

LAMPIRAN

Bill Of Material Mesin Banch Saw

No.	Part Name	Amount		Material / Maker	Spec.
Electical part					
1	MCCB	1	pcs	Fuji	BW series 15A
2	MCB	1	pcs	Fuji	BC series 3A
3	Trafo	1	pcs	Matshuyoshi	Step Down 380-220 volt 300watt
4	Fuse	2	pcs	Hanyoung	220 volt 3A
5	Magnetic Contactor	3	pcs	Mitshubishi	S-T12
6	Thermal Overload Relay	3	pcs	Mitshubishi	TH-T12
7	Push Button on	5	pcs	Fuji	AR22
8	Push Button off	4	pcs	Fuji	AR22
9	Selector Switch	2	pcs	Fuji	AR22
10	Emergency Button	2	pcs	Fuji	AR22
11	Pilot Lamp	3	pcs	Fort	LED 220 volt
12	PLC Control	1	pcs	Omron	CP1L-L20DR-A
13	Distance Sensor	5	pcs	Omron	E3Z series
14	Power Supply	1	pcs	Omron	S8VM-05024A
15	Terminal Connector	34	pcs	General	TR10 & TR25
16	Cable Power and motor	1	roll	Supreme	NYAF 1,5 x 4
17	Cable wiring power	30	meter	Supreme	NYAF 1.5
18	Cable wiring control	2	roll	Supreme	NYAF 0.75
19	Skun wiring	5	pak	General	3-1,25 & 4-1,5
20	Sign Tower	1	pcs	Gold-Vin	Tricolour (red,transculent,green) 220V
21	Fan	1	pcs	Sankomec	4 inch
22	Lain lain	1	lot	-	Rest way cable, MCB rail, conduit & etc.
Mechanical Part					
1	Motor Roll forward and backward	2	unit	Teco	1:10 gearbox 0.75 HP 900rpm hollow shaft
2	Motor Chain Transfer	1	unit	Teco	1:10 gearbox 0.75 HP 900 Rpm
3	Rubber Roller Conveyor	16	unit	general	diameter 80 mm L = 501
4	Rubber Roller Conveyor Center	2	unit	general	diameter 80 mm L = 395
5	Chain roller plus sprocket & idler	2	lot	FSCM	RS40
6	Type Flat Belt Transfer plus pully	1	lot	General	
6	Floating Joint connector	4	pcs	SMC	JS40-14-150-S
7	Air Cylinder	4	pcs	SMC	CA2F 80-50
8	Flange block 2-Bolt Flange	9	pcs	FYH	UCFL 204
9	Flange block 4-Bolt Flange	13	pcs	FYH	UCF 202D
10	Bearing	32	pcs	general	Diameter 20 mm
11	Caster	6	pcs	Hammer	415E-R Whith stopper
12	Foot Adjuster solid	6	pcs	SS400	diameter 80 M12
13	Pneumatic instalation	1	lot	SMC	Tubing & fitting SMC
14	Bolt, Ring And Nuts	1	lot	general	M8,M10,M12
Machining and Fabrication					
1	Main Frame	1	unit	SS400	Hollow 60x60 base on design
2	flat belt transfer base frame	1	unit	SS400	Hollow 50x50 base on design
3	Gravity frame	1	unit	SS400	Hollow 60x60 & plate base on design
4	Chain transfer holder	9	unit	SS400	SS400 plate base on design
5	Roller Gravity	13	unit	Steel Tube	Steel tube carter side
6	main long shaft transfer pulley 1 to pulley 2	1	unit	S45C	shaft for pully transfer
7	main short shaft pulley 2	16	unit	S45C	main shaft transfer for belt

