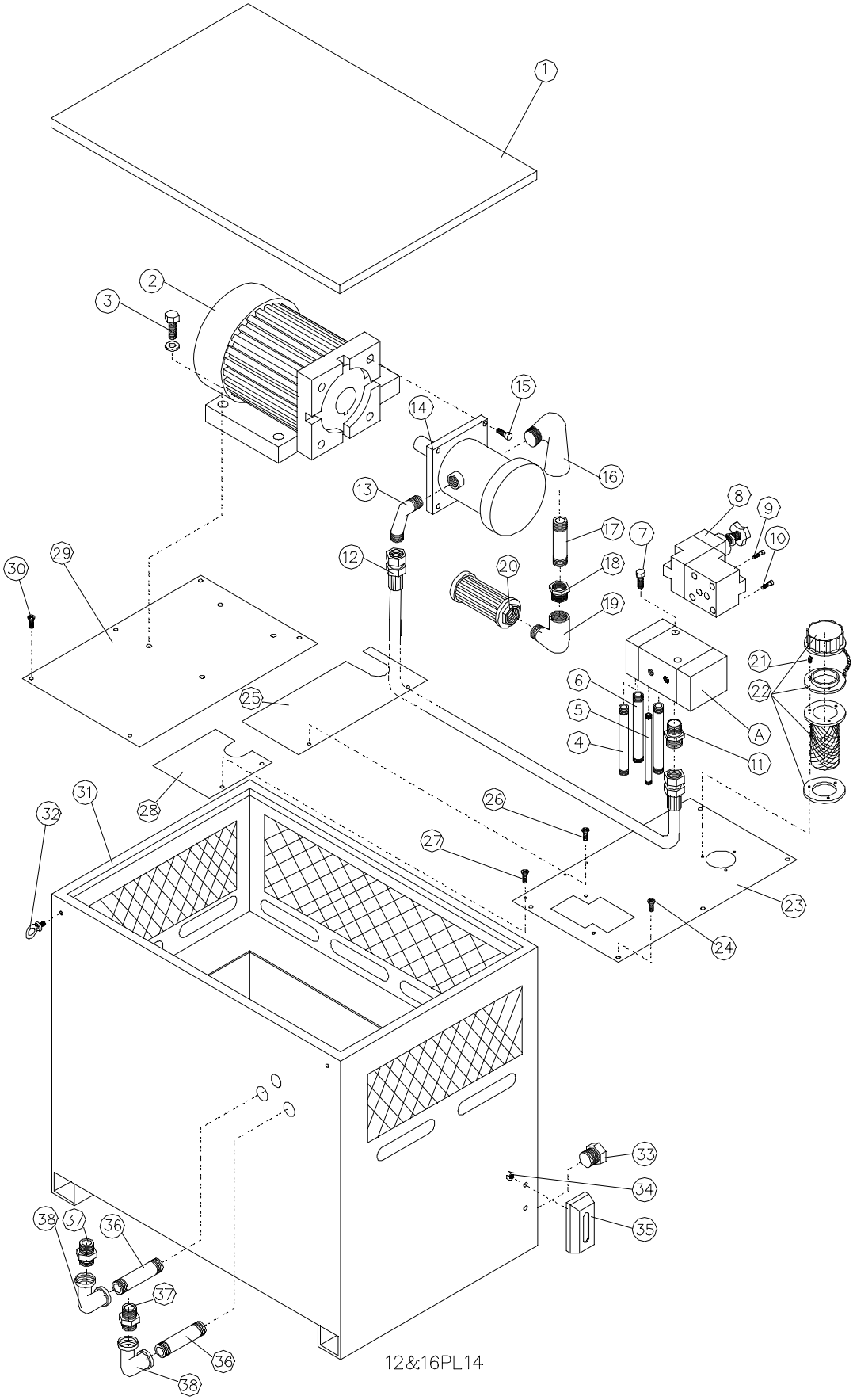


TABLE REVERSING MECHANISM (3661)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2640011005	LEAK-PROOF NUT	3	
2.		O-RING	6	P10
3.	2630013005	FIXING NUT	3	
4.	2830003005	SMALL THROTTING SHAFT	3	
5.	2010004005	SIDE COVER OF REVERSING BODY	2	
6.		HOLE PLUG	2	1/8PT
7.		STEEL BALL	2	ϕ 5
8.	2700008005	SPRING	2	
9.	2890014005	TOP BLOCK OF REVERSING SHAFT	2	
10.		INNER RETAINING RING	2	ϕ 28
11.		ASBESTOS GASKET	1	95x90x1
12.	2640012005	LEAK-PROOF NUT	2	
13		O-RING	4	P8
14.	2630016005	FIXING NUT	2	
15.		HEADLESS SCREW	2	M8x40L
16.		SOCK HEAD CAP SCREW	8	M6x40L
17.	1030067005	REVERSING SHAFT	1	
18.	1430047005	REVERSING SHAFT SLEEVE	1	
19.	2820003005	REVERSING BODY	1	
20.		SOCK HEAD CAP SCREW	4	M5x45L
21.		SOLENOID VALVE	1	DV24V

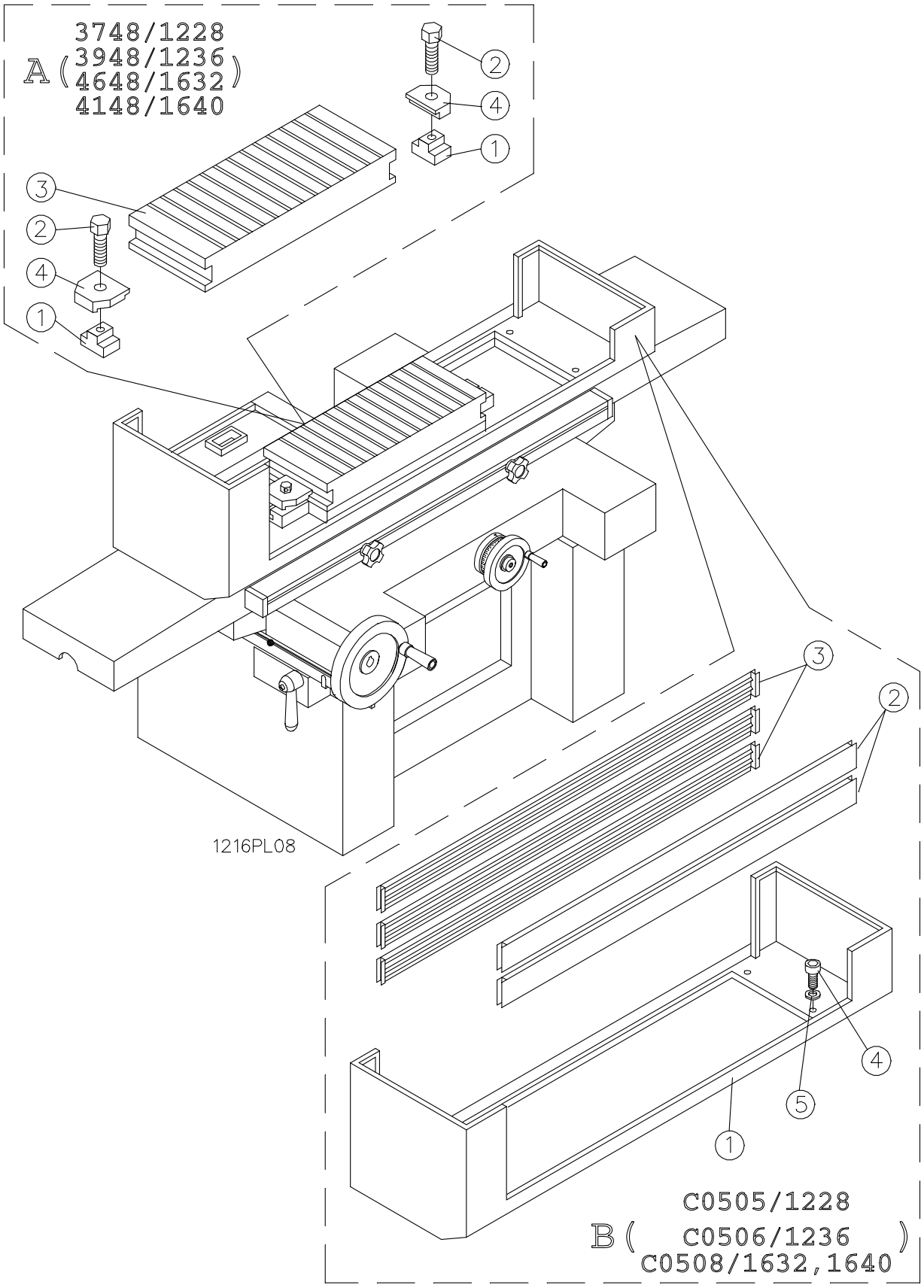
HYDRAULIC SYSTEM (366)



