



Operation Manual & Parts List For RH12

Rev 3

Milltronics Manufacturing Company
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INSTRUCTION MANUAL

PRELIMINARY INFORMATION

UNCRATING:

Carefully remove the protective crating and skid so that the machine and parts are not marred, scratched or otherwise damaged. In the event of any damage in transit, notify our representative at once as well as the transportation company making final delivery. The machine should be lifted from the base of the crate by placing a sling under the overarm.

SHORTAGES:

Inspect the complete shipment carefully against the itemized packing list to make sure that all items are present. In the event damage or shortages are noticed they should be reported immediately to the delivering carrier and to the representative from whom the machine was purchased with a clear indication as to which parts have not been received.

CLEANING:

Thoroughly clean the rust preventive materials from the machine with mineral spirits, or other suitable solvents. Do not move the table, saddle, knee or other moving parts until all of the sliding way surfaces have been well cleaned and lubricated. After cleaning carefully move to a limit stop in one direction the table, saddle and knee, and clean and lubricate the exposed way surfaces. Then move each of these units to the opposite limit stop and similarly clean and lubricate the exposed way surfaces. Loosen the two locks to unlock the overarm and move this forward and backward to the extreme position in order to clean and lubricate.

FOUNDATION:

For best performance it is important that the machine be placed on a solid foundation and that it be level. A solid concrete floor is desirable, but a firm wooden floor, freed from vibration, may be suitable. If the machine is to be located on an upper floor or balcony it should be placed as close as possible to a strong supporting pillar or column.

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LEVELING:

The machine is provided with four bolt holes one at each corner of the base. Steel wedges or steel plates should be used for leveling. A good machinist's level should be used in the leveling process and the bubble should have adequate time to come to rest. The level should be placed both lengthwise and crosswise on the machine table.

VERTICAL HEAD ON OVERARM: (EXPORT ONLY)

When the machine leaves the factory the vertical head is positioned on the overarm with the spindle up and the motor down. Before operating the machine it is necessary that the head be returned to its normal operationing position by loosening the hexagonal units located at the head end of the overarm. It will then be possible to tilt the head into normal operating position by using a crank on the 1/2" stud located on the right side of the front end of the overarm. Because of the heavy overhung weight involved, the tilting of the head back to its normal position will be greatly facilitated if a second person can help push it into position. The head may then be trammed in as described.

VERTICAL HEAD ON OVERARM:

When the machine leaves the factory the vertical head is tilted back on the overarm. Before operating the machine it is necessary that the head be returned to its normal operating position and trammed in as described.

HANDLES:

When crating, the three ball crank handles are turned facing each other. The handles should be reversed during installation.

LUBRICATION:

Do not operate machine until properly lubricated. Follow the instructions given in fig. 3, Page 6, and Lubrication plate, Page 7.

INSPECTION:

Machine is carefully inspected and lined up before it leaves our factory. Figures # 1 and 2 shows the way your machine is lined up.

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ADJUSTMENT OF TABLE GIB

The table is provided with a full length tapered gib in the saddle, with an adjusting screw on the left side. To take up gib, tighten large screw slightly and repeat until a slight drag is felt when moving the table by hand. (Fig. 4)

Fig. 4

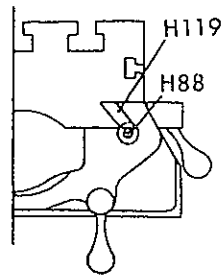
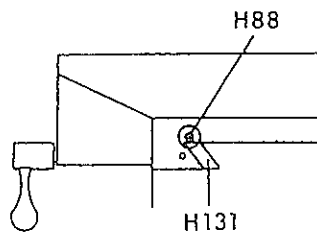


Table-saddle gib

ADJUSTMENT OF SADDLE AND KNEE GIBS

A tapered gib is used for adjusting the saddle bearing on the knee. This forms a guide for the saddle. To tighten gib same principal as described above is used; however, chip wiper must be removed first. (Fig. 5)

Fig. 5

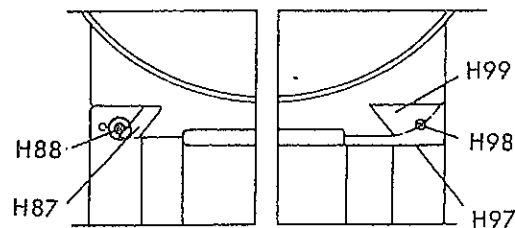


Saddle-knee gib

ADJUSTMENT OF KNEE GIB

Remove chip wiper and adjust screw until smooth movement is attained. (Fig. 6)

Fig. 6



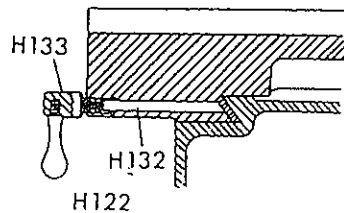
Knee-Column gib

INSTRUCTION MANUAL

CLAMPING TABLE SADDLE

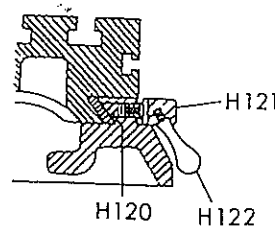
When milling with longitudinal table feed only, it is advisable to clamp the knee to the column and the saddle to the knee to add rigidity to these members and provide for heavier cuts with a minimum of vibration. The saddle locking lever is located on the left-hand side of saddle. (Fig. 7) Excessive Pressure can cause slight table bind. Use moderate clamping pressure, as this will hold saddle sufficiently.

Fig. 7



The table clamping levers are located on front of saddle and should always be clamped when longitudinal movement is not required. (Fig. 8)

Fig. 8



REMOVING OF TABLE

Remove as follows: Ball crank handles, dial holders, bearing brackets. Screw will then turn all the way so that it can be removed. When this is accomplished, the table can easily be taken off merely by sliding from saddle.

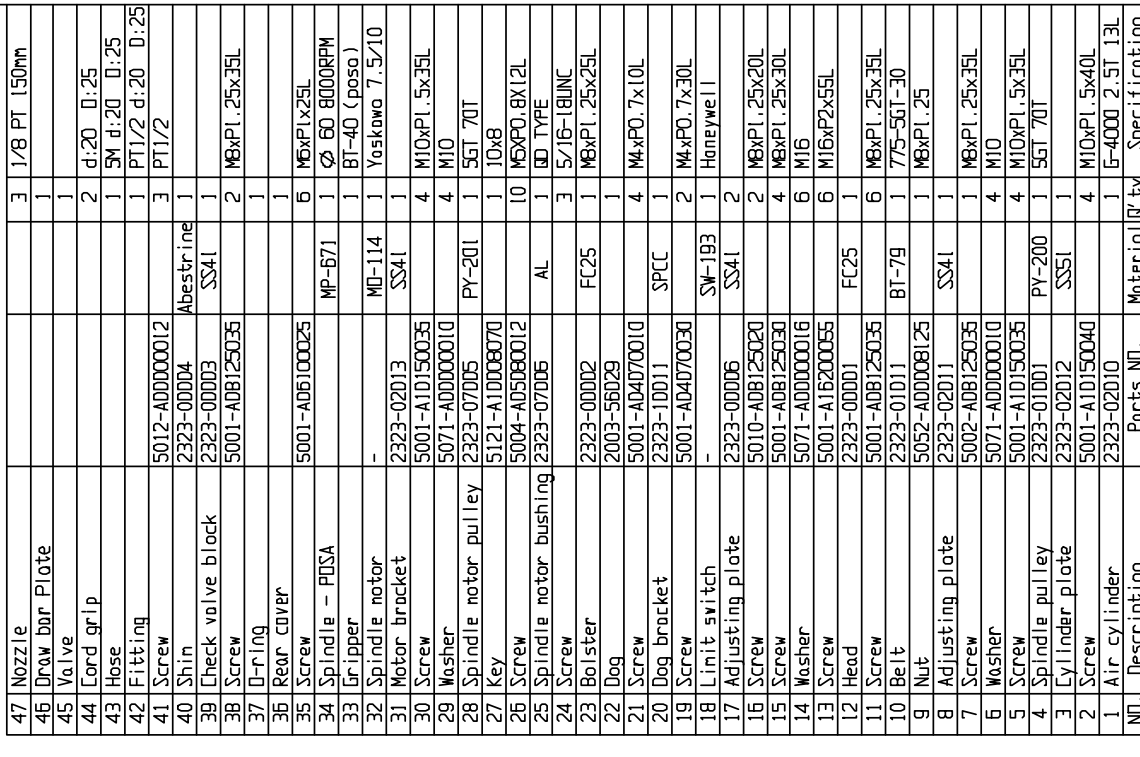
REMOVING OF SADDLE

Follows along the same lines as removing table; however, it is necessary to remove entire front bracket assembly completely. Then remove nut bracket which has become accessible after table has been removed.

MB-RH-RW/11-12 Series belts and pulleys

For belted models (A-B Versions)

	X Axis	Y axis	Z axis
Ballscrew pulley / bushing	PY-126* / PY-34	PY-126* / PY-34	PY-31 / PY-32
	20 tooth / .625"	20 tooth / .625"	24 tooth / .625"
Motor pulley / bushing	PY-126* / PY-95	PY-126* / PY-95	PY-61 / PY-95
	20 tooth / 19mm	20 tooth / 19mm	18 tooth / 19mm
Drive belt	BT-09	BT-30	BT-09
	187L075	322L075	187L075
Spindle Drive Belt, RH&RW – BT-79			
Spindle Drive Belt, MB12B rev2 – BT-100 (2 piece split)			
* PY-126 can be replaced with aluminum pulley (PY-239) to avoid rust issues			



This diagram illustrates the exploded view of a Yaskawa Servo Motor assembly. The central component is the motor, labeled 'YASKAWA SERVO MOTOR 7.5/10HP 8000RPM'. The assembly includes various mounting brackets, screws, and a control unit. The components are numbered 1 through 47, corresponding to the list on the right. The diagram shows the motor mounted on a base, with a control unit and various mounting hardware. The exploded view shows the relative positions of the components, including the motor, mounting brackets, screws, and the control unit.