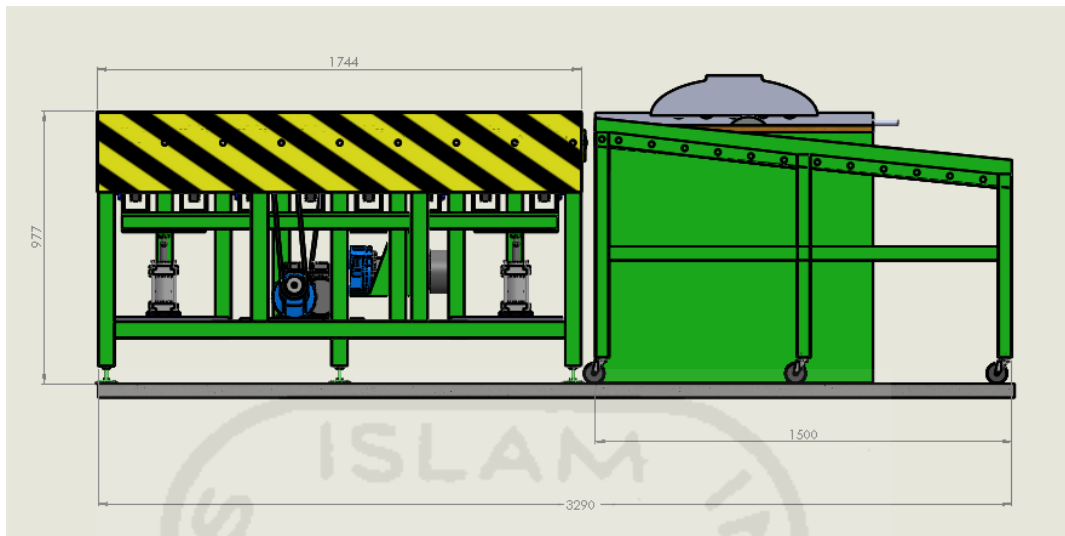
Benda Kerja

1	Key block	P121	1220 x 480 x 26	212,4 & 178,8	Jig belah miring
2	Key block	B1	1220 x 480 x 26	226 & 154	Jig belah miring
3	Side arm	P116	1220 x 367 x 36	367 x 177	
4	Side arm	B1	1220 x 383,7 x 31,6	383,7 x 311	Jig belah miring
5	Side arm	B2	1220 x 387,5 x 38	387,5x139	
6	Pedal rail	All model	1470 x 400 x 26	400 x 88	
7	Side arm	CVTRE	1220 x 403 x 50	403 x 157	
8	Side arm	P121	1220 x 404 x 43	404 x 177	
9	Side arm	P22	1220 x 410 x 46	410 x 230	
10	Side arm	U1J	1220 x 412 x 43	412 x 226,1	
11	Side arm	B3	1220 x 415 x 43	415 x 151	
12	leg	P121	485 x 455 x 36	485x56, (55&53,8)	belah 2& 3 memakai jig
13	Side sleeve all model	All model	640 x 530 x 17	530 x 60,3	
14	leg	B3,U1J	531 x 455 x 33	531 x 87	
15	Leg	B2	543 x 455 x 30,6	543 x 64 & 37	Jig belah miring
16	Cleat fall back U1J	U1J	610 x 450 x 90	610 x 60 x90	
17	Back rail wood	B2	800 x 400 x 11	800 x 30	
18	Back rail wood	U1J	1270 x 400 x11	1270 x 35	
19	Top board	B1	1470 x 430 x 17	1470 x 212,8	
20	Top frame	B1	1470 x 310 x 17	1470 x 296,6	
21	Top frame	B2	1470 x 310 x 17	1470 x 297,8	
22	Top frame	B3	1470 x 385 x 17	1470 x 378,6	
23	Fall back	B1	1470 x 340 x 17	1470 x 64	
24	Fall back	B2	1470 x 340 x 17	1470 x 92	
25	Key slip	B1	1470 x 610 x 17	1470 x 63	