HYDRAULIC SYSTEM (366)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1910068005	UPPER PROTECTION COVER OF OIL TANK	1	
2.		HYDRAULIC MOTOR	1	3HP6P
3.		HEX HEAD SCREW	4	M10x20L
4.		STRAIGHT CONNECTION PIPE	1	1/2 "PTx6"L
5.		STRAIGHT CONNECTION PIPE	1	1/8 "PTx6"L
6.		STRAIGHT CONNECTION PIPE	2	3/8" PTx6"L
7.		HEX HEAD SCREW	2	M8x110L
8.		PRESSURE-REGULATING VALVE	1	RFG06-31
9.		SOCK HEAD CAP SCREW	2	M16x65L
10.		SOCK HEAD CAP SCREW	2	M12x55L
11.		HIGH PRESSURE PIPE	1	3/4"PTx3/4"PH
12.		HIGH PRESSURE PIPE	1	3/4"x570L
13.		HIGH PRESSURE PIPE 90°CONNECTION	1	3/4"PTx3/4"PH
14.		HYDRAULIC PUMP	1	40 CC/PRM
15.		SOCK HEAD CAP SCREW	4	M10x30L
16		PIPE ELBOW	1	1"PT
17.		STRAIGHT CONNECTION PIPE	1	1" PTx13"L
18.		TRANSFER CONNECTION	1	1PT
19.		HIGH PRESSURE PIPE 90°CONNECTION	1	2"PT
20.		OIL FILTER	1	2" PT
21.		CROSS HEAD SCREW	3	3/16" Wx0.5"L
22.		OIL-FEEDING FILTER	1	
23.	2420030005	DIRECTIONAL VALVE FIXED PLATE	1	
24.		SOCK HEAD CAP SCREW	4	M6x15L
25.	2000108005	OIL TANK SUB-COVER	1	
26.		CROSS HEAD SCREW	2	M6x10L
27.		CROSS HEAD SCREW	2	M6x10L
28.	2000110005	OIL TANK SUB-COBVER B	1	
29.	1810069005	FIXING PLATE	1	
30.		CROSS HEAD SCREW	5	M6x15L
31.	3230002015	OIL TANK	1	
32.		HANGING RING	4	5/16"W
33.		HOLE PLUG	2	1/2"PT
34.		NUT	2	M8
35.		OIL LEVEL GAGE	1	3"
36.		STRAIGHT CONNECTION PIPE	2	1/2PTx3.5"L
37.		HIGH PRESSURE PIPE CONNECTION	2	1/2PTx3/4PH
38.		PIPE ELBOW	2	1/2PTx1/2PT

CHUCK & SPLASH GUARD



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CHUCK & SPLASH GUARD

A: CHUCK OPTIONAL (3748/1428) (3948/1436) (4648/1632)(4148/1640)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	2630046005	T-NUT	2	1428,1436
	2630046005	T-NUT	4	1632,1640
2.		HEX SCREW (M12x55L)	2	1428,1436
		HEX SCREW (M12x55L)	4	1632,1640
3.		CHUCK(300x700MM)	1	1428
		CHUCK(300x900MM)	1	1436
		CHUCK(400x800MM)	1	1632
		CHUCK(400x1000MM)	1	1640
4.		CHUCK FIXING BLOCK	2	1428,1436
		CHUCK FIXING BLOCK	4	1632,1640

.

B: SPLASH GUARD OPTIONAL (C0505/1428) (C0506/1436) (C0508/1632,1640)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	3520066005	SPLASH GUARD(300x700)	1	1428
	3520069005	SPLASH GUARD(300x900)	1	1436
	3520076005	SPLASH GUARD(400x800,400x1000)	1	1632,1640
2.	2350016005	FRONT WATER-PROOF MOVABLE PLATE	2	1428
	3520028005	FRONT WATER-PROOF MOVABLE PLATE	2	1436,1632,1640
3.	2350017005	WATER PROOF MOVABLE PLATE	2	1428
	2350026005	WATER PROOF MOVABLE PLATE	2	1436,1632,1640
4.		SOCK HEAD CAP SCREW	4	M8x20L
5.		WASHER	4	D8

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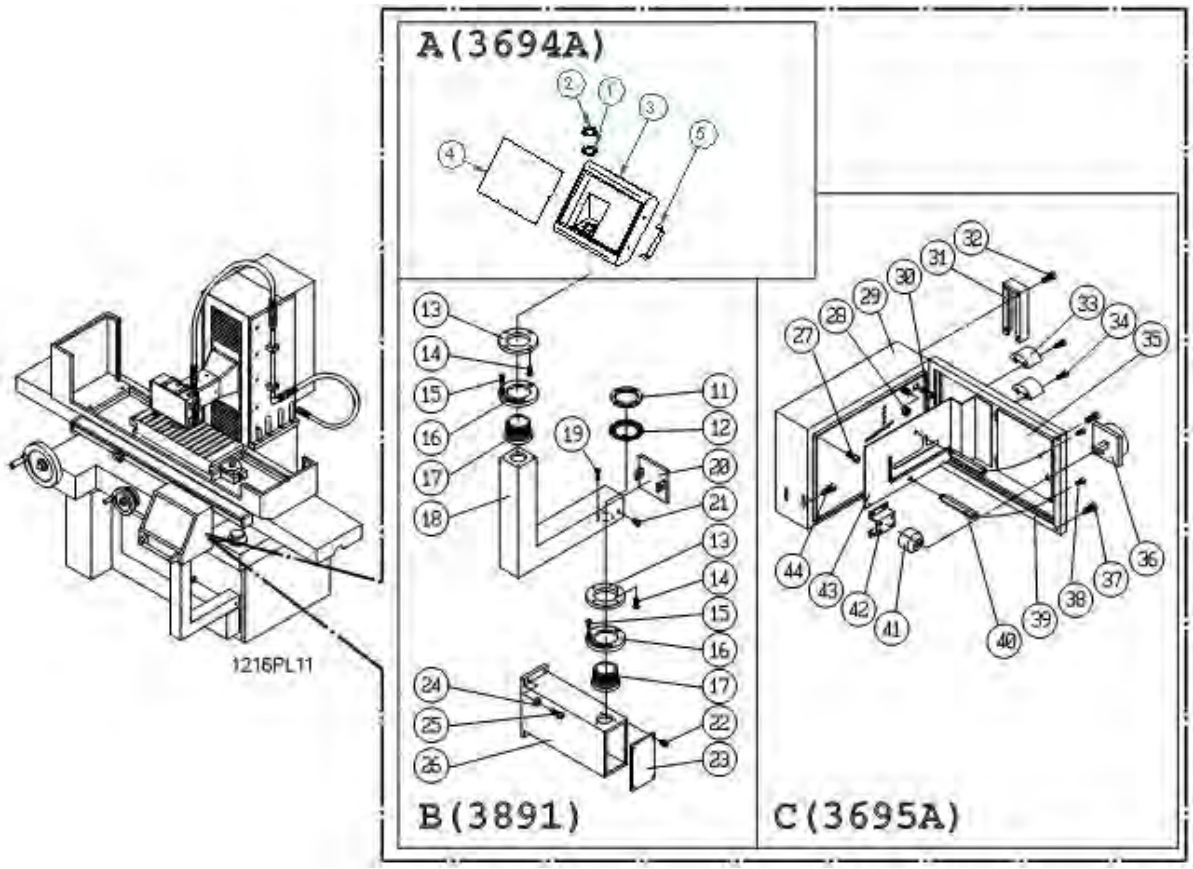
ELECTRICAL AND CONTROL BOX



ELECTRICAL AND CONTROL BOX

A: CONTROL BOX SET (3694B)(3694BN)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	A18BA0AW12	LOCKED WASHER	1	AW12
2.	A12000AN12	LOCKED NUT	1	AN12
3.	3050075035	CONTROL BOX	1	
4.		CONTROL PANEL	1	
5.	J091UAGS20	HANDLE	1	AGS-200

B: SUPPORT ARM SEAT SET (4891)

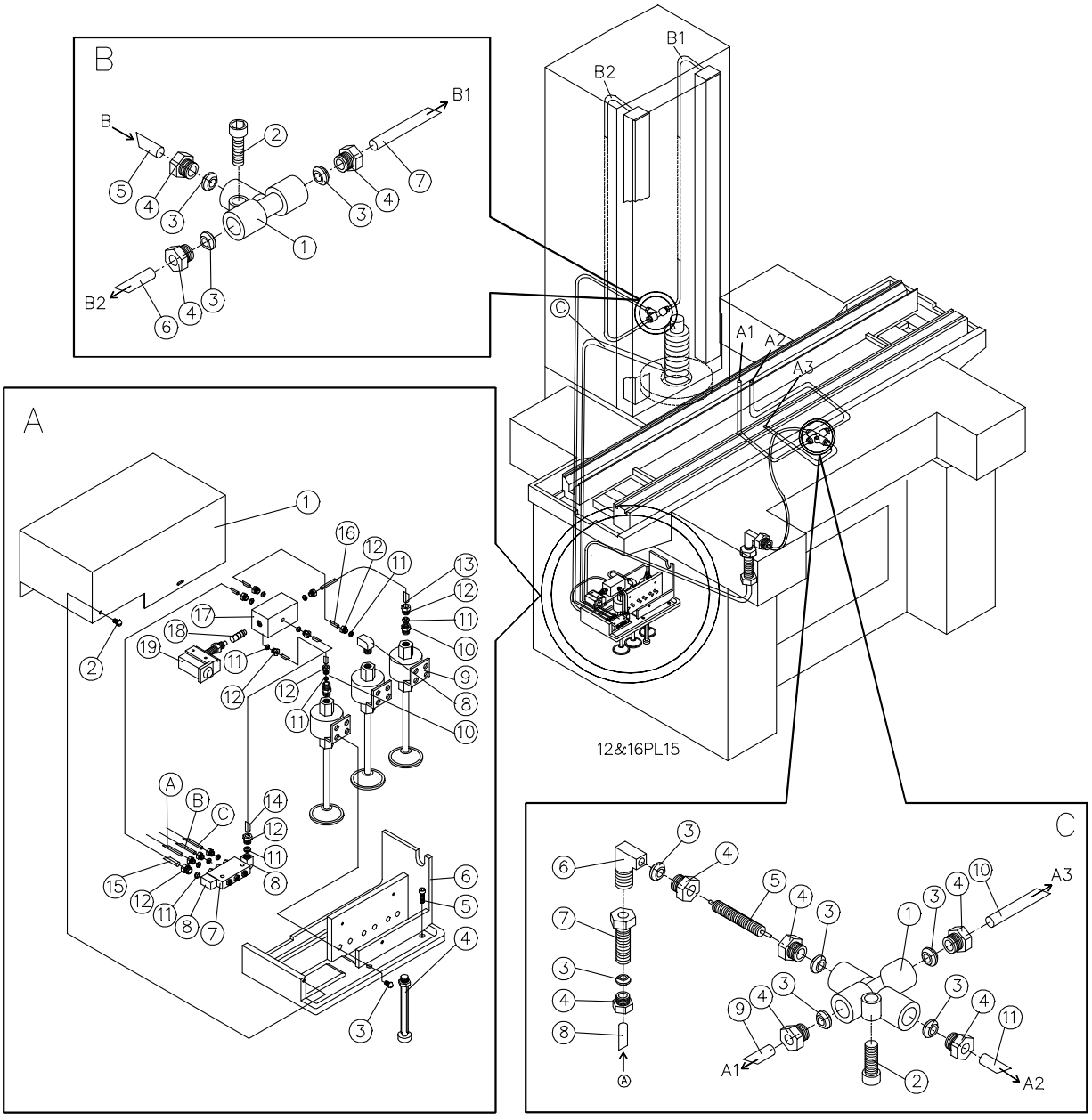
NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
11.	2640013005	FIXING NUT	2	(AN12)
12.		WASHER	2	MB12
13.	2420035005	FIXING PLATE OF TURNING SHAFT	2	
14.		CROSS FLATE HEAD SCREW	3	M5x8L
15.		SOCK HEAD CAP SCREW	3	M6x14L
16.	0640044005	HOLDING-DOWN PLATE OF TURNING SHAFT	2	
17.	3130011005	TURNING SHAFT OF CONTROL BOX	2	
18.	3090009005	CONTROL BOX SUPPORT ARM	1	
19.		SOCK HEAD CAP SCREW	3	M6x14L
20.	2000119005	SIDE SEALED COVER OF SUPPORT ARM	1	
21.		CROSS HEAD SCREW	2	M6x10L
22.		CROSS HEAD SCREW	4	M4x10L
23.	2000120005	SIDE SERLED COVER OF SUPPORT ARM	1	
24.		WASHER	4	ϕ 8
25.		SOCK HEAD CAP SCREW	4	M8x30L
26.	3160004015	FIXING PLATE OF SUPPORT ARM	1	