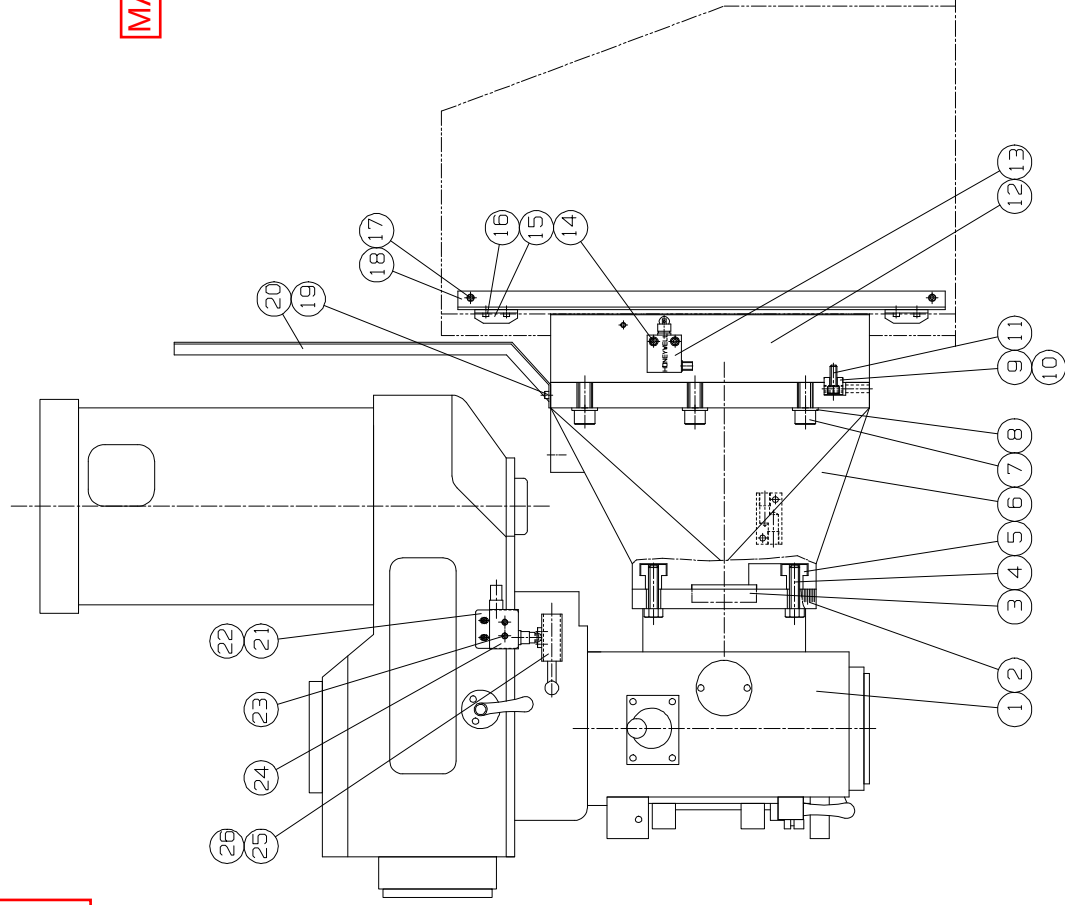
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Z axis rear
waycover bracket
MPS-307

#47 MA-21
#44 & 42 WX-326
#38 MPL-867
#33 TL-118
#11 & #7
MPL-867
#3 MPS-572

- #32 NU-25
- #31 NU-33
- #30 MHVS-300
- #29 10053
- #28 NU-07
- #27 MA-22
- #25 MPS-516
- #24 SW-193
- #3 MHVS-575

MB11-12 Head / Bolster Assembly



Intermediate bolster spacer
VM-182
Chip guard MPS-314

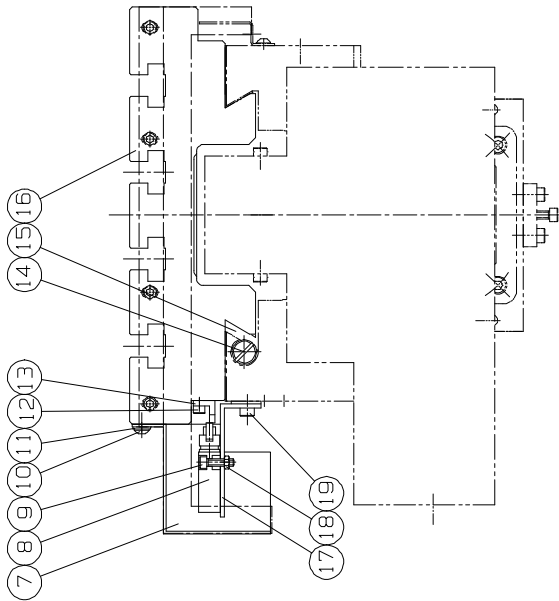
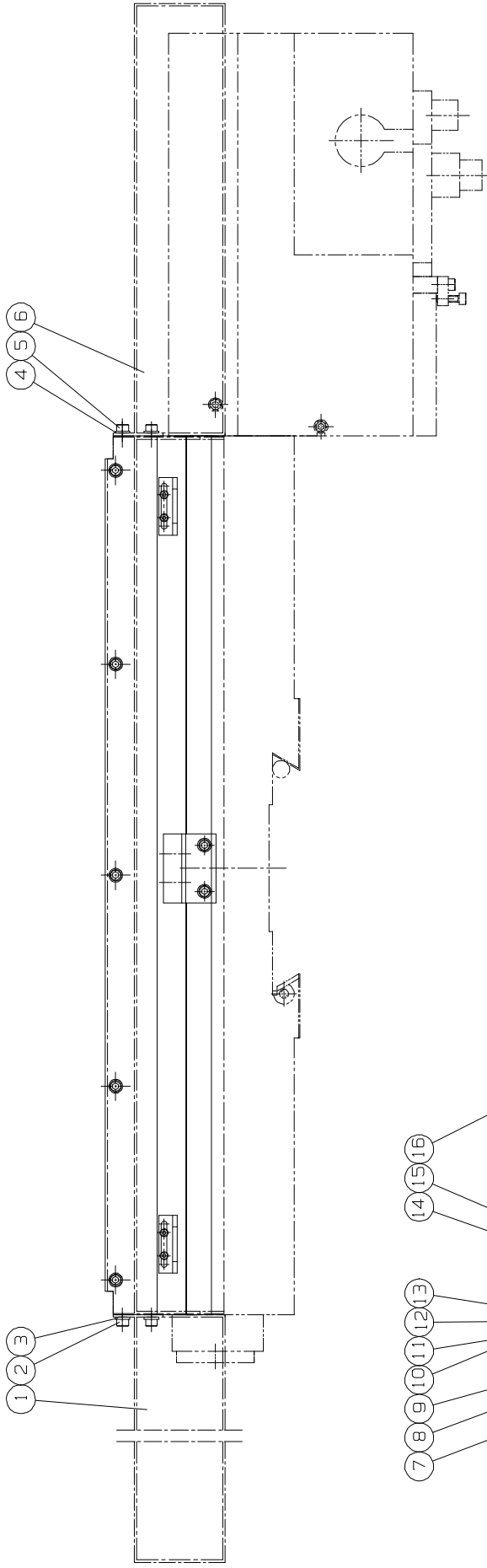
No.	Description	Parts No.	Material	Qty	Spec
	App'd	Check	Design	Drawn	Mode
	Leon	Scale	1:4	Title	Head Assembly
	90073	Unit	MM	Dwg No	2101-00-A
32	Tube	-		2	PT1/4XØ13
31	Elbow Fitting	-		1	
30	Block	2101-00006-400		1	M6XP1.0X30L
29	Screw	5001-B06100030		2	PT1/4
28	Level	-		1	PT1/4
27	Nozzel	-		1	PT1/4
26	Screw	5001-A050800012		2	M5XP0.8X12L
25	Hi/Low Switch Lever	2103-00012-400		1	
24	Limit Switch	-		1	
23	Screw	5001-B04070025		2	M4XP0.7X25L
22	Screw	5001-B04070012		2	M4XP0.7X12L
21	Switch Plate	2103-00011-400		1	
20	Guard	2101-00015-400		1	
19	Screw	5001-A050800012		2	M5XP0.8X12L
18	Dog Bracket	2323-10011-400		1	
17	Screw	5001-B050800012		2	M5XP0.8X12L
16	Screw	5001-B050800012		4	M5XP0.8X12L
15	Dog	2003-56029-400		2	
14	Screw	5001-B050800015		2	M5XP0.8X15L
13	Limit Switch	-	SW-193	1	HoneyWell 914CE2
12	Bolster	2323-00002-202		1	
11	Screw	5001-B08125025		4	M8XP1.25X25L
10	Screw	5010-A08125020		2	M8XP1.25X20L
9	Fix Block	2323-00006-400		2	
8	Flat Washer	5071-A000000016		6	#16
7	Screw	5001-B16200055		6	M16XP2.0X55L
6	Intermediate Bolster	2101-00002-201		1	
5	T-Bolt	-		4	
4	Hex. Screw	-		4	
3	Worn Gear	-		1	
2	Scale	-		1	
1	Head	-		1	3HP/5HP

This technical drawing shows a mechanical assembly with 29 numbered callouts. The assembly includes a main body with a central rectangular feature, a top flange, and a base. The callouts are distributed as follows:

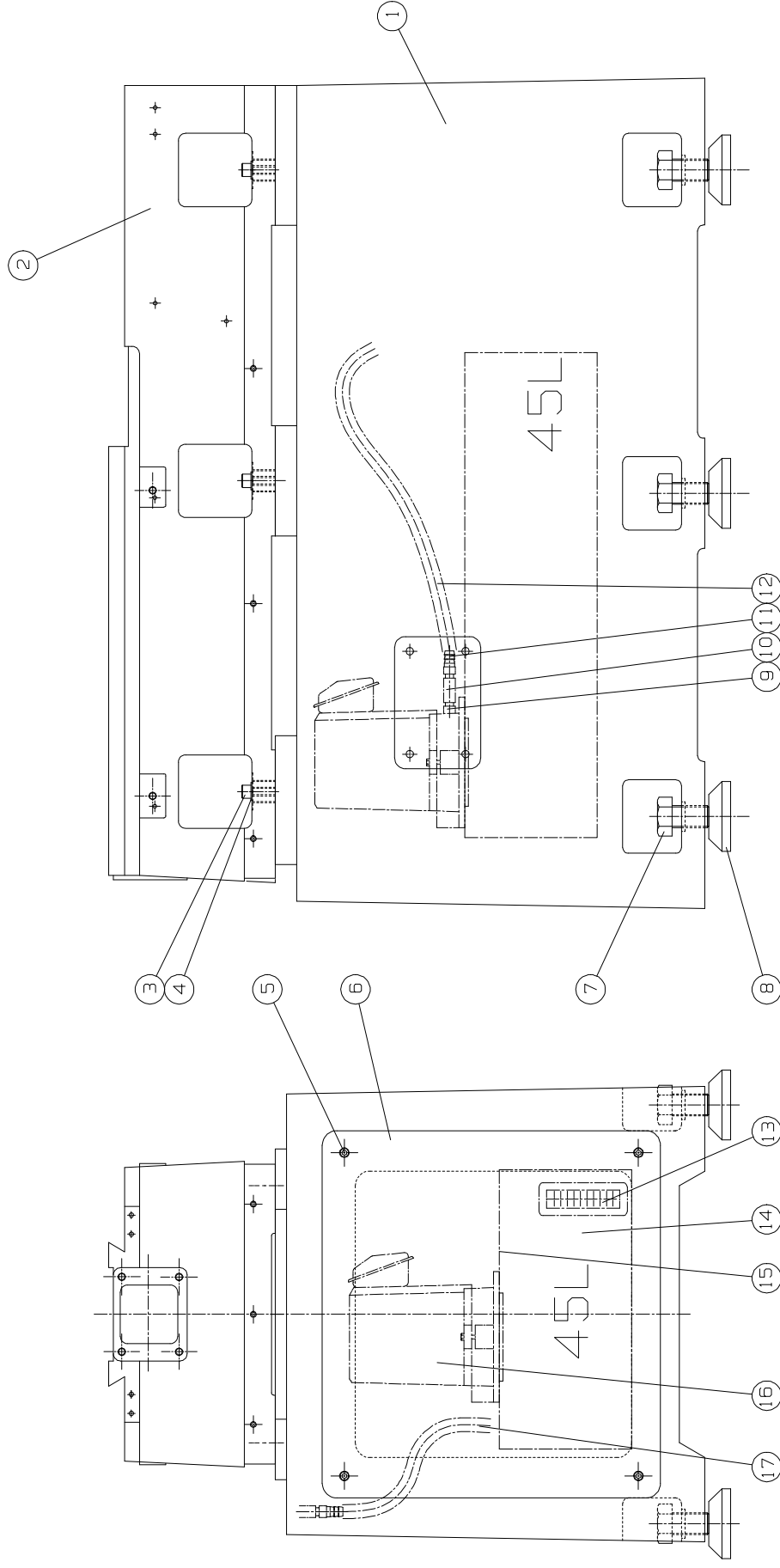
- 1: Top flange
- 2: Top flange
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- 22: Top flange
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- 25: Top flange
- 26: Top flange
- 27: Top flange
- 28: Top flange
- 29: Top flange

Technical drawing of a mechanical assembly, likely a pump or motor component, showing a cross-section. The drawing includes various parts labeled with circled numbers 15 through 26. The assembly consists of a main housing (15) with internal components including a rotor (16), a stator (17), and a shaft (18). A pump head (19) is mounted on the shaft, and a pump body (20) is attached to the pump head. A pump cover (21) is shown at the bottom, and a pump base (22) is at the top. A pump inlet (23) and pump outlet (24) are indicated. A pump seal (25) is shown on the shaft, and a pump bearing (26) is shown supporting the shaft.

Technical drawing of a mechanical assembly, likely a pump or motor component, showing a cross-section. The drawing includes various parts labeled with circled numbers 15 through 26. The assembly consists of a main housing (15) with internal components including a rotor (16), a stator (17), and a shaft (18). A pump head (19) is mounted on the shaft, and a pump body (20) is attached to the pump head. A pump cover (21) is shown at the bottom, and a pump base (22) is at the top. A pump inlet (23) and pump outlet (24) are indicated. A pump seal (25) is shown on the shaft, and a pump bearing (26) is shown supporting the shaft.

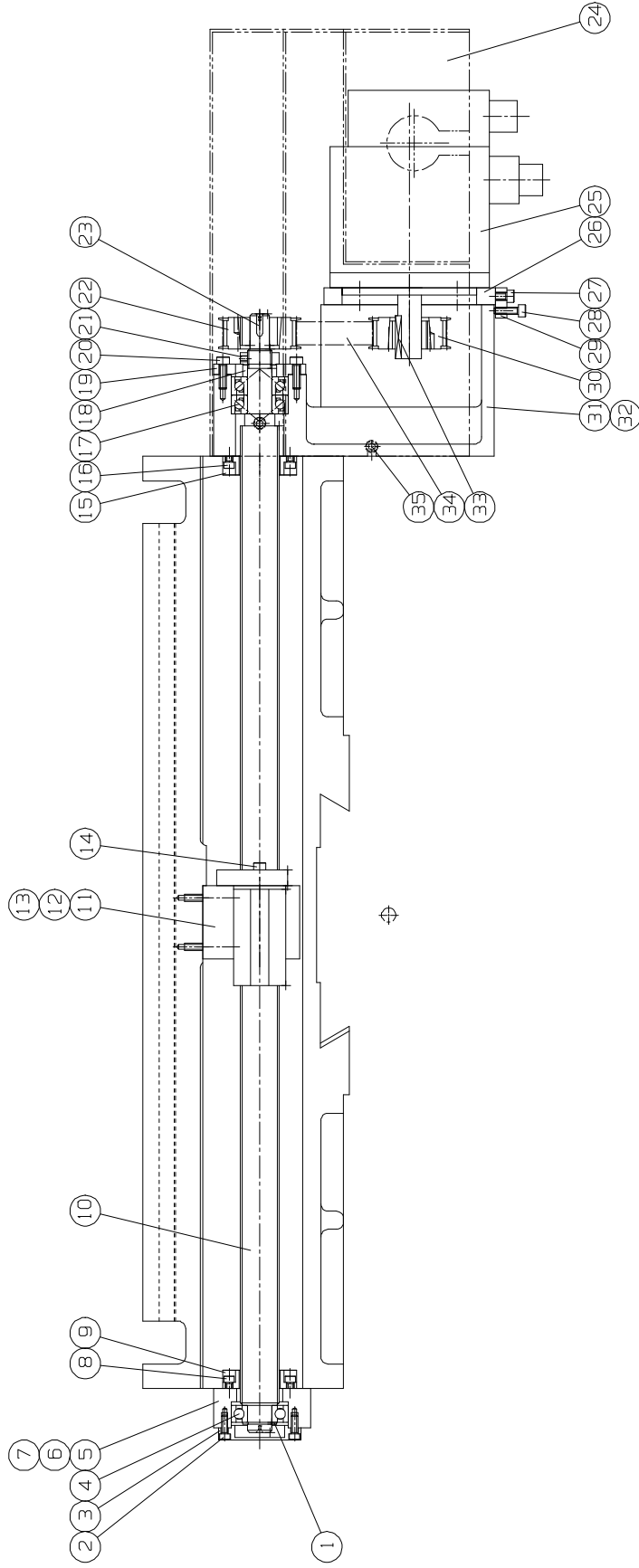


19	Screw	5001-B06100012	2	M6XP1.0X12L
18	Nut	5051-A00005080	1	M5XP0.8
17	Switch Plate	2323-20013-400	SPCC	1
16	Table	2323-30100-102	FC30	1
15	Gig	F-011	FC30	1
14	Adjusting Screw	F-010	-	2
13	Dog	2003-56029-400	S45C	2
12	Screw	5001-A05080012		4
11	Washer	5071-B00000006	#6	5
10	Screw	5005-B06100012		5
9	Screw	5001-B05080020		2
8	Limit Switch	-	SW-193	1
7	Front Cover	2101-30006-300	MPS-299	1
6	X-Way Cover-Right	2101-30010-400		1
5	Screw	5001-B06100012		6
4	Washer	5071-B00000006	#6	6
3	Washer	5071-B00000006	#6	6
2	Washer	5001-B06100012		6
1	X-Way Cover-Left	2101-30011-401		1
No.	Description	Parts No.	Material	Qty
App'd	Check	Design	Drawn	Mode
Leon	Scale	1:2.5	Title	Table Assembly
900731	Unit	MM	Dwg No	2101-30-A