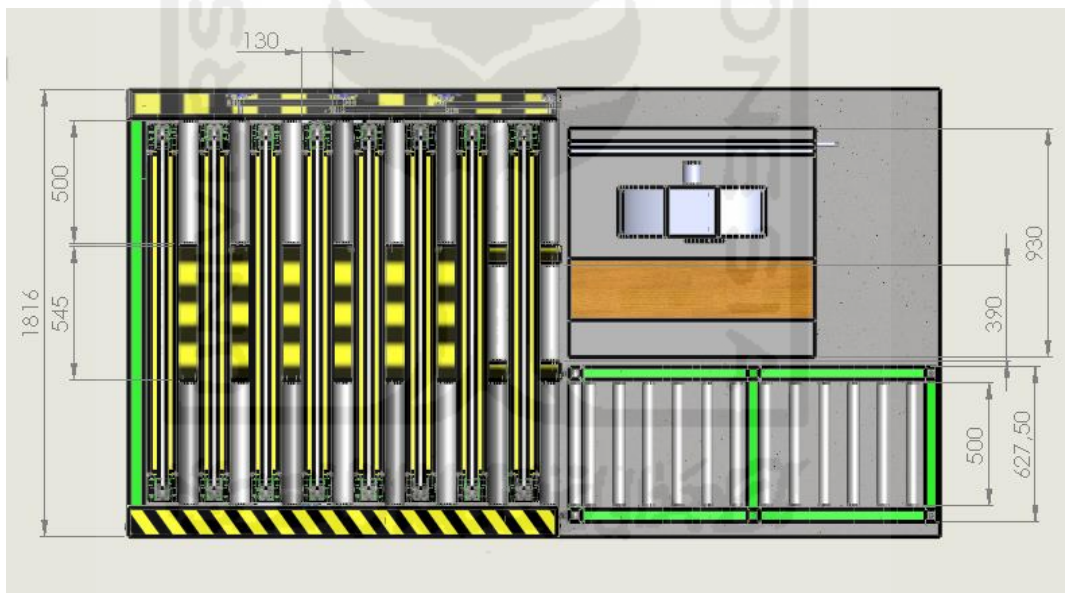
26	Key slip	B2	1470 x 610 x 18	1470 x 63	
27	Key slip	B3	1470 x 610 x 18	1470 x 73,8	
28	Hinge stripe	B1	1470 x 610 x 17	1470 x 47,8	
29	Hinge stripe	B2	1470 x 610 x 17	1470 x 43,8	
30	Hinge stripe	B3	1470 x 610 x 17	1470 x 63	
31	Fall center	B1	1470 x 340 x 17	1470 x 169	
32	Fall center	B2	1470 x 340 x 17	1470 x 162	
33	Fall center	B3	1470 x 340 x 17	1470 x 167,7	
34	Fall back	B3	1470 x 610 x 17	1470 x 122,8	
35	Top board front	U1,P121	1500 x 380 x 20	1500 x 160	
36	top board rear	U1,P121	1500 x 380 x 20	1500 x 180	
37	Fall back	U1	1500 x 610 x 17,4	1500 x 131	
38	Fall front	B2,B3	1500 x 610 x 17	1500 x 60	