C: ELECTRIC BOX SET (3695A)

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
27.		SOCK HEAD CAP SCREW	4	M8x16L
28.		NUT	4	M8
29.	3000022005	ELECTRICAL BOX	1	
30.		SOCK HEAD CAP SCREW	4	M8x12L
31.	3520070005	SPLASH COVER	1	
32.		SOCK HEAD CAP SCREW	4	M4XP0.7L
33.	3520011005	SPLASH COVER	2	
34.		SOCK HEAD CAP SCREW	4	M4XP0.7L
35.	3030026005	ELECTRICAL FIXING PLATE	1	
36.		LOCK	2	
37.		SOCK HEAD CAP SCREW	2	M6x25L
38.		SOCK HEAD CAP SCREW	2	M6x25L
39.		RUBBER	1	
40..	1440034005	COPPER BAR2	2	
41.	2410060005	BACK-UP PLATE	1	

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
42.	2030004005	ELECTRIC BOX GROUND STRAP	1	
43.		SOCK HEAD CAP SCREW	1	M10x30L

LUBRICATION SYSTEM (368)



LUBRICATION SYSTEM (368)

A:

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.	1910069005	COVER	1	
2.		SOCK HEAD CAP SCREW	2	M5x8L
3.		SOCK HEAD CAP SCREW	6	M6x15L
4.		OIL LEVEL SWITCH	1	FS-8102
5.		SOCK HEAD CAP SCREW	2	M6x20L
6.	1820016005	PUMP FIXED STAND	1	
7.		OIL SEPARATOR	1	
8.		ELBOW CONNECTOR 90°	3	PH-602
9.		PUMP(AC110V)	3	
10.		STRAIGHT ADAPTER	2	PD602
11.		COMPRESSION SLEEVE	10	PB-6
12.		COMPRESSION SLEEVE	10	PA-6
13.		ALUMINIUM TUBING	1	ϕ6
14.		ALUMINIUM TUBING	1	ϕ6
15.		ALUMINIUM TUBING	1	ϕ6
16.		ALUMINIUM TUBING	2	ϕ6
17.		AB TYPE OIL REGULATING MANIFOLD	1	B-3
18.	1730001005	SENSOR FIXED SUPPORT	1	
19	2250071005	SENSOR SLIDING STEM	1	
20.		SENSOR	1	TZ-7310

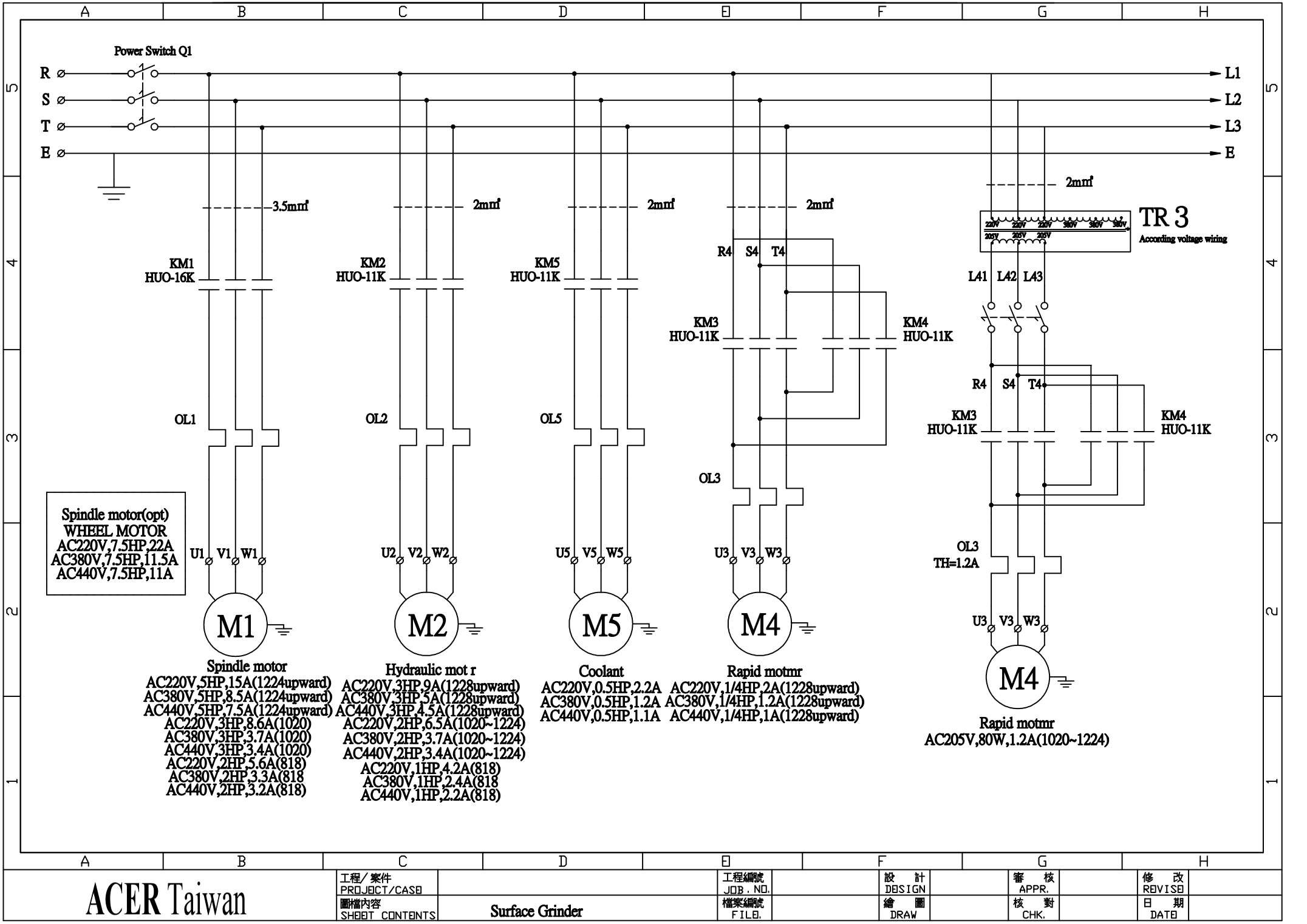
B:

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		JUNCTION 3-WAY	1	PKD-4
2.		SOCK HEAD CAP SCREW	1	M5x20L
3.		COMPRESSION SLEEVE	3	PB-4
4.		COMPRESSION BUSHING	3	PA-4
5.		ALUMINIUM TUBING	1	ϕ4
6.		ALUMINIUM TUBING	1	ϕ4
7.		ALUMINIUM TUBING	1	ϕ4

C:

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
1.		JUNCTION 4-WAY	1	PJD-4
2.		SOCK HEAD CAP SCREW	1	M5x20L
3.		COMPRESSION SLEEVE	5	PB-4
4.		COMPRESSION BUSHING	5	PA-4
5.		HOSE ASSEMBLY	1	ϕ4x400L
6.		ELBOW CONNECTOR 90°	1	PH-401
7.		FIXED JOINT BOLT	1	PM-104-1
8.		ALUMINIUM TUBING	1	ϕ4
9.		ALUMINIUM TUBING	1	ϕ4