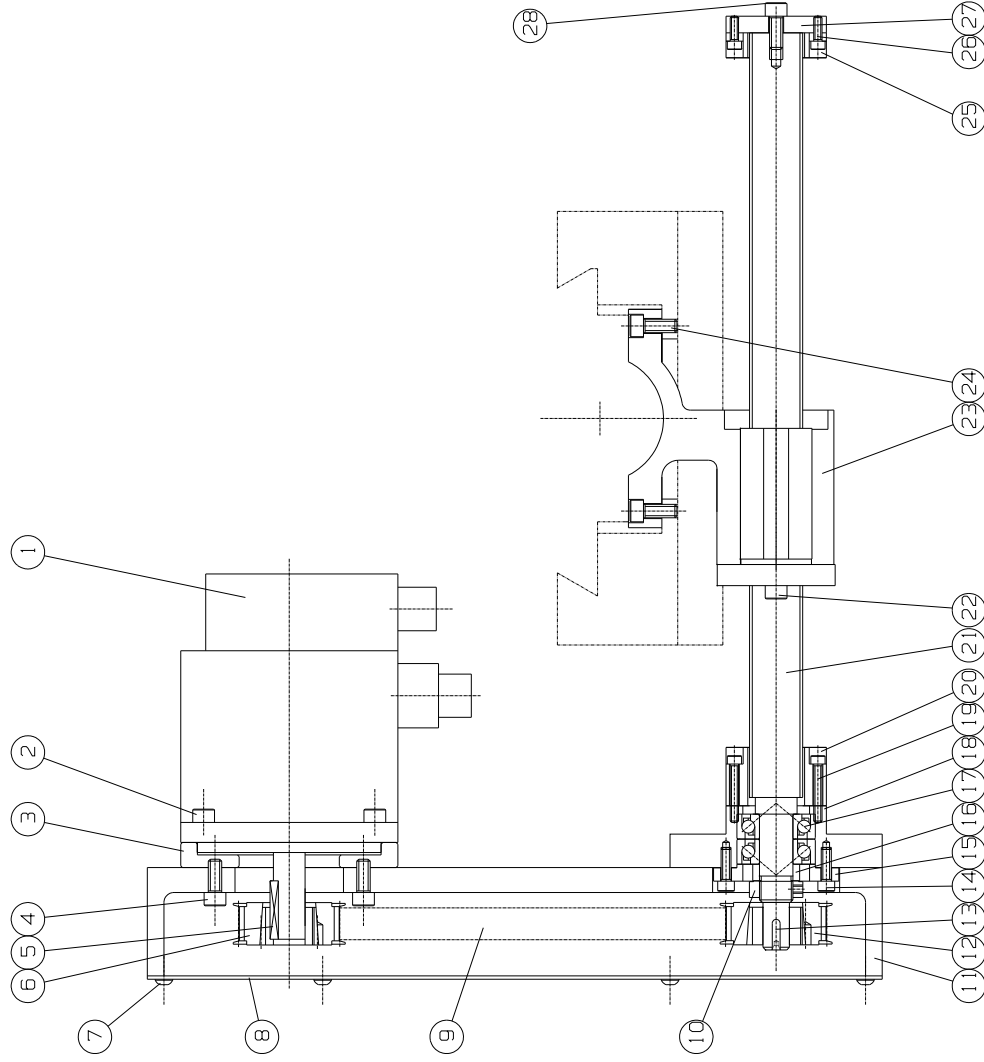
#8 MBC-190
#7 MBB-131
#6 MBT-215

19							8	Leveling Pad	F-016		FC25	6	
18							7	Leveling Bolt	F-015		S45C	6	M30XP1.5
17	Coolant Hose	-			1	Ø13XØ19X1in	6	Front Cover	F-014		SPCC	1	
16	PUMP	F-020	MA-267		1		5	Screw	5001-A08125015			4	M8XP1.25X15L
15	Tank Cover	F-019			1		4	Washer	5071-A00000012			6	#12
14	Tank	F-018			1		3	Screw	5001-A12175050			6	M12XP1.75X50L
13	Scale	F-017			1		2	Base	F-013		FC30	1	
12	Coolant Hose	-			1	Ø13XØ19X4in	1	Stand	F-012		FC25	1	
11	Fitting	-			1	PT3/4	No.	Description	Parts No.		Material	Qty	Spec
10	Check Valve	-			1	PT3/4	App'd	Check Design	Drawn		Mod	MB-11/12	
9	Fitting	-			1	PT3/4	Scale	1:4	Unit	Leon	Title	Base Assembly	
No.	Description	Parts No.	Material	Qty	Spec		Unit	MM	Dwg No	2101-40-A			



35	Screw	5005-B06100012	2	M6XP1.0X12L	16	Screw	5001-A05080012		2	M5XP0.8X12L
34	Belt	2323-51020-400	1	165L075	15	Ruber Stop	2323-51015-400	PDM	1	
33	Key	5121-A05005035	1	5X5X35L	14	Screw	5001-A08125025		4	M8XP1.25X25L
32	Taper Pin	-	2	#5	13	Taper Pin	-		2	#6
31	Motor Bracket Housing	2323-51010-300	FC25	1	12	Screw	5001-A06100025		4	M6XP1.0X25L
30	Pulley-Motor	2323-51006-400	PY-126	1	20L075	11	Carrier	2323-51009-401	FC25	1
29	Adjusting Plate	2323-51017-400	S45C	1	M6XP1.0X20L	10	Ball Screw	2323-51100-400	MPB-02	1
28	Screw	5001-A06100020	2	M6XP1.0X20L	9	Rubber Stop	2323-51015-400	PDM	1	Ø31.75XP10
27	Screw	5001-A06100020	S45C	1	8	Screw	5001-A05080012		2	M5XP0.8X12L
26	Motor Plate	2323-51011-401	S45C	1	7	Taper Pin	-		2	#5
25	Servo Motor	-	1	YASKAWA 05A	6	Screw	5001-A08125030		2	M8XP1.25X30L
24	Motor Cover	2323-51018-301	SPCC	1	5	Bracket	2323-51016-300	FC20	1	
23	Key	-	1	3/16X3/16X18	4	Ball Bearing	-	BG-02	1	6204
22	Pulley-Ball Screw	2323-51007-400	PY-126	1	20L075	3	Cover-Left End	2323-51012-400	S45C	1
21	Nut	-	1	YSR M20X1.0	2	Screw	5001-A05080015		4	M5XP0.8X15L
20	Screw	5001-A06100020	S45C	4	M6XP1.0X20L	1	C-Snap	5141-A00000020	1	#20
19	Bearing Cup	2323-51013-400	S45C	1	No.	Description	Parts No.	Materid	Q'ty	Spec
18	Spacer	2323-51014-400	S45C	1	App'd	Check	Design	Drawn	Mode	MB-11/12
17	Ball Bearing	-	BG-102	2	20TAC47B	Leon	Scale	1:2.5	Title	X-Axis Assembly
No.	Description	Parts No.	Materid	Q'ty	Spec			Unit	MM	Dwg No
						900731	2101-51-A			

Y axis



#25 & 20 MP-718

#21 Cut MPB-02 to 21.25" length. Drill and tap M8-1.25x20mm hole in cut end on center before shipping replacement ballscrew.

[illegible]



#15 SP-66
#8 MPL-867

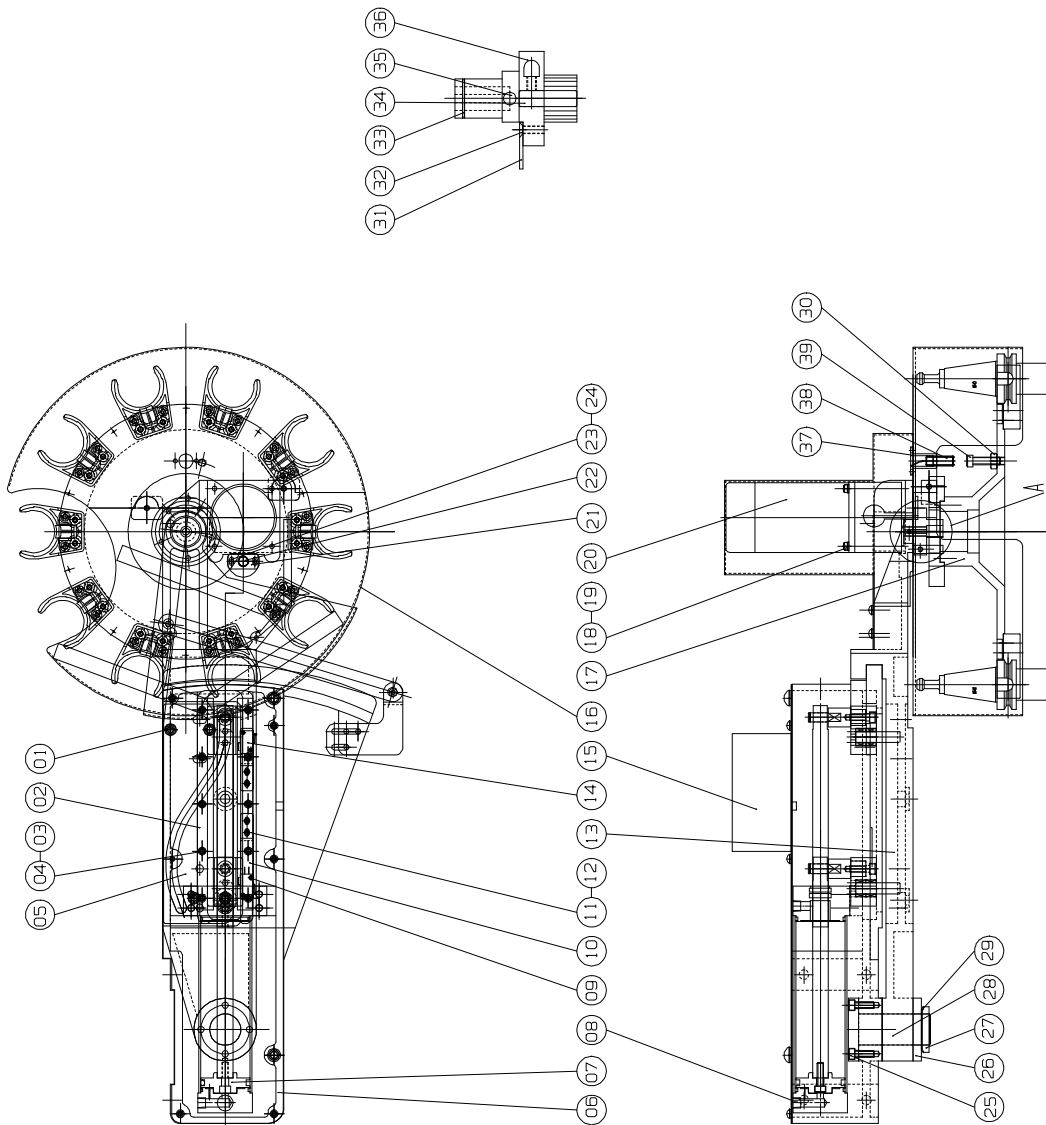
[illegible]