Dimensi ukuran *auto return* tampak depan



Dimensi ukuran *auto return* tampak atas



Data spesifikasi motor yang digunakan

SPECIFICATION TABLE

IE2 EFFICIENCY 3-PHASE INDUCTION MOTORS
TYPE: AESV2E, AESU2E

IE2

ITEM	STANDARD SPECIFICATION	
RATING	Kind of Motors	Squirrel - Cage Induction Motors (SCIM) .
	Design Standards	IEC 60034, IEC 60072 .
	Voltages	230V, 400V, 690V, 265V, 460V .
	Frequency	50Hz or 60Hz .
	Output Range	0.37 kW ~ 315 kW (50Hz) or 0.43 kW ~ 362 kW (60Hz) .
	R.P.M. (Syn.)	3000 ~ 750 R.P.M. (2 ~ 8 Poles) or 3600 ~ 900 R.P.M. (2 ~ 8 Poles) .
	Time Duty	Continuous. S1 , S.F. : 1.0 .
	Frame Nos.	80M ~ 315D .
	Protection Enclosure	Totally Enclosed (IP 55) .
	Cooling Method	Self External Fan, Surface Cooling (IC 411) .
MOUNTING		Horizontal Foot Mounted B3 (IM 1001) .
		Horizontal Flange Mounted B5 (IM 3001) .
		Horizontal Foot And Flange Mounted B35 (IM 2001) . Vertical Flange Mounted , Shaft Down V1 (IM 3011) .
APPLICATION	Environment Conditions	Place : Shadow, Non-Hazardous. Ambient Temperature : -20 ~ 40°C . Relative Humidity : Less Than 90%RH (Non-Condensation) . Altitude : Less Than 1,000 Meters .
	Power Source Conditions	Voltage : ±10%, Frequency : ±5%, and 10% Max. of Combined Voltage and Frequency. But Frequency Variation Does Not Exceed ±5% .
	Method of Starting	Full Voltage Direct On Line or Y - Δ Starting .
	Drive Method	Coupling Or Belt Servie Are Available For All Range Depends On Bearing Capacity. Bearing Capacity Refers To Radial Bearing Load .
	Direction of Rotation	CW According to IEC Definition, Suitable For Bi - Directional Operation .
	Bearing	Bracket Mounting , Vacuum De - Gassed High Quality Open Bearings for Frame Nos. 180M ~ 315D, Grease Pre - Packed Shielded Rolling Bearings for the Others .
APPLICATION	Lead Terminal	Solderless Lug Terminals .
	Terminal Box	Cast iron, Can be Rotated Each 90° With Conduit Hole for Cable Entrance. The Terminal Box is Usually Placed on The Top of The Frame and The Cables Could be Connected from Four Possible Directions .
	Stator Insulation	Class F Insulation System .
	Painting	Phenolic Rust Proof Base Plus Lacquer Surface Finished Painting in Pebble - Gray Color (Munsell 5Y 7.5/1) (RAL 7032) .
	Bolt Thread	ISO Metric System (Strength Catagory 8.8T) .
	Grounding Terminal	Two Terminals . One inside The Terminal Box, Another One On The Outside Of The Frame .
PERFORMANCE	Test Procedure	IEC 60034-2-1:2007 And Full Voltage Measuring Starting Performance .
	Winding Temperature Rise	Not to Exceed 80 Ø Rise by Resistance Method at S.F 1.0 Operation .
	Over Speed	120% Syn. R.P.M. for 2 Min .
	Over Torque	160% Rated Torque for 15 Sec .