NO.	PART NO.	DESCRIPTION	Q'TY	SPEC.
10.		ALUMINIUM TUBING	1	ϕ 4
11.		ALUMINIUM TUBING	1	ϕ 4



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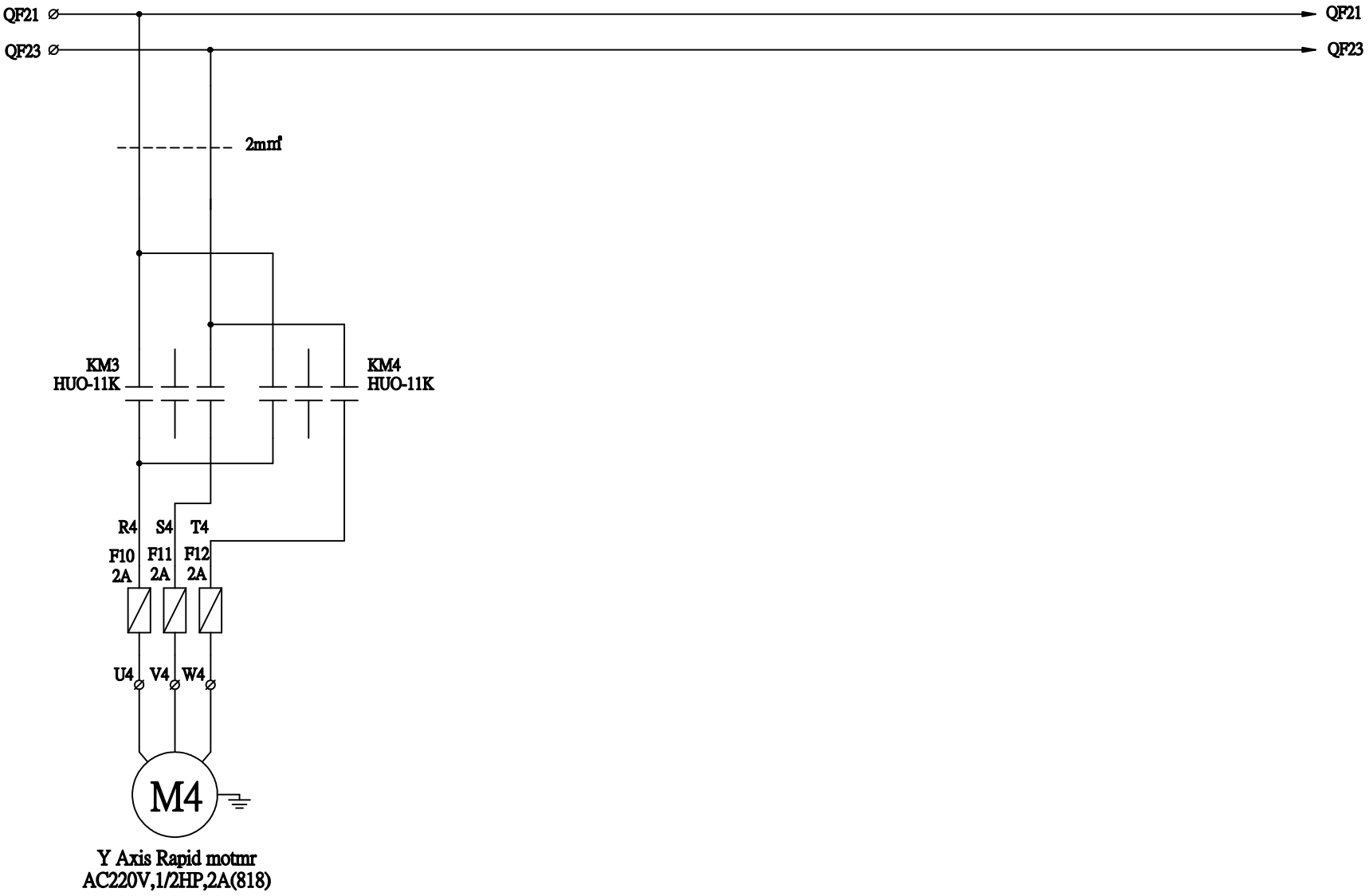

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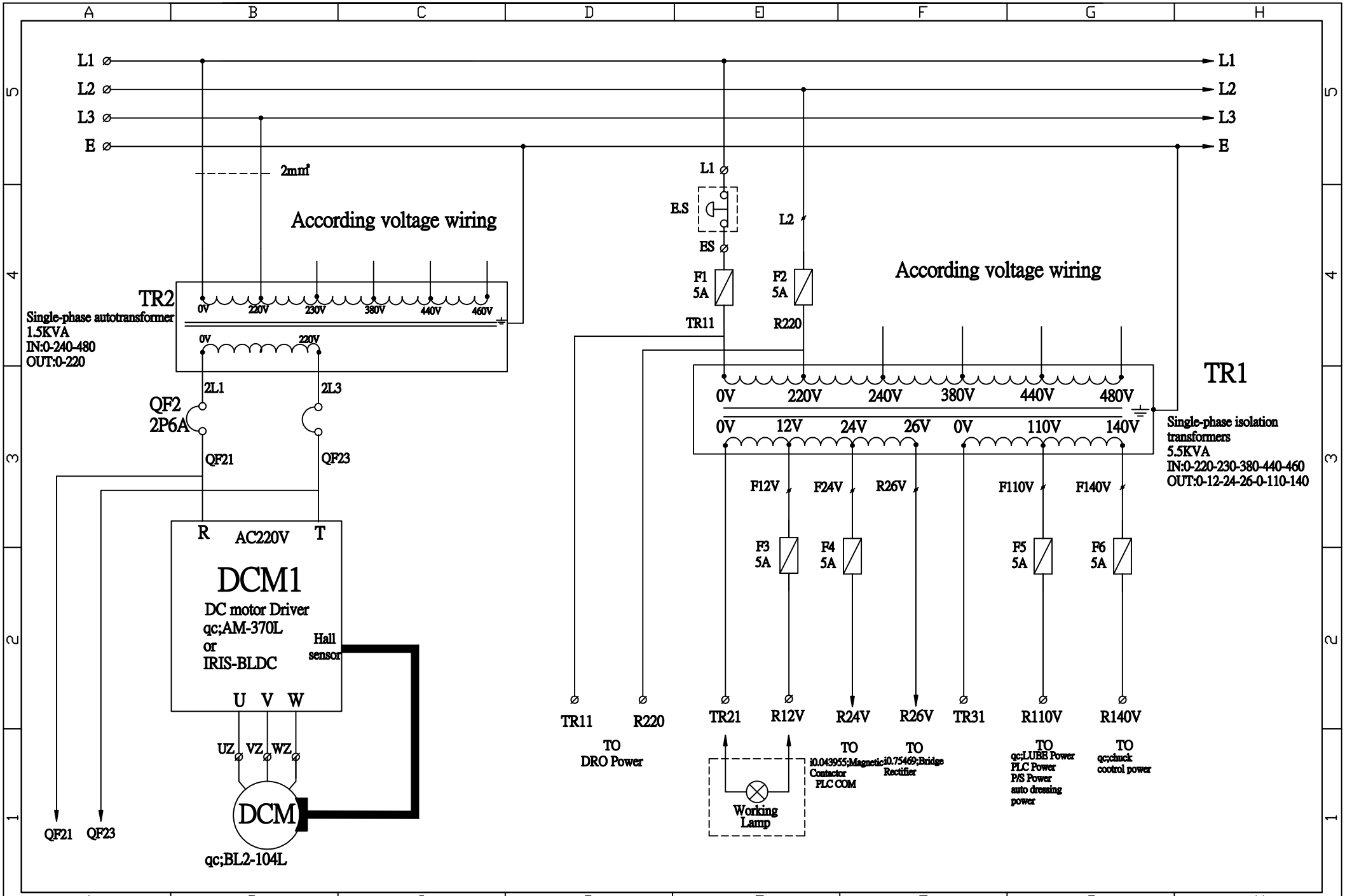

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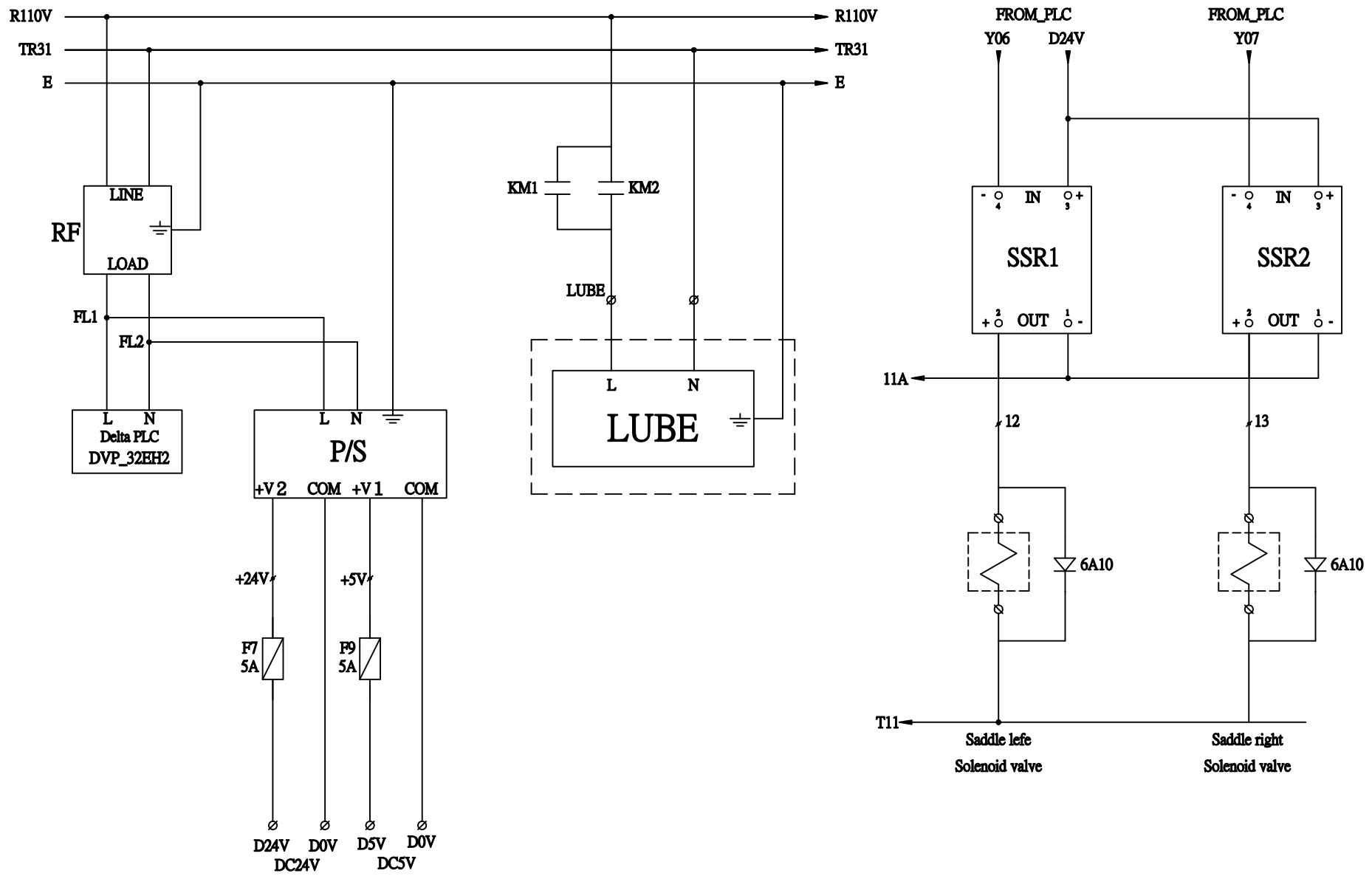

