Operating and Maintenance Manual

KIRLOSKAR™
GREEN
POWER IDEAS

Kirloskar Green Brushless A C Generators

Reliable | Efficient | Compact

KIRLOSKAR OIL ENGINES LIMITED

KIRLOSKAR GREEN AC GENERATOR

Dear Customer,

We extend a hearty welcome to the family of Kirloskar Green Brushless AC Generator owners. Kirloskar Green AC Generators are built and tested to exacting standards to ensure reliable and efficient performance of the machine.

We request you to study this manual in detail and preserve it in the interest of maintaining the product for a trouble free & long lasting operation. Service records may be updated to know the history of the machine.

Please fill up AC GENERATOR REGISTRATION FORM: (ARF) copy enclosed in duplicate page no. 25 and send it to our product support department at Bangalore to avail warranty services soon after commissioning.

Always at your service,

Yours Sincerely,
KIRLOSKAR OIL ENGINES LIMITED

For SERVICE COMPLAINTS :

For any service complaints, information & supply of spare parts contact
Kirloskar Oil Engines Authorised Service Dealers in your area or
Product Support Department
Regd.Office: Laxmanrao Kirloskar Road, Khadki, Pune 411 003 (India)
Phone: 020 25810341 Telex: 0145-7245 Gram: 'KEOL',Pune (India)
Telefax : 020-25813208, 25810209
E-Mail:k-genesets@koel.co.in Web: www.kirloskar.com

Contents Page No.

1.0 GENERAL:

This manual covers in detail, most of the aspects of Kirloskar Green Brushless AC Generators for standard Voltage of operation i.e., 415- 600 3 Phase, 240-340V single Phase as mentioned in the operating parameters as per part given in 3.1. The details included help the personnel concerned for proper installation, commissioning and maintenance of KG AC Generators. The sectional views included in this manual illustrate the mechanical design of AC Generator and its components for better understanding of the product.

1.1 STANDARDS:

The Kirloskar Green AC Generators generally comply with various national and international standards such as IS: 4722, IS:13364, BS: 5000 Part3 and IEC 34-1 and specifications mutually agreed upon at the time of order.

1.2. ENCLOSURES AND MOUNTING:

The AC Generators have degree of protection of IP 23 with B15(SB)/B3(DB) type of Mounting. Other types of protection and mounting can also be supplied on request.

1.3 ELECTRICAL DESIGN

All standard products have 2/3 pitch main windings to eliminate the third harmonics. This serves to lower operating temperatures, give lower harmonic content and better waveform.

1.4 AUTOMATIC VOLTAGE REGULATOR

The standard voltage regulator is compact, encapsulated; static types with a solid state build up circuit. Standard features include, adjustable under frequency protection, over excitation protection, stability and voltage adjustment pot. See the regulator manual for more information.

1.5 HOW TO READ A MACHINE NUMBER

It is extremely important to properly identify the machine when requesting parts or service. Always have the generator model number and serial number when requesting information from the factory. We will be able to help you only with this information.
For example Machine no: BS3J007A12793H

Kirloskar Green Alternator Sr. No. Nomenclature for AC Generator Rating 5 kVA to 650 kVA

B	S	3	S	0	0	8	G	1	1	0	0	0	0

B - 164 Frame
C - 184 Frame
D - 204 Frame
E - 224 Frame
F - 254 Frame
G - 284 Frame
I - 354 Frame