IE2

ELECTRICAL CHARACTERISTICS - AESV2E / AESU2E

TEFC, CLASS F, 40°C AMBIENT TEMP., IEC DESIGN N CONTINUOUS DUTY, S.F. 1.0 400V/50HZ

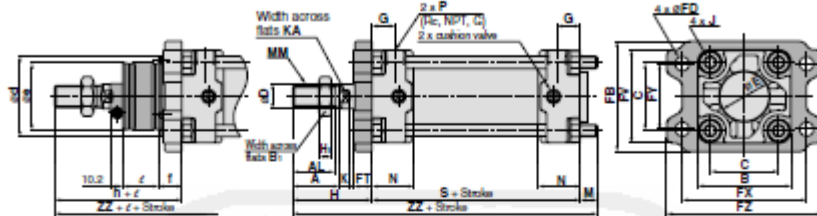
OUTPUT		FULL LOAD rpm	FRAME NO.	EFFICIENCY				POWER FACTOR				CURRENT		TORQUE				MOTOR GD2 kg-m ²	APPROX WEIGHT kg
HP	kW			FULL LOAD (%)	¾ LOAD (%)	½ LOAD (%)	¼ LOAD (%)	FULL LOAD (%)	¾ LOAD (%)	½ LOAD (%)	¼ LOAD (%)	FULL LOAD (A)	LOCKED ROTOR (A)	FULL LOAD (Nm)	LOCKED ROTOR %FLT	PULL UP %FLT	BREAK DOWN %FLT		
0.5	0.37	915	80M	65.5	63.8	57.9	40.5	65.0	55.5	44.0	31.0	1.25	5	3.856	230	215	260	0.009	17.5
		1425	80M	78.1	78.0	75.1	64.1	72.5	62.0	47.5	30.0	1.40	8	3.680	290	260	305	0.010	17.5
0.75	0.55	900	80M	68.5	68.8	64.9	50.2	67.0	57.0	44.0	29.0	1.73	7	5.827	225	220	250	0.012	19.5
		2850	80M	77.4	78.0	76.3	64.3	85.5	78.5	66.0	44.5	1.64	9	2.509	215	180	280	0.005	17.0
1	0.75	1415	80M	79.6	79.5	76.9	66.3	73.5	63.5	49.5	31.0	1.85	11	5.054	300	330	325	0.013	20.5
		935	90S	75.9	76.4	73.9	63.8	69.5	60.0	46.5	29.5	2.05	10	7.649	210	185	260	0.019	25.5
		695	100L	71.8	71.0	68.0	54.0	65.0	56.0	43.5	28.0	2.32	10	10.29	210	175	235	0.046	37.5
1.5	1.1	2875	80M	79.6	80.0	78.3	68.5	85.5	79.0	67.0	45.0	2.33	17	3.648	255	200	305	0.007	19.5
		1445	90S	81.4	81.4	78.9	69.8	76.0	67.0	53.0	33.5	2.57	19	7.259	270	205	325	0.017	25.0
		930	90L	78.1	78.8	76.9	68.2	71.5	62.0	48.5	30.5	2.84	14	11.28	215	190	260	0.026	30.0
		690	100L	74.7	75.0	73.0	61.5	67.5	58.5	45.5	28.0	3.15	14	15.20	210	175	230	0.059	44.5

Spesifikasi *pneumatic cylinder*

Air Cylinder: Standard Type
Double Acting, Single Rod **Series CA2**

Rod Side Flange Style: CA2F

With rod boot



Bore size (mm)	Stroke range (mm)																		
	Without rod boot	With rod boot	A	AL	FB	B	B ₁	C	D	E	FV	FD	FT	FX	FY	FZ	G	H	J
40	Up to 800	20 to 800	30	27	71	60	22	44	16	32	60	9.0	12	80	42	100	15	8	M8 x 1.25
50	Up to 1000	20 to 1000	35	32	81	70	27	52	20	40	70	9.0	12	90	50	110	17	11	M8 x 1.25
63	Up to 1000	20 to 1000	35	32	101	85	27	64	20	40	86	11.5	15	105	59	130	17	11	M10 x 1.25
80	Up to 1000	20 to 1000	40	37	119	102	32	78	25	52	102	13.5	18	130	76	160	21	13	M12 x 1.75
100	Up to 1000	20 to 1000	40	37	133	116	41	92	30	52	116	13.5	18	150	92	180	21	16	M12 x 1.75