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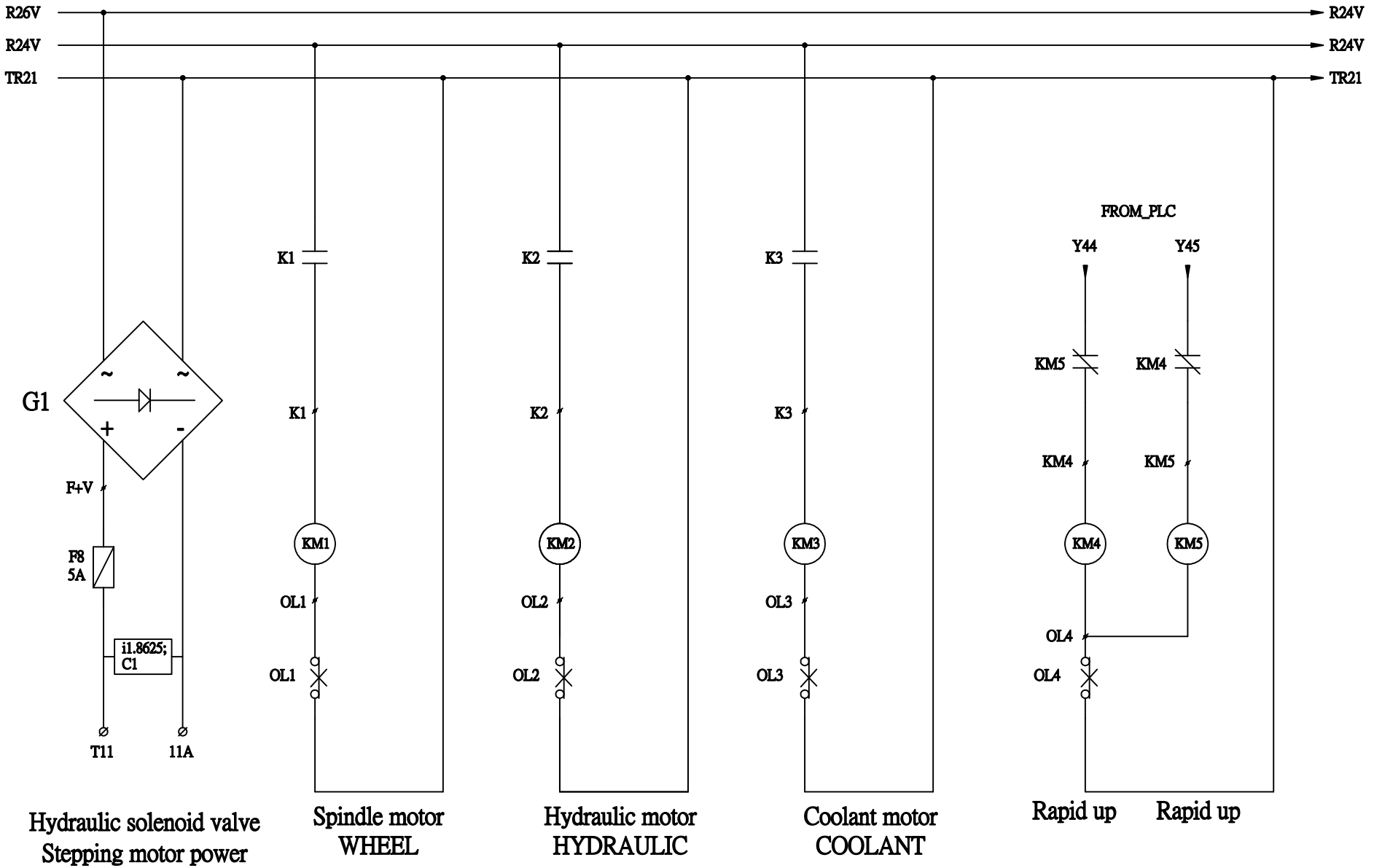

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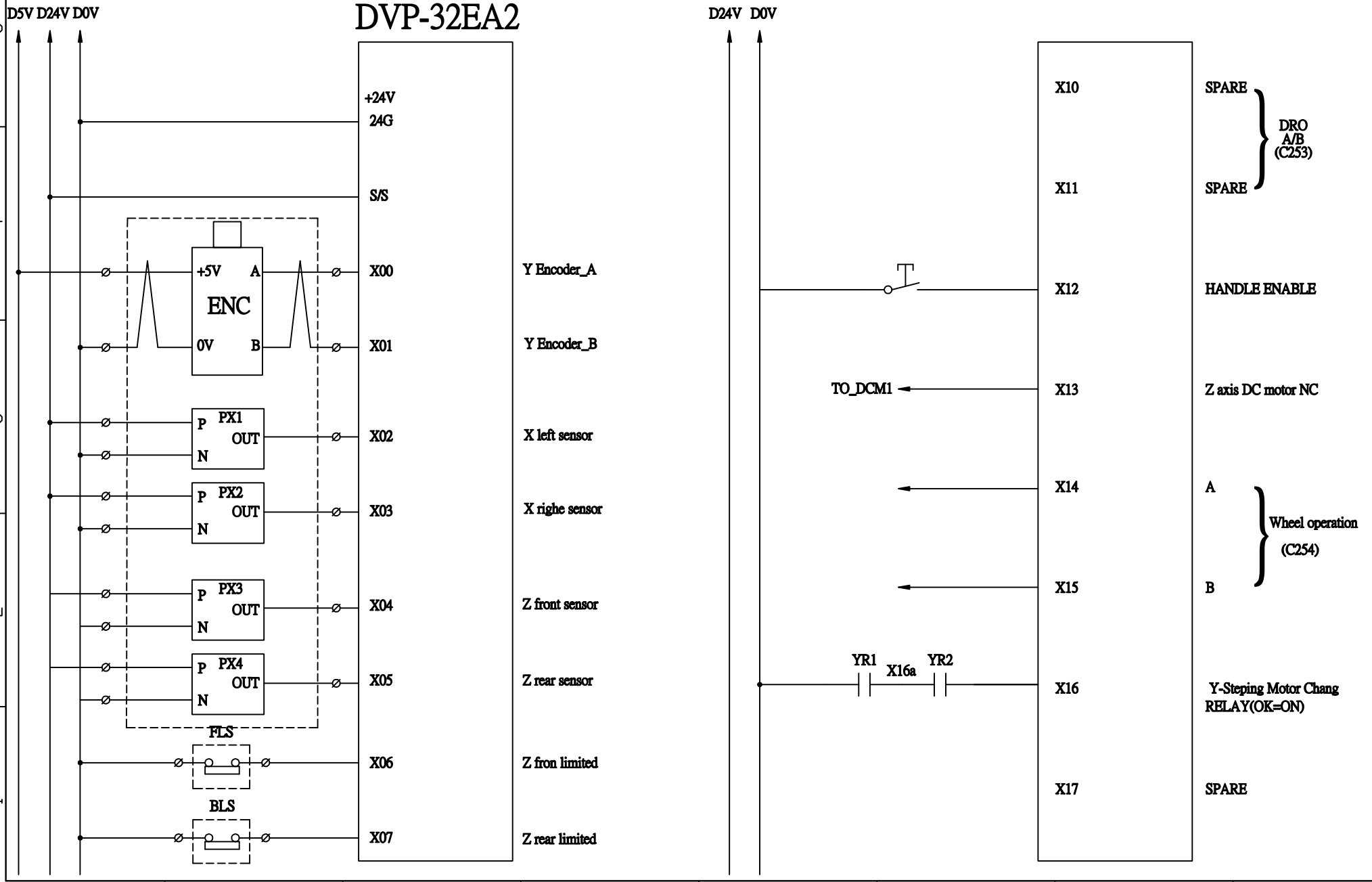
C3



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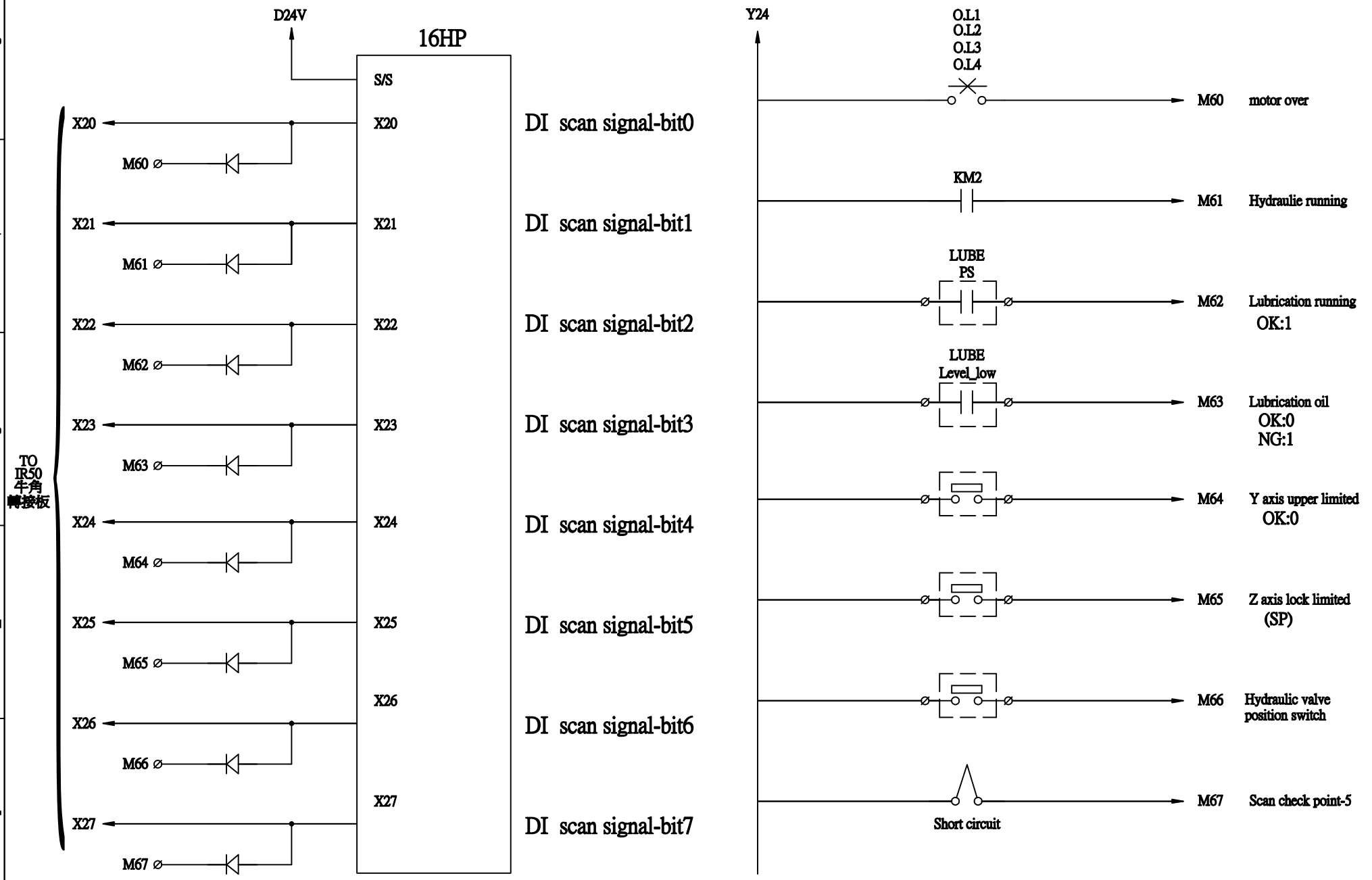
C4