ATC Tool Magazine

Dwg no. 2323-65-A1

Item	Parts No.	Description	Material	Specification	Q'ty
1		Hex. socket screw		M8 x 1.25P x 40L	4
2	ILC1016	Slide clamp	SPHC		1
3		Hex. socket screw		M6 x 1P x 20L	10
4		Washer		ψ6	10
5	ILC1003A	Cam	S45C		1
6	ILC1001A	Union bracket	FC30		1
7		Cylinder			1
8		Socket		JSC-1002	2
9		Hex. socket screw		M5 x 0.8P x 10L	4
10	ILC1022A	Limit switch bracket	SPHC		1
11		Hex. socket screw		M4 x 0.7P x 10L	4
12		Washer		ψ4	4
13	ILC1027A	Arm	FC30		1
14	SW-273	Limit switch		YAMATAKE V-5114E	2
15		Junction box			1
16		Guard			1
17		Disk			1
18		Hex. socket screw		M6 x 1P x 80L	4
19		Washer		ψ6	4
20		Motor		5RK40GN-CF	1
21	HC50102901	Sensor bracket	SPHC		1
22		Sensor		M12x1P-2mm(PNP-NO)	1
23		Hex. socket screw		M5 x 0.8P x 10L	2
24		Washer		ψ5	2
25		Hex. socket screw		M8 x 1.25P x 25L	4
26	ILC1010A	Washer	S45C		1
27		Bearing nut		AN08	1
28	ILC1009A	Shaft	S45C		1
29		Washer		AW08	1
30		Nut		M10 x 1.5P	1
31	ILB0028A	Sensor plate	SPHC		1
32		Flat head screw		M5 x 0.8P x 15L	2
33		Snap		S-25	1
34		Fork	SK2		1
35		Bolt		M6 x 1P x 10L	1
36		Drive wheel 2	SCM4		1
37	ILC1018A	Sensor bracket	S45C		1
38		Sensor		M12x1P-2mm(PNP-NO)	1
39		Hex. socket screw		M10 x 1.5P x 35L	1

BUFFALO MACHINERY CO., LTD.



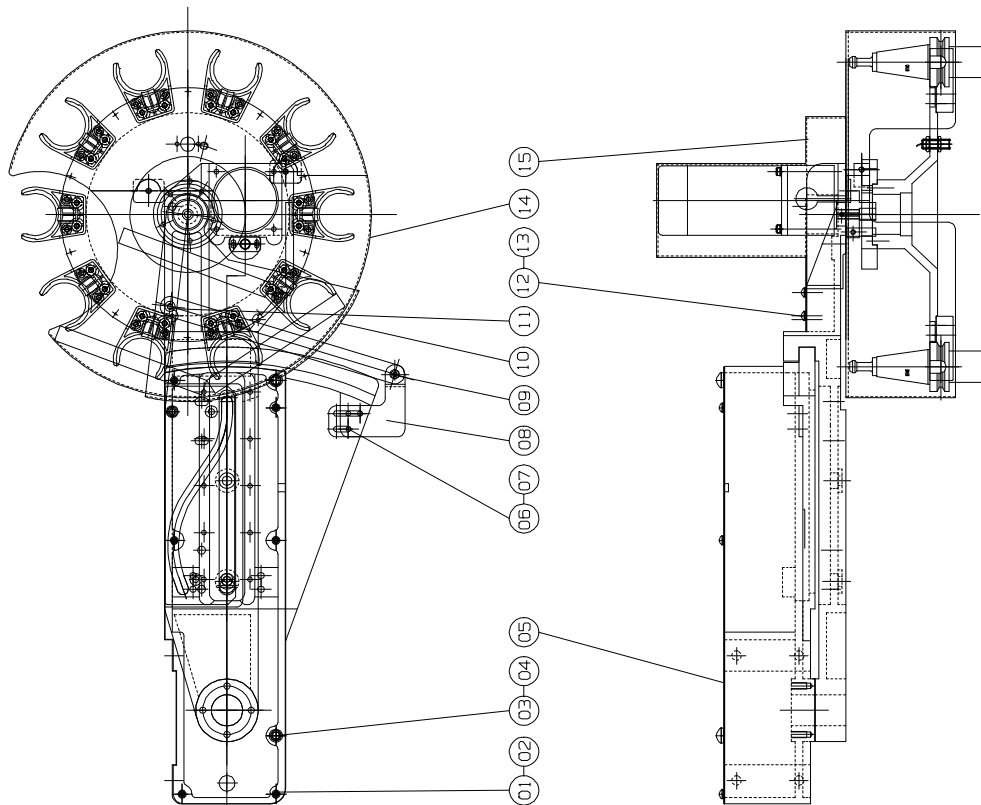
App'd	Check	Design	Drawn	Scale	Unit	MM	Draw No	2323-65-A1	Mode	ILC-10T ATC
			Leon	1:4					Title	ATC-Tool Magazine
			90101						Unit	

ATC Guard

Dwg no. 2323-65-A2

Item	Parts No.	Description	Material	Specification	Q'ty
1		Hex. socket screw		M5 x 0.8P x 10L	4
2		Washer		ψ5	4
3		Hex. socket screw		M10 x 1.5P x 25L	2
4		Washer		ψ10	2
5	ILC1019A	Cover	SPHC	MP-717	1
6		Washer		ψ6	3
7		Hex. socket screw		M6 x 1P x 15L	3
8	ILC2008A	Door rod bracket	SPHC		1
9		Flat head screw		M6 x 1P x 5L	1
10	ILC2007A	Door	SPHC		1
11		Flat head screw		M6 x 1P x 5L	1
12		Washer		ψ5	3
13		Hex. socket screw		M5 x 0.8P x 10L	3
14	ILC2005A	Disk cover	SPHC		1
15	ILC2002A	Motor cover 2	SPHC		1

BUFFALO MACHINERY CO., LTD.

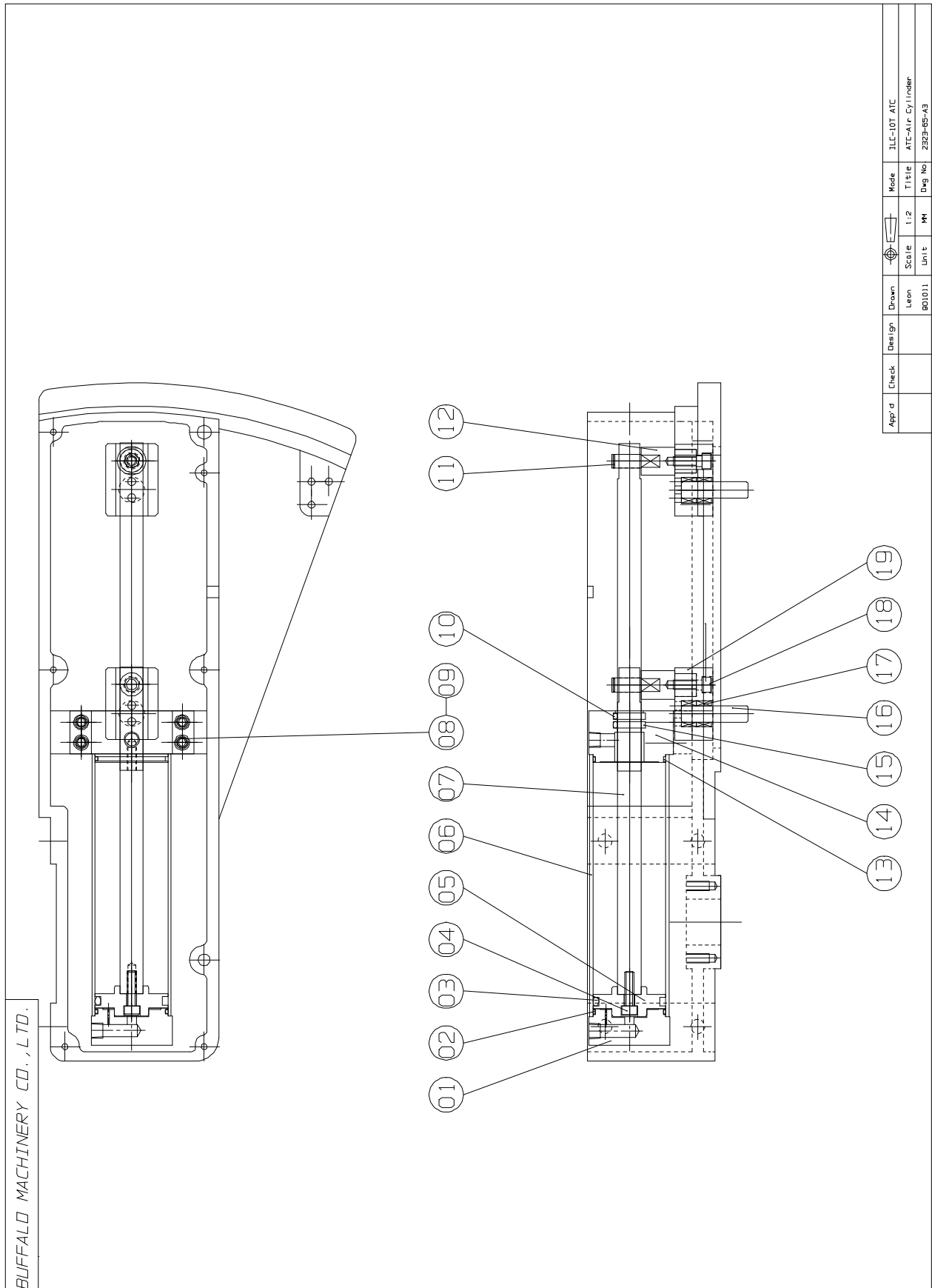


App'd	Check	Design	Drawn	Scale	Unit	Model	Title	Dwg No.	Rev
			Leon	1:1	MM		ATC-Guard	2323-65-42	
							ILC-10T ATC		