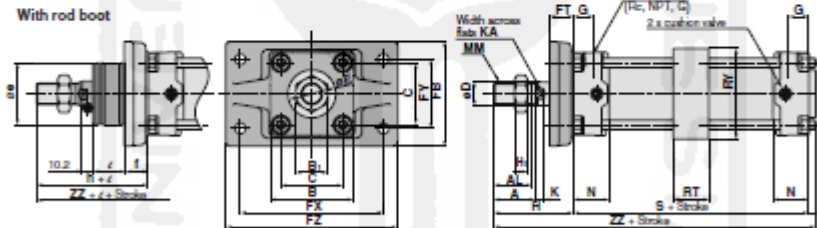
Bore size (mm)	K	KA	M	MM	N	P	S	Without rod boot						With rod boot					
								H	ZZ	d ^a	e	f	h	i	ZZ	H	ZZ	d ^a	e
40	6	14	11	M14 x 1.5	27	1/4	84	51	146	52	43	15	59	1/4 stroke	154				
50	7	18	11	M18 x 1.5	30	3/8	90	58	159	58	52	15	66	1/4 stroke	167				
63	7	18	14	M18 x 1.5	31	3/8	98	58	170	58	52	17.5	66	1/4 stroke	178				
80	10	22	17	M22 x 1.5	37	1/2	116	71	204	80	65	21.5	80	1/4 stroke	213				
100	10	26	17	M26 x 1.5	40	1/2	126	72	215	80	65	21.5	81	1/4 stroke	224				

* If a hole is provided to accommodate the rod boot when the air cylinder is mounted, make the hole diameter larger than the outside diameter of the rod boot mounting bracket rod.

- CJ1
- CJP
- CJ2
- CM2
- CG1
- MB
- MB1
- CA2
- CS1
- CS2

Long stroke (a stroke of 1001 mm or larger)

With rod boot



Bore size (mm)	Stroke range (mm)																		
		A	AL	FB	B	B ₁	C	D	E	FD	FT	FX	FY	FZ	G	H	J	K	KA
50	1001 to 1000	35	32	88	70	27	52	20	40	9.0	20	120	58	144	17	11	M8 x 1.25	7	18
63	1001 to 1000	35	32	105	85	27	64	20	40	11.5	23	140	64	170	17	11	M10 x 1.25	7	18
80	1001 to 1000	40	37	124	102	32	78	25	52	13.5	26	164	84	198	21	13	M12 x 1.75	10	22
100	1001 to 1000	40	37	140	116	41	92	30	52	13.5	29	180	100	220	21	16	M12 x 1.75	10	26