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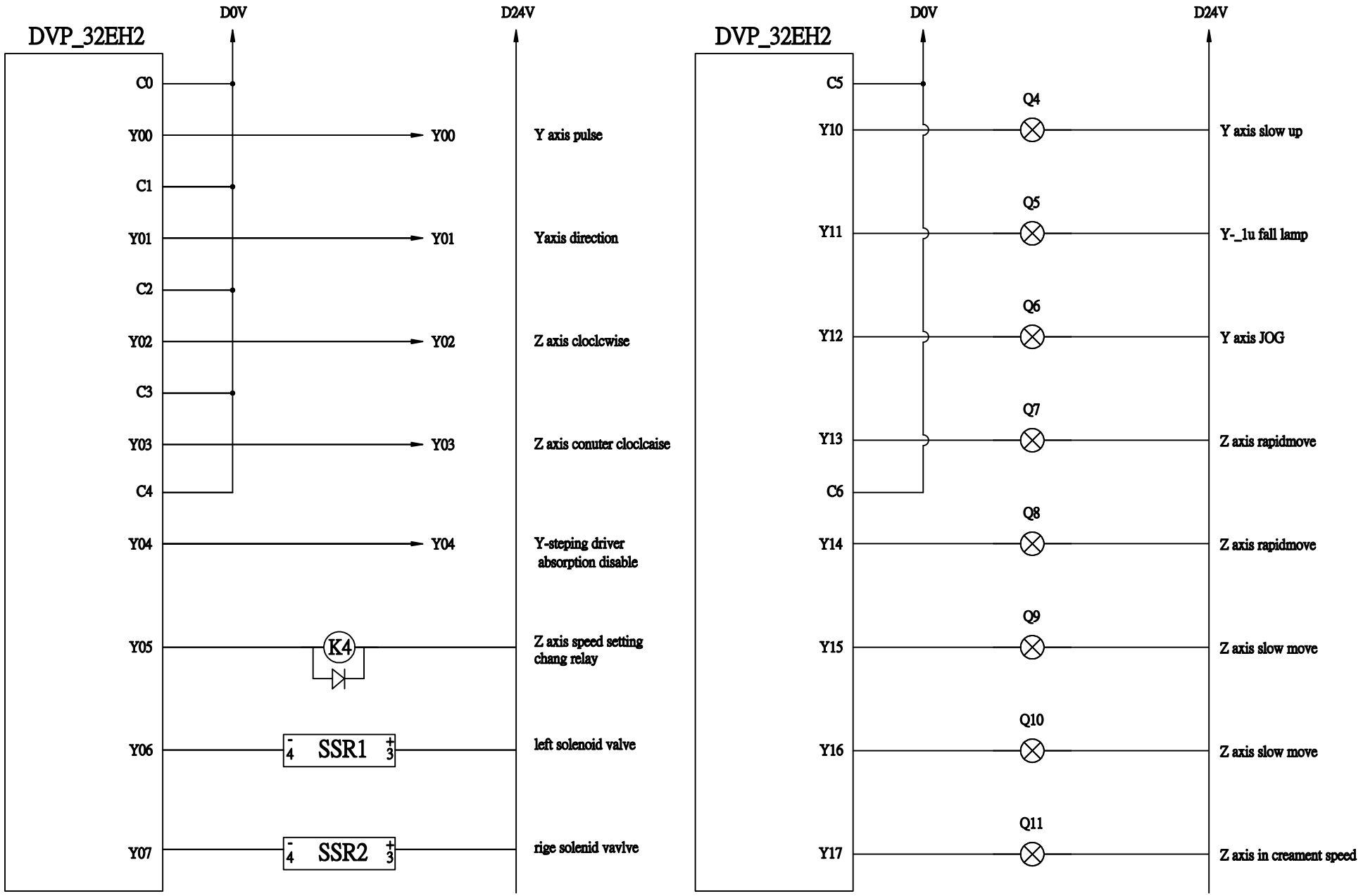
	圖檔內容 SHEET CONTENTS	Surface Grinder	檔案編號 FILE.		繪圖 DRAW		核對 CHK.		日期 DATE		

C5



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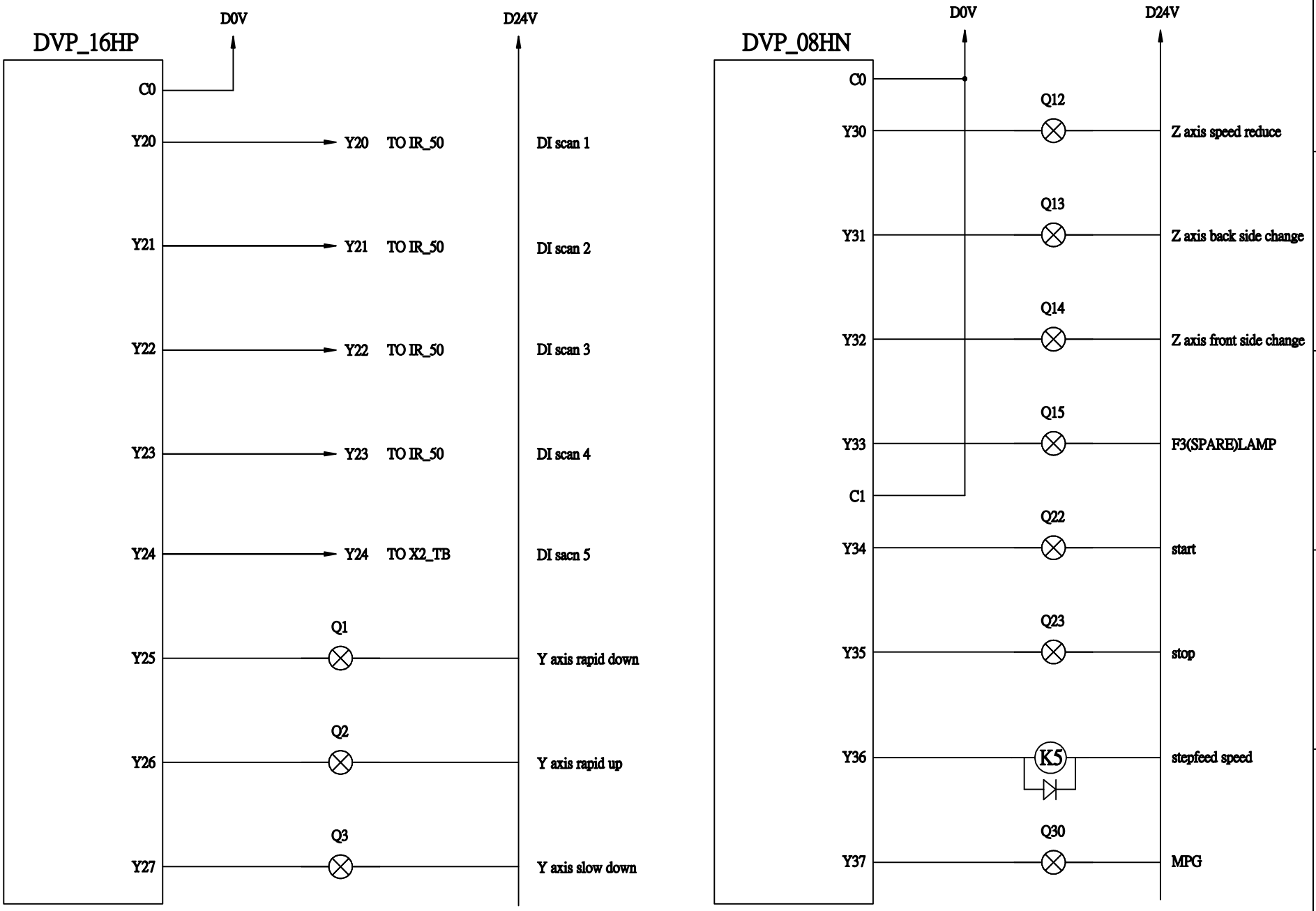
C6