Air cylinder assembly

Dwg no. 2323-65-A3

Item	Parts No.	Description	Material	Specification	Q'ty
1	ILC1012A	Cylinder cover - rear	AL-6061		1
2		Oil seal		G55	1
3		Oil seal		P53	1
4		Hex. socket screw		M8 x 1.25P x 50L	1
5	ILC1011A	Piston	AL-6061		1
6	ILC1014A	Cylinder rod	AL		1
7	ILC1015A	Shaft	S45C		1
8		Hex. socket screw		M8 x 1.25P x 50L	4
9		Washer		ψ8	4
10		Wiper - ring		DK20	1
11		Snap		S12	1
12	ILC1007A	Push rod	S45C		1
13		Oil seal		G55	1
14		Cylinder cover - front	AL-6061		1
15		Oil seal		US20	1
16	ILC1008A	Shaft	SMC21		1
17		Bearing		RAN4900	2
18		Hex. socket screw		M8 x 1.25P x 20L	1
19	ILC1006A	Slide	S45C		1

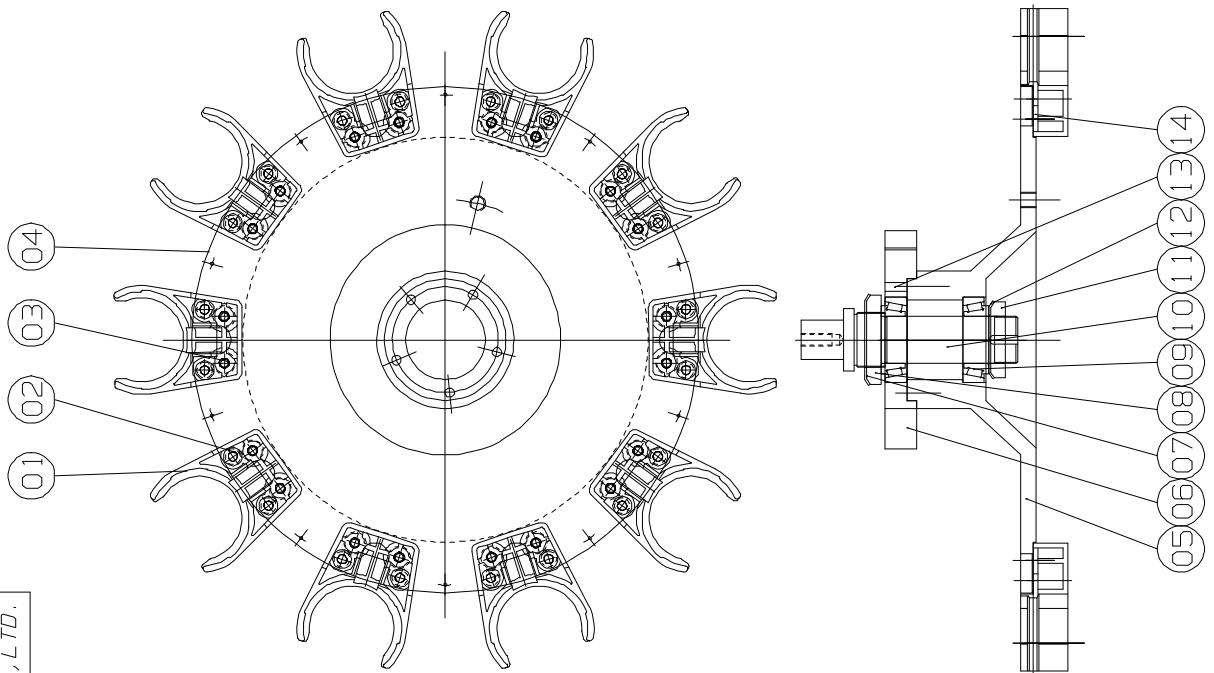


ATC Disk

Dwg no. 2323-65-A4

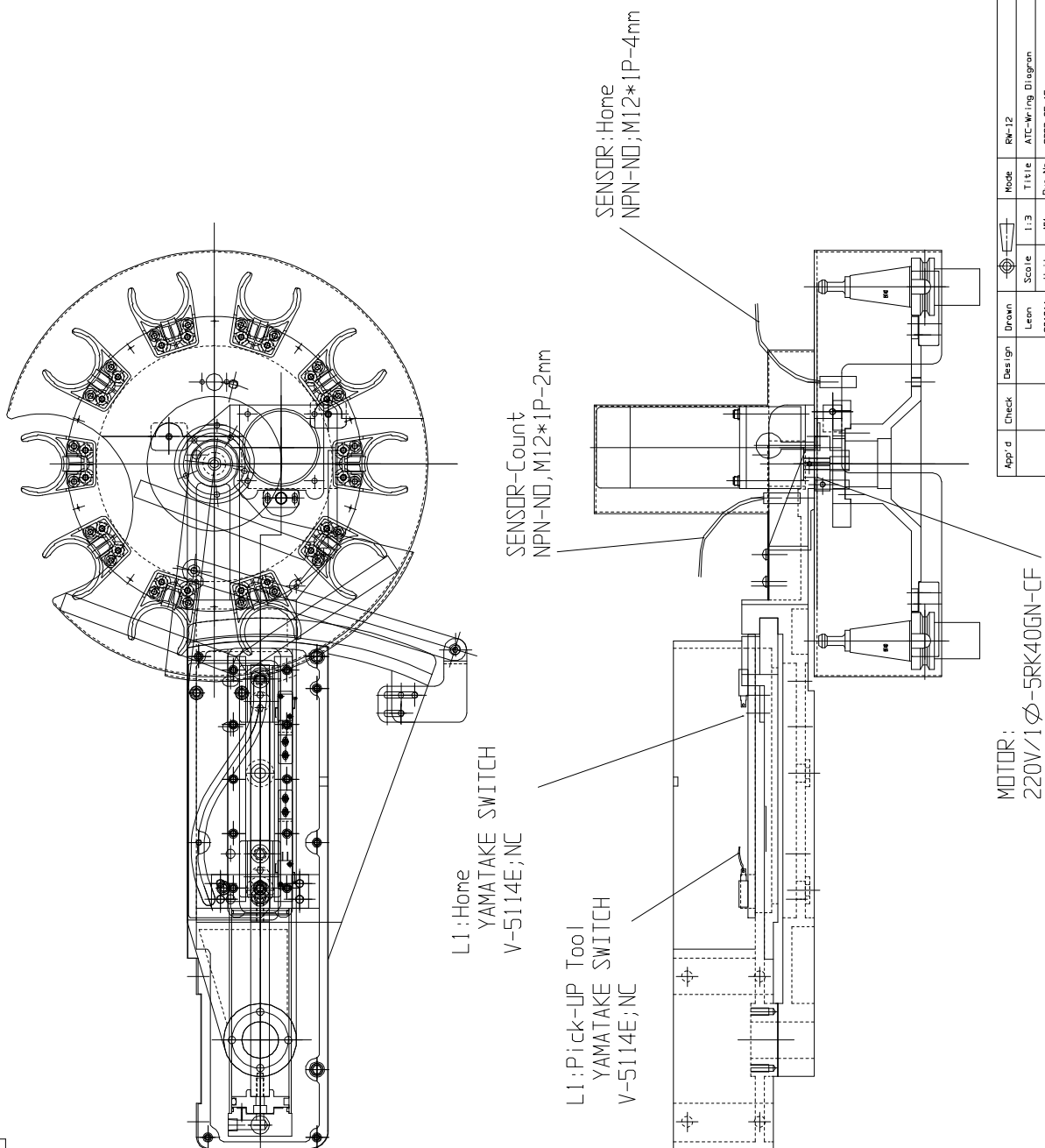
Item	Parts No.	Description	Material	Specification	Q'ty
1	DR4040101	Clipper	Nylon/Fiber	MP-696	10
2		Hex. socket screw		M6 x 1P x20L	20
3		Spring pin		ψ6 x 20L	20
4	ILC2009A	No. plate	Aluminum		10
5	ILC2001A	Disk	FC30		1
6	ILB0003A	Cam	SCM4		1
7		Washer		AW07	1
8		Bearing nut		AN07	1
9		Bearing		32006	2
10	ILC1017A	Shaft	S45C		1
11		Bearing nut		AN06	1
12		Washer		AW06	1
13		Spring pin		ψ6 x 20L	2
14	DR40400301	Positioning pin	SPHC		10

BUFFALO MACHINERY CO., LTD.