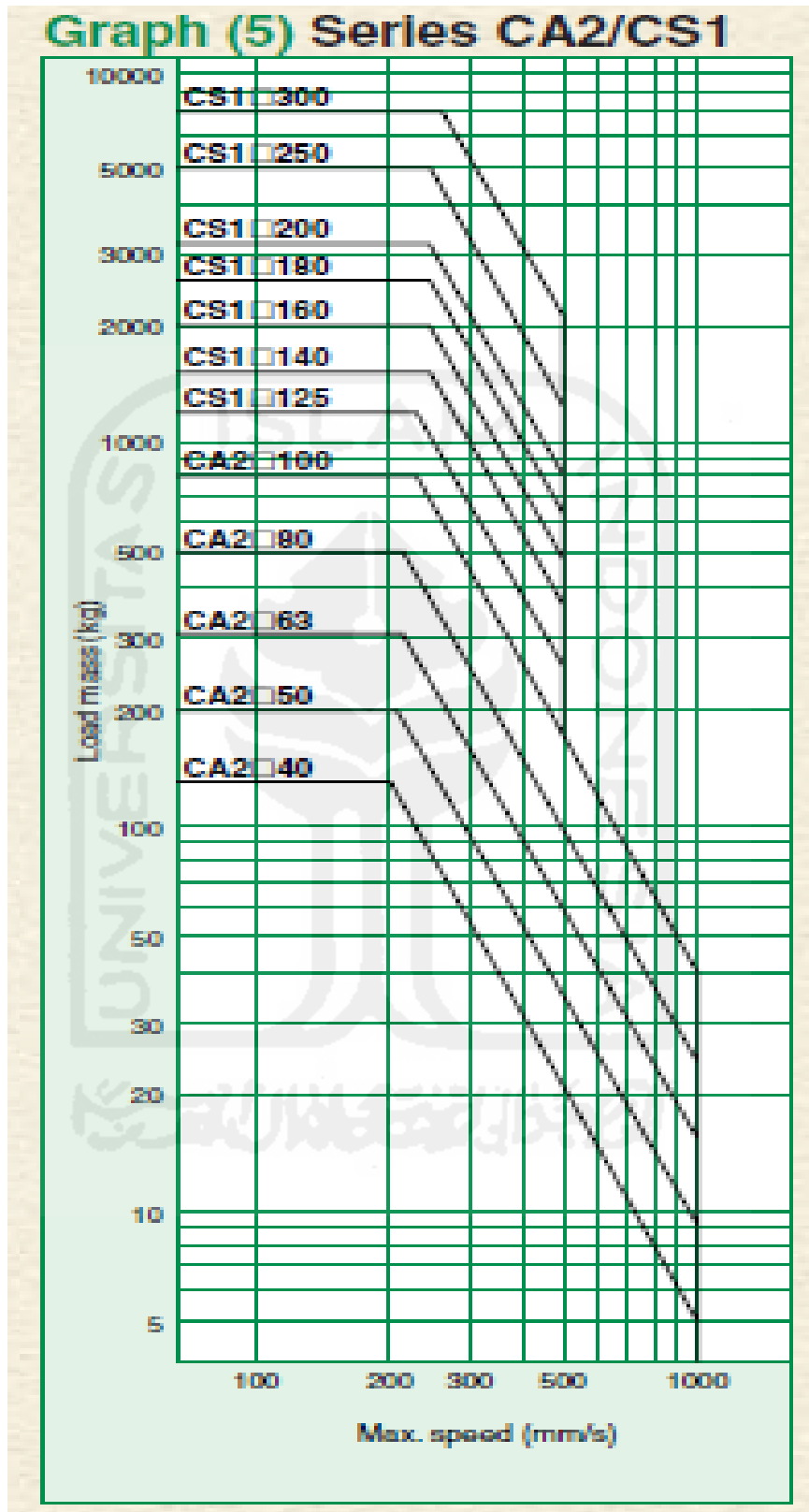
Bore size (mm)	M	MM	N	P	RT	RY	S	Without rod boot						With rod boot					
								H	ZZ	d ^a	e	f	h	i	ZZ	H	ZZ	d ^a	e
50	6	M16 x 1.5	30	3/8	30	76	90	67	163	52	19	66	1/4 stroke	162					
63	10	M18 x 1.5	31	3/8	40	92	98	71	179	52	19	66	1/4 stroke	174					
80	12	M22 x 1.5	37	1/2	45	112	116	87	215	65	21	80	1/4 stroke	206					
100	12	M26 x 1.5	40	1/2	50	136	126	89	227	65	21	81	1/4 stroke	219					

* If a hole is provided to accommodate the rod boot when the air cylinder is mounted, make the hole diameter larger than the outside diameter of the rod boot rod.

- D-□
- X□
- Individual
- X□
- Subtotal size

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Grafik untuk menentukan waktu *pneumatic cylinder* bekerja



Tabel koefisien gesek



Coefficients of Friction "F"