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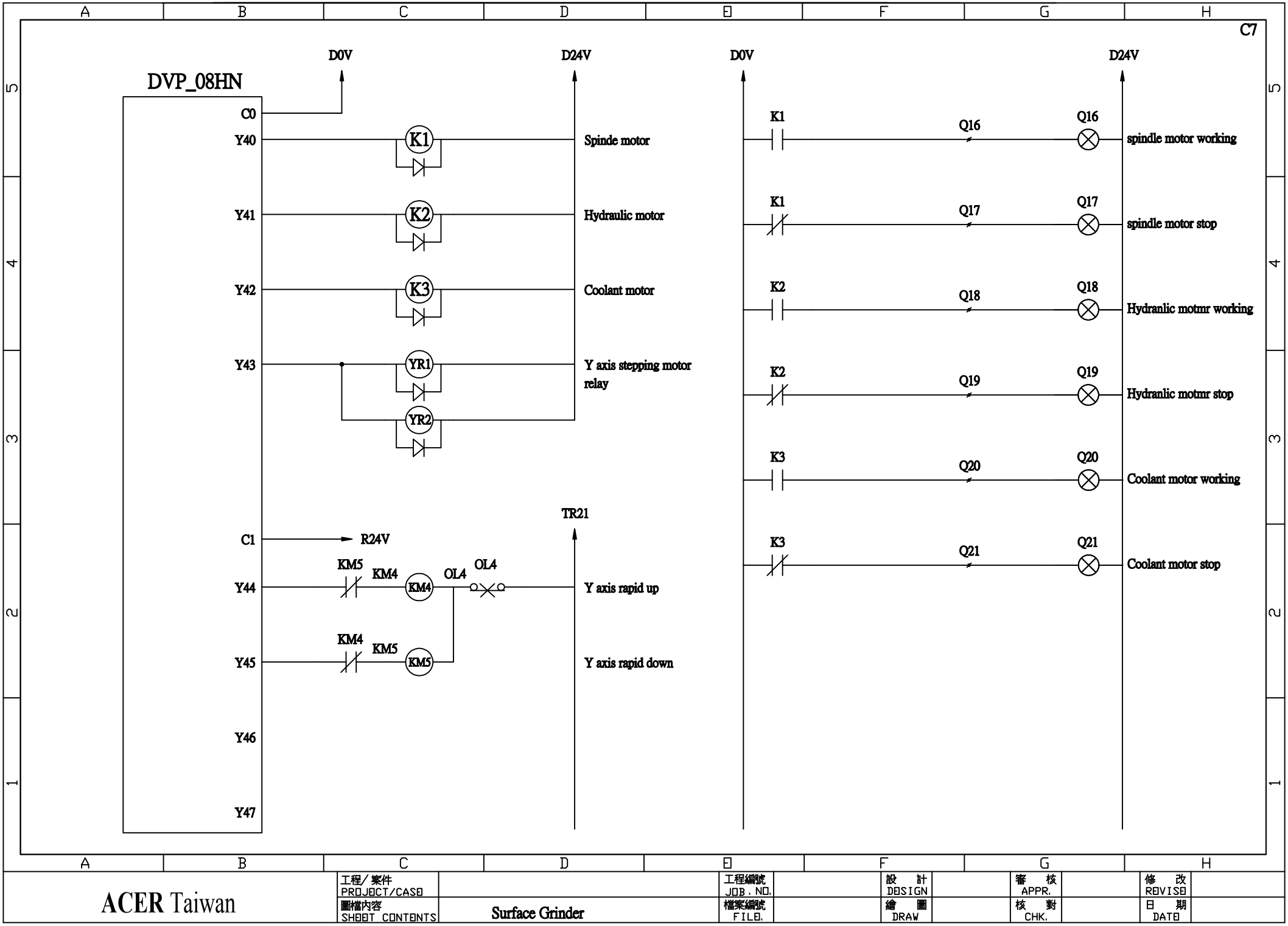
	圖檔內容 SHEET CONTENTS	Surface Grinder	檔案編號 FILE.		繪圖 DRAW		核對 CHK.		日期 DATE	



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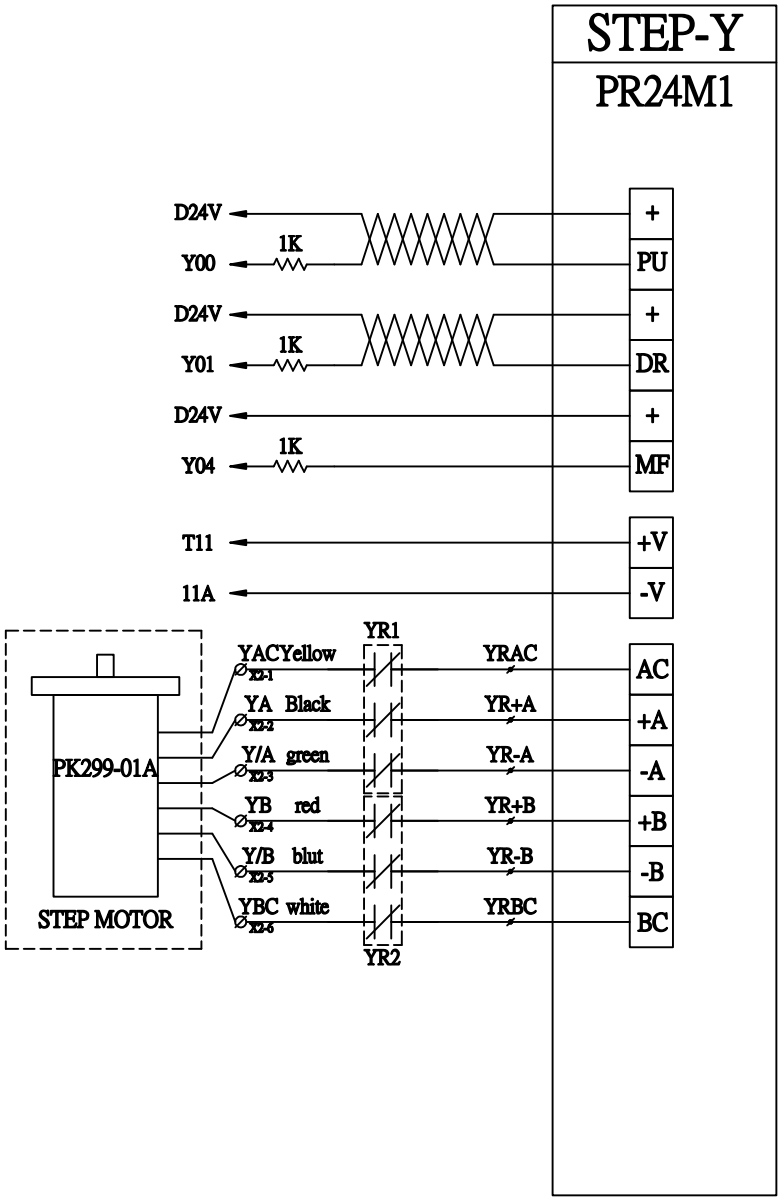
	圖檔內容 SHEET CONTENTS	Surface Grinder	檔案編號 FILE.		繪圖 DRAW		核對 CHK.		日期 DATE	