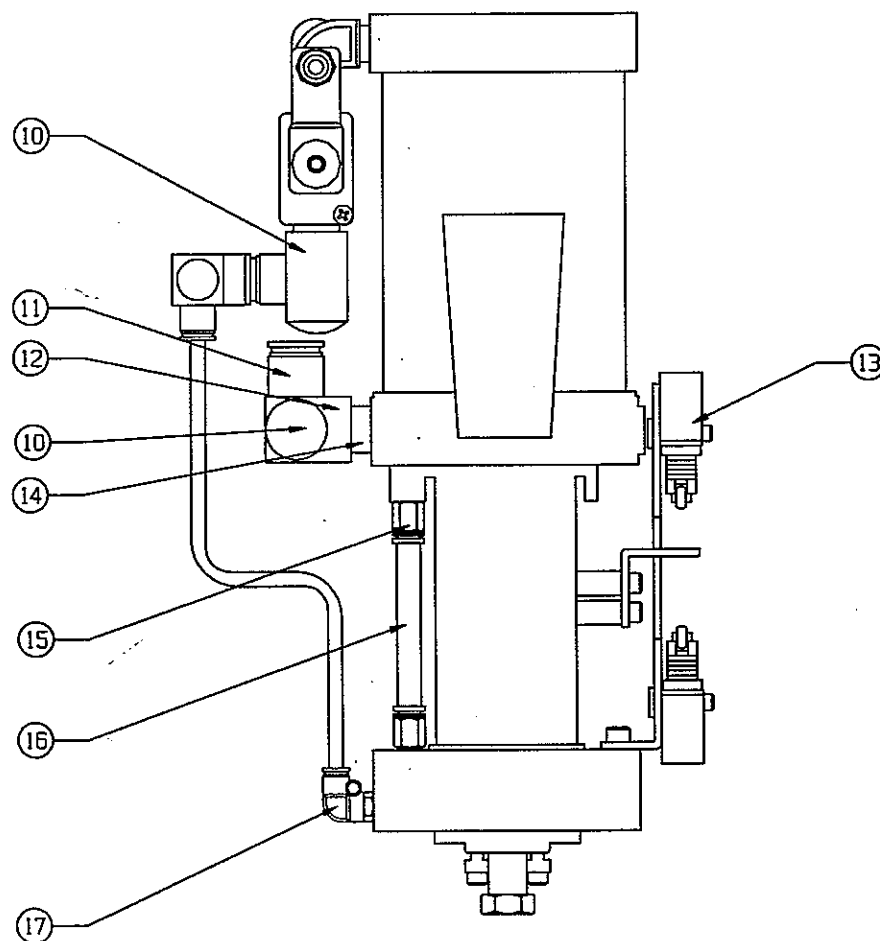
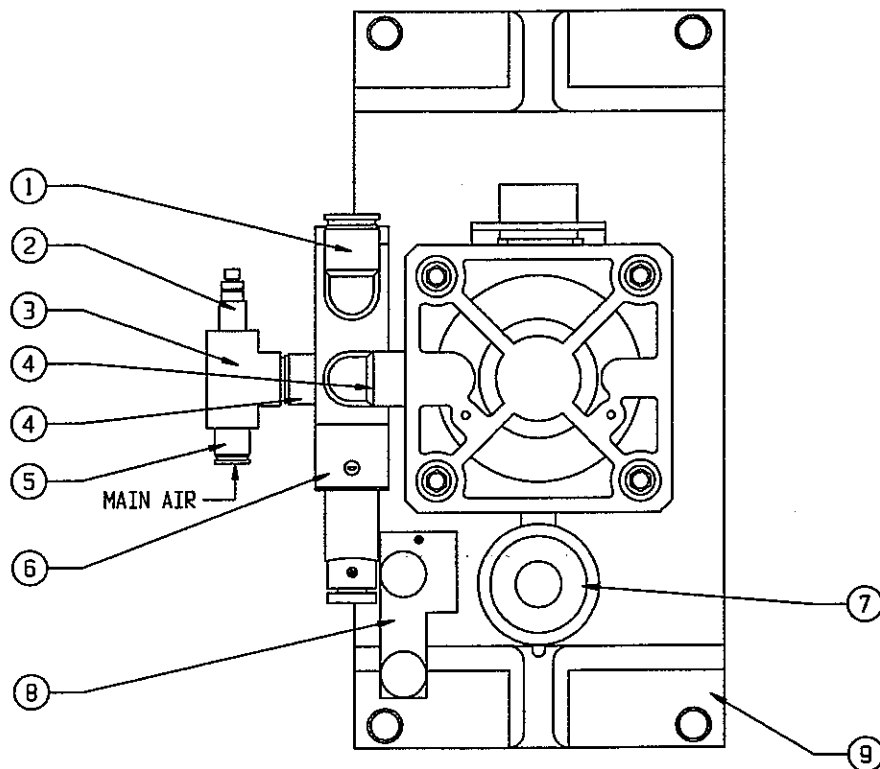


App'd	Check	Design	Drawn	Scale	Unit	Node	RW-12
			Leen	1:2	MM	ATC-Disk	
			901011			Dwg No	2323-65-A4

BUFFALO MACHINERY CO., LTD.

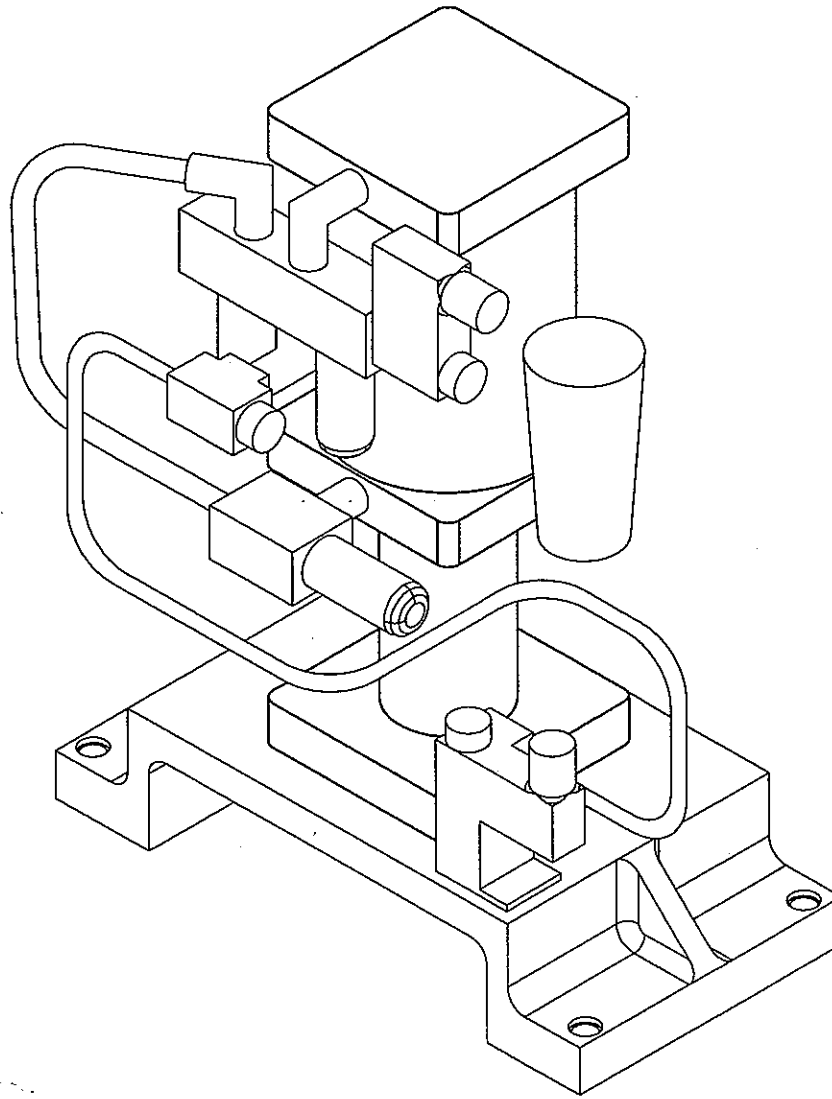


App'd	Check	Design	Drawn	Scale	Title	Mode	Rev
			Leen	1:3	ATC-Wiring Diagram	RW-12	
			981011	Unit		2323-65-A5	



REV.	DESCRIPTION	E.C.B. NO.	APP'D BY	DATE
1	NU-281 DRAW BAR ASSEMBLY	SCALE 2:1	DRG No. 6-10-032-020	SIZE B
APPLICATION	SOLID WAYS BED MILL	DATE 12 FEB 02	DRAWN BY DAHLKE	SHEET NO. 1 OF 2

MILLTRONICS
1400 HILL LANE
TACOMA, WA 98407 USA
800-648-2410



PARTS LIST			
No.	QTY	PART No.	DESCRIPTION
1	1	NU-289	3/8NPT 90° SWIVEL 10mm TUBE
2	1	NU-290	3/8NPT 6mm TUBE - FLOW CONTROL
3	1	NU-291	3/8NPT FEMALE TEE
4	2	NU-292	3/8NPT MALE ELBOW
5	1	NU-70	3/8NPT MALE STRAIGHT 3/8 TUBE
6	1	NU-293	DRAWBAR SOLENOID
7	1	NU-294	OIL CUP
8	1	NU-295	AIR PURGE SOLENOID
9	1	-	BASE CASTING
10	3	NU-296	NOISE SUPPRESSOR (MUFFLER)
11	1	NU-297	3/8NPT MALE STRAIGHT 10mm TUBE
12	1	NU-298	CHECK VALVE
13	2	SW-52	LIMIT SWITCH
14	1	NU-299	3/8NPT BRASS NIPPLE
15	1	NU-300	1/8NPT MALE STRAIGHT 8mm TUBE
16	1	NU-301	8mm TUBING
17	1	NU-302	1/8NPT 90° SWIVEL 6mm TUBE

REV.	DESCRIPTION	E.C.D. NO.	APP'D BY	DATE
		SCALE 2:1	DWG No. 6-10-032-020	SIZE B
TITLE	NU-281 DRAW BAR ASSEMBLY	DATE	12 FEB 02	SHEET NO. 2 OF 2
APPLICATION	SOLID WAYS BED MILL	DRAWN BY	DAHLKE	