Material	Static		Sliding	
	Dry	Lubricated	Dry	Lubricated
Aluminum on aluminum	1.35	-	-	-
Canvas belt on rubber lagging	0.30	-	-	-
Canvas belt, stitched, on steel	-	-	0.20	0.10
Canvas belt, woven, on steel	-	-	0.22	0.10
Cast Iron on asbestos, fabric brake material	-	-	0.35-0.40	-
Cast Iron on brass	-	-	0.30	-
Cast Iron on bronze	-	-	0.22	0.07-0.08
Cast Iron on cast Iron	1.10	-	0.15	0.06-0.10
Cast Iron on copper	1.05	-	0.29	-
Cast Iron on lead	-	-	0.43	0.13-0.36
Cast Iron on leather	.6	-	-	0.07-0.20
Cast Iron on oak (parallel)	-	-	0.30-0.50	-
Cast Iron on magnesium	-	-	0.25	0.133
Cast Iron on steel, mild	-	0.18	0.23	-
Cast Iron on tin	-	-	0.32	-
Cast Iron on zinc	0.85	-	0.21	-
Earth on earth	0.25-1.0	-	-	-
Glass on glass	0.94	-	0.40	-
Hemp rope on wood	0.50-0.80	-	0.40-0.70	-
Nickel on nickel	1.10	-	0.53	0.12
Oak on leather (parallel)	0.50-0.60	-	0.30-0.50	-
Oak on oak (parallel)	0.62	-	0.48	0.16
Oak on oak (perpendicular)	0.54	-	0.32	0.07
Rubber tire on pavement	0.8-0.9	0.6-0.7*	0.75-0.85	0.5-0.7*
Steel on ice	0.03	-	0.01	-
Steel, hard, on babbit	0.42-0.70	0.08-0.25	0.33-0.35	0.05-0.16
Steel, hard, on steel, hard	0.78	0.11-0.23	0.42	0.03-0.12
Steel, mild, on aluminum	0.61	-	0.47	-
Steel, mild, on brass	0.51	-	0.44	-
Steel, mild, on bronze	-	-	0.34	0.17
Steel, mild, on copper	0.53	-	0.36	0.18
Steel, mild, on steel, mild	0.74	-	0.57	0.09-0.19
Stone masonry on concrete	0.76	-	-	-
Stone masonry on ground	0.65	-	-	-
Wrought iron in bronze	0.19	0.07-0.08	0.18	...
Wrought iron on wrought iron	-	0.11	0.44	0.08-0.10

* Wet pavement.

Tabel koefisien gesek pulley dengan belt

Table 18.2. Coefficient of friction between belt and pulley.

Belt material	Pulley material						
	Cast iron, steel			Wood	Compressed paper	Leather face	Rubber face
	Dry	Wet	Greasy				
1. Leather oak tanned	0.25	0.2	0.15	0.3	0.33	0.38	0.40
2. Leather chrome tanned	0.35	0.32	0.22	0.4	0.45	0.48	0.50
3. Convass-stitched	0.20	0.15	0.12	0.23	0.25	0.27	0.30
4. Cotton woven	0.22	0.15	0.12	0.25	0.28	0.27	0.30
5. Rubber	0.30	0.18	—	0.32	0.35	0.40	0.42
6. Balata	0.32	0.20	—	0.35	0.38	0.40	0.42

Faktor Keamanan untuk pembebanan

Dobrovolsky ("Machine element")

-> **Faktor Keamanan/ Safety Factor** berdasarkan jenis beban adalah :

- Beban Statis : 1,25 – 2
- Beban Dinamis : 2 – 3
- Beban Kejut : 3 – 5

Koefisien gesek untuk roller mati

Rolling Friction

When a cylinder rolls on a surface the force resisting motion is termed rolling friction. Rolling friction is generally considerably less than sliding friction. If W is the weight of the cylinder converted to force, or the force between the cylinder and the flat surface, and R is radius of the cylinder and F is the force required to overcome the rolling friction then.

$$F = f \times W/R$$

f is the coefficient of rolling friction and has the same unit of length as the radius R -in the example below m (metres)

Typical values for f are listed below

Note: Values for rolling friction from various sources are not consistent and the following values should only be used for approximate calculations.

- Steel on Steel $f = 0,0005m$
- Wood on Steel $f = 0,0012m$
- Wood on Wood $f = 0,0015m$
- Iron on iron $f = 0,00051m$
- Iron on granite $f = 0,0021m$
- Iron on Wood $f = 0,0056m$
- Polymer on steel $f = 0,002m$
- Hardrubber on Steel $f = 0,0077m$
- Hardrubber on Concrete $f = 0,01 - 0,02m$
- Rubber on Concrete $f = 0,015 - 0,035m$