C8

Y axis stepping driver



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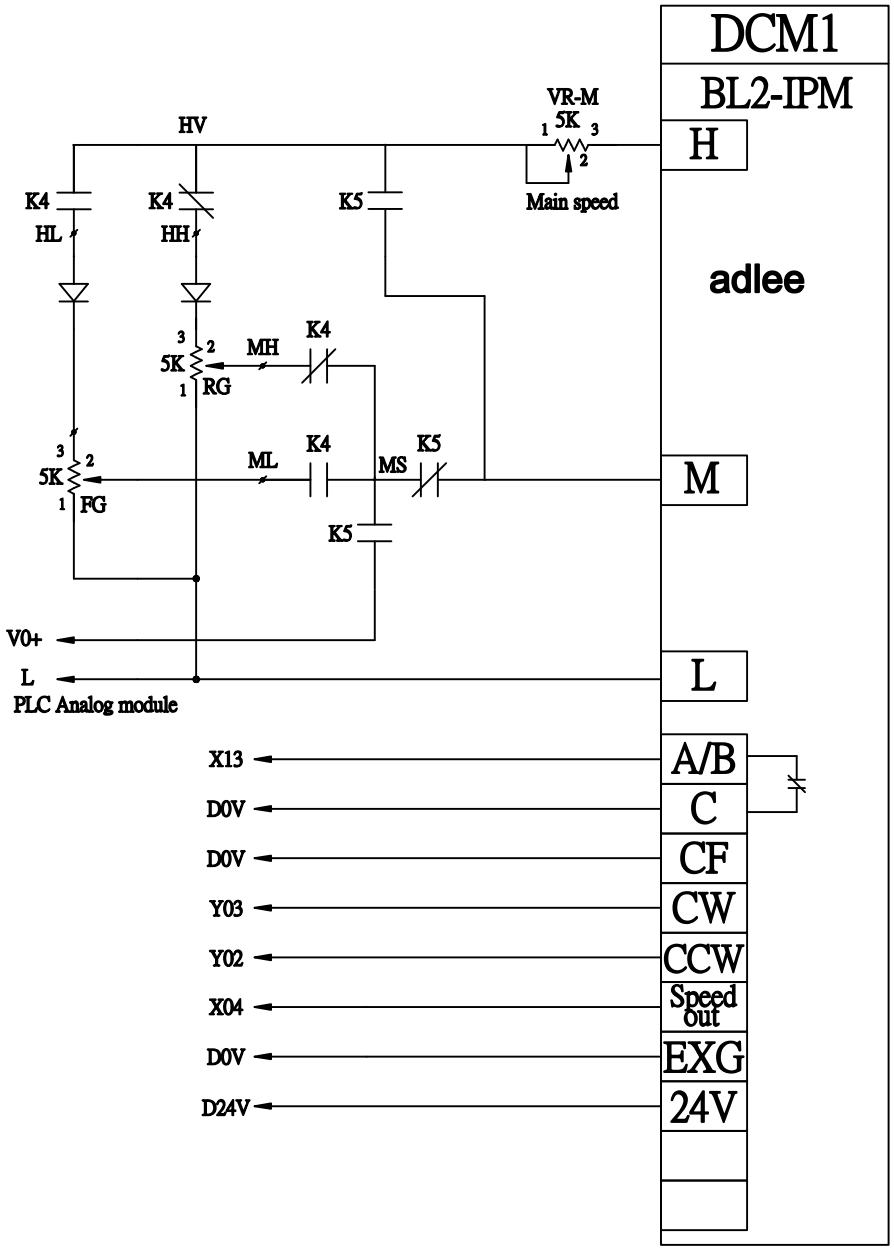
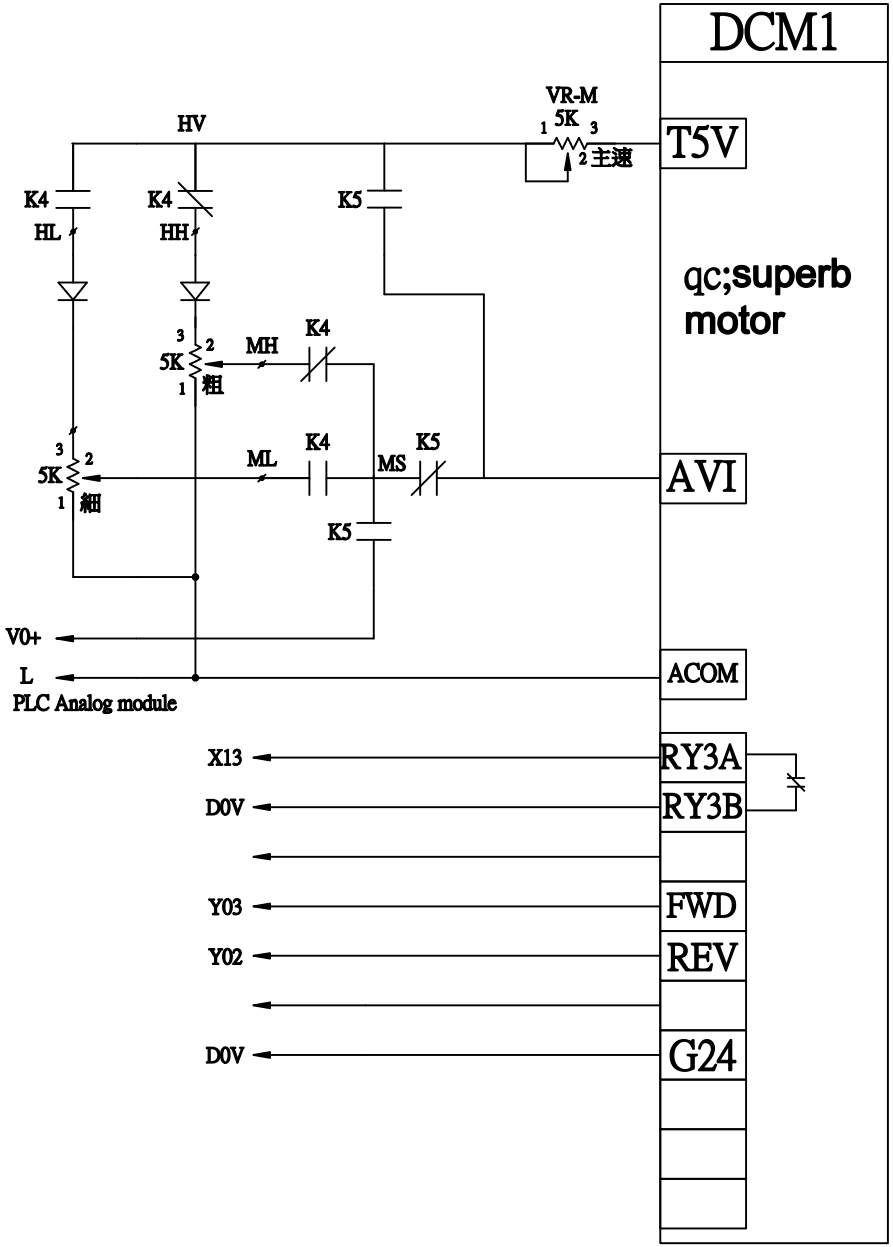
	圖檔內容 SHEET CONTENTS	Surface Grinder	檔案編號 FILE.		繪圖 DRAW		核對 CHK.		日期 DATE	

C9

Z axis DC motor driver



Z axis DC motor driver



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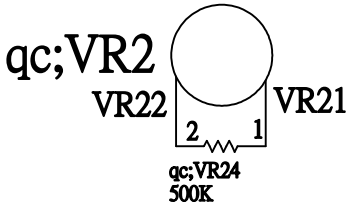
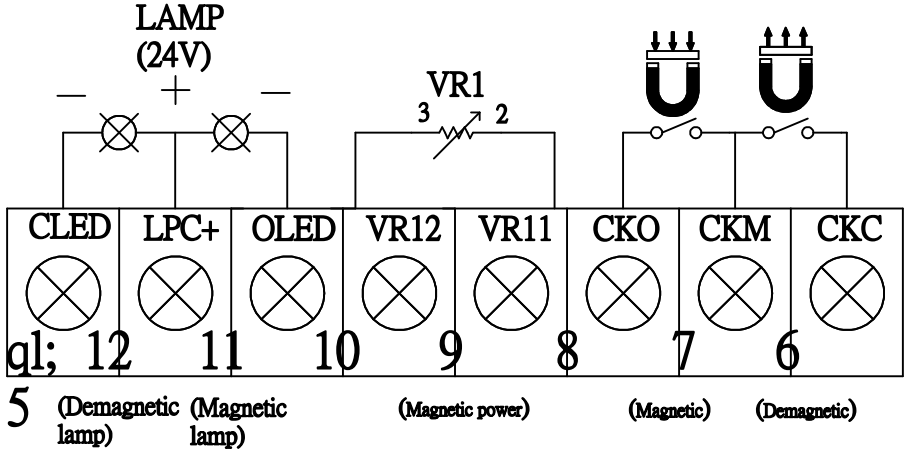
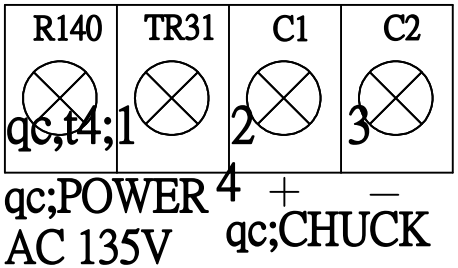
	圖檔內容 SHEET CONTENTS	Surface Grinder	檔案編號 FILE.		繪圖 DRAW		核對 CHK.		日期 DATE	2011/06/16	

C10

INPUT 135AC
OUTPUT 120DC
DATE XXXX







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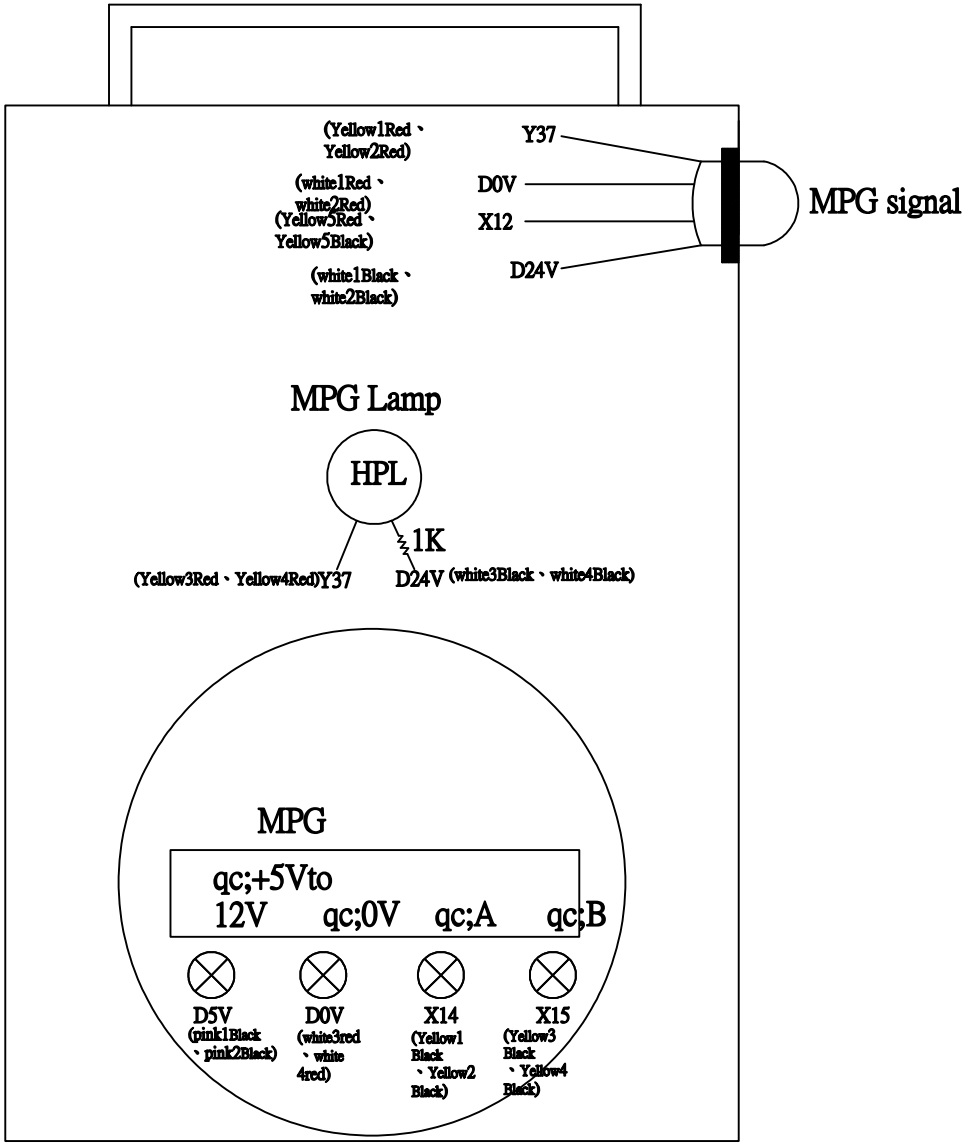
C11



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	圖檔內容 SHEET CONTENTS	Surface Grinder	檔案編號 FILE.		繪圖 DRAW		核對 CHK.		日期 DATE	2011/06/16	