BEARINGS
S – Sin
Beari
D – Double Bearing

RATING

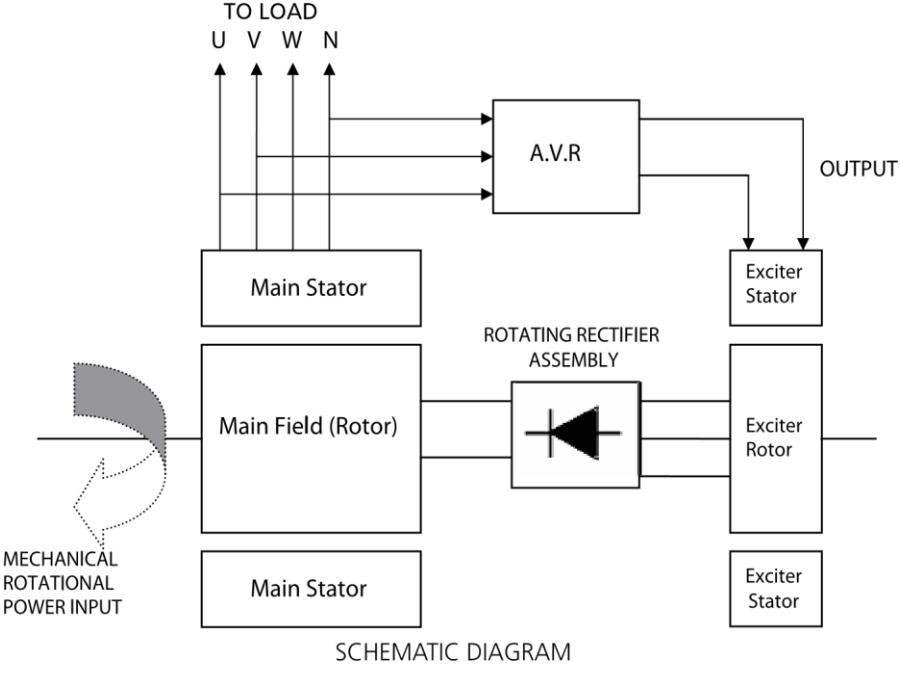
OF PHASES
1- gle phase
3 -Three phase

MONTH
YEAR (A– Jan ,B – Feb ,C– March etc)

M/C SERIAL NO.
(last two digit of the Year)

2.0 PRINCIPLE OF OPERATION:

A) STANDARD BRUSHLESS AC GENERATOR



SCHEMATIC DIAGRAM

I. Here the excitation power is derived from the main output winding. Referring to schematic diagram, initially the machine builds up voltage with the help of residual magnetism.

II. The automatic voltage regulator (AVR) will sense this low voltage and compare it with the 'set reference' voltage level and provides such power as is available from the main stator winding in order to establish the exciter field.

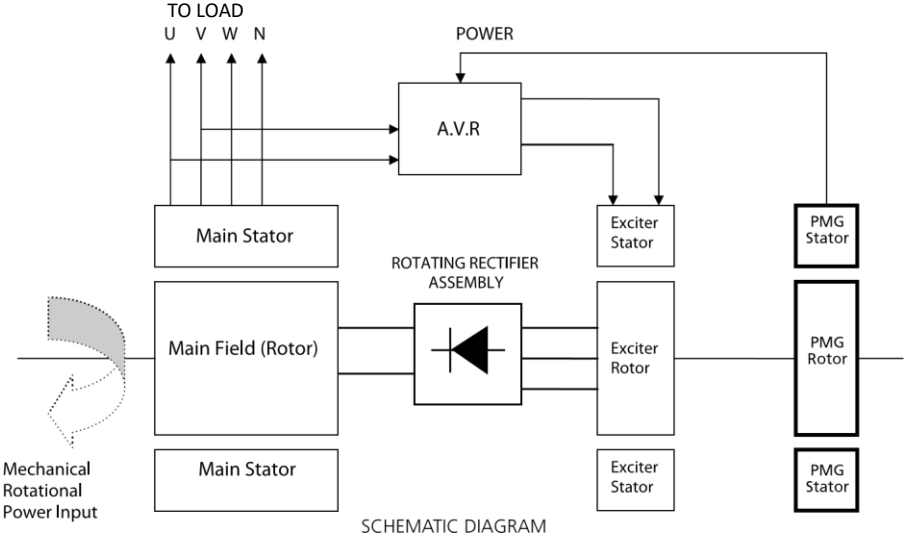
III. The power from the main output winding is rectified in the AVR and added to residual voltage level of exciter to produce a greater magnetic field strength. This in turn increases output voltage from the exciter rotor.

IV. The output from the exciter rotor is rectified by the rotating diodes which adds to the field strength and increases the output voltage from the main stator.

V. The AVR senses this increases, compares it with the 'set reference' and uses the increased power from the main stator to further increase the exciter field excitation as required.

In this way the main stator voltage is progressively built up until the 'sensed' voltage is the same as the 'set reference' voltage.

B) BRUSHLESS AC GENERATOR WITH PERMANENT MAGNET GENERATOR (PMG)



SCHEMATIC DIAGRAM

I. In this generator there is a separate source to AVR from a small permanent magnet A.C. generator mounted on the same shaft as the main machine.

II. The permanent magnet produces an output voltage that is only dependent on speed and is independent of load conditions. This constant output voltage is fed to the exciter field winding through the AVR.

III. By comparing the main output 'sensed' voltage with the 'set reference' voltage, the AVR decides on the proportion of permanent magnet machine output to rectify and feed to the exciter field.

IV. The exciter rotor output would then increase, established a strong main field and therefore a marked increase in main output voltage.

V. The AVR