<i>MOBILITH AW SERIES, MULTIPURPOSE EP GREASE</i>	
PRODUCT NUMBER	64352-8
NLGI GRADE	1
COLOR	GREEN
STRUCTURE	SMOOTH/TACKY
SOAP TYPE	LITHIUM COMPLEX
MINERAL OIL VISCOSITY	
cST AT 40°C	150
cST AT 100°C	13
SUS AT 100°F	750
SUS AT 210°F	70
ISO VISCOSITY GRADE	150
PENETRATION AT 23°C (77°F), WORKED	325
DROPPING POINT, ASTM D 2265, F°	475
TIMKEN OK LOAD, ASTM D 2509, lb	40
FOUR-BALL EP TEST, ASTM D 2596, WELD LOAD, kg	250
LOAD WEAR INDEX	40
FOUR-BALL WEAR TEST, ASTM D 2266, SCAR DIAMETER, mm, MAX	0.5
CORROSION PREVENTION, ASTM D 1743	PASS
WHEEL BEARING TEST, ASTM D 4290 MODIFIED, LEAKAGE, GRAM	5

<i>MOBIL VACTRA OIL No. 2</i>	
PRODUCT NUMBER	60049-4
SPECIFIC GRAVITY, 60/60F	0.88
POUR POINT, °C (°F), max.	-9 (16)
FLASH POINT, °C(°F), min.	244 (472)
VISCOSITY	
cST AT 40°C	68
cST AT 100°C	8.6
SUS AT 100°F	356
SUS AT 210°F	55
VISCOSITY INDEX	97
ISO VG	68
COLOR, ASTM D 1500	4
FZG, PASS STAGES	11
4 BALL WELD, kg, ASTM D 2783	160
4 BALL WEAR, mm, ASTM D 4172	0.22
COPPER CORROSION, ASTM D 130	1B
RUST, D665A	PASS
VICKERS V-104C, mg D 2882 (MOD)	-
CMCO, P-SPEC, APPROVAL	P-47
BIJUR PT 37-1 APPROVAL	PASS
OKUMA APPROVAL	PASS

Lubricating VK Machines:

Z AXIS RAILS:

Using Mobilx EP lubricant (see spec. sheet), grease the Z-axis rails monthly. Grease fitting can be located on the top and bottom of the rails on both sides.

Head:

Using Mobilx EP lubricant (see spec. sheet) grease the head monthly. There is a grease fitting on the right side of the head near the High/Low gear and on the left side of the head near the quill feed selector. The *oil cups* can be filled periodically. One oil cup can be found on the front of the head, the other cup is near the High/Low gear.

AUTO LUBRICATOR:

The auto oiler should be checked weekly. Make sure the oiler is filled and is working properly.

DISCHARGE VOLUME PER CYCLE:

Adjustable from 2.5 CC minimum to 5.0 CC maximum. To reduce oil delivery remove the lock screw, measure A (Fig. 1), turn Adjusting screw clockwise increasing dimension A in the increment (corresponding to the desired discharge) as shown. (Table 1)

IN.	DISCHARGE	NOTES:
.400	2.5 c.c.	
.320	3.0 c.c.	
.240	3.5 c.c.	
.160	4.0 c.c.	
.080	4.5 c.c.	
0.00	5.0 c.c.	Break In Value

(Table 1)

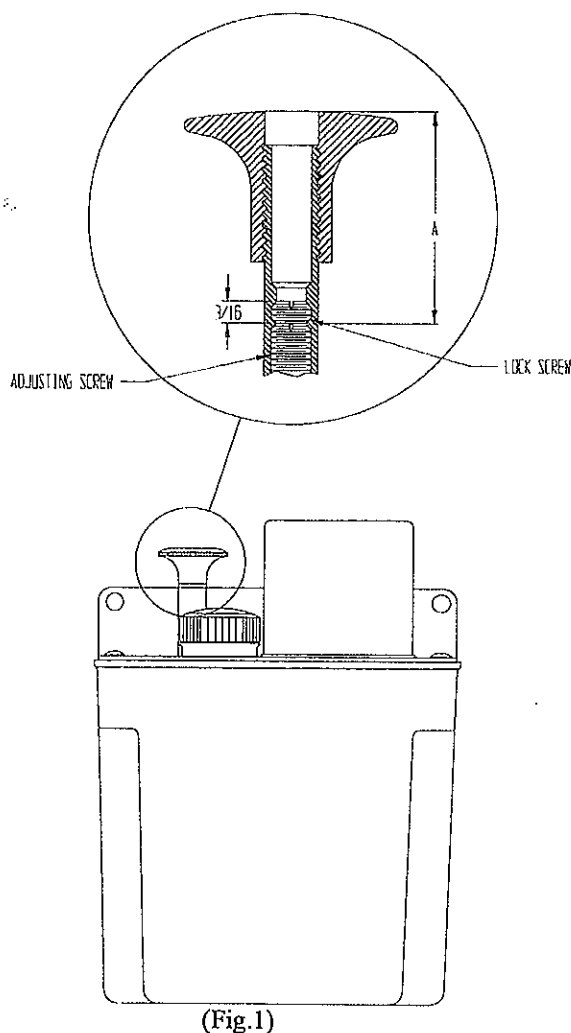
DISCHARGE PRESSURE: 60 psi Maximum.

Peak system Pressure will decrease when:

- (a) Discharge volume decreases.
- (b) Number of Meter-Units in system increases.
- (c) Oil viscosity decreases.

OIL VISCOSITY RANGE: See specification sheet

RECOMMENDED OIL: Mobil Vactra Oil No. 2



(Fig.1)

Procedure to adjust CESD (MA-219) Lubrication Unit

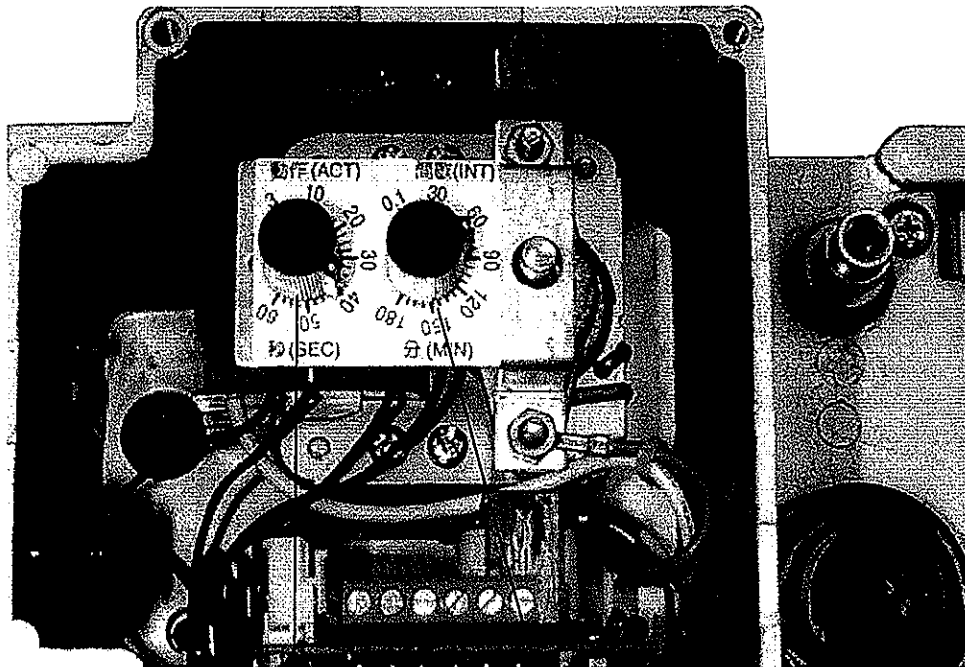
As long as the machine is reset the oiler will be pumping. In the event that the tank falls below the **MIN** line on the tank an audible alarm will sound. The machine will not let a program start with a low lube alarm (**451 Low Lube Fault**)

The **MA-219** has the ability to set the time between each pump cycle. It will pump the same amount of way lube (**.13 Liters/Min**) each pump cycle. We are not varying the amount of oil but the interval between each pump cycle. A new machine shipped from Milltronics will have the oiler pumping Aprox. 5 seconds every 25 to 30 minutes.

Adjusting the Seconds knob (left) will change the length of time in seconds the pump cycle for (.13 Liters/Min). Adjusting the Minute knob (right) will change the time between each pump interval. It will always pump the same amount

To adjust the intervals between each cycle of the pump:

1. Remove the 4 screws holding the top cover.
2. Adjust the two knobs shown below.
3. The dials are very sensitive. Turn them very slowly.



Turn this dial to vary the seconds that it pumps for each minute interval.

Turn this dial to vary the minutes between each pump cycle.

Checking and Adjusting Backlash

Use a good solid magnetic base and a .0005 Inch indicator. Install the magnetic base on the machine table in close proximity to the spindle. Clean the area that the indicator will be in contact with.

Go into PARAMETERS/AXIS arrow down to BACKLASH press F1 EDIT and set X, Y and Z to zero. (*Before setting them to zero note original settings*)

Find the high spot on the spindle by moving the indicator back and forth and set indicator to zero. (*See point A on Fig. 4*)

The next step is easiest if done in jog mode. (*Select distance and 1 inch increments*) You may have to press the jog key several times for the desired direction to clear the spindle.

Press the jog key for the desired direction for A to move towards D (*see Fig. 4*) and then back to A, the indicator may have moved, adjust it back to zero and repeat this step until it stays at zero.

Jog the desired axis or tool (*see Fig. 4*) from point A to B to C back to B then back to the start point A. The reading on the indicator is backlash and should be put into the backlash parameter under PARAMS-SETUP-AXIS.

After putting the backlash into the table, repeat the procedure to ensure the numbers took affect. If the indicated error seems to increase this is addlash, and you may have to subtract the indicated number from the backlash chart.

*The X axis procedure is shown, repeat procedure for Y and Z.
Remember to save these new changes to your parameter disk.*

(The diagram below is an example of checking your backlash in the X-axis.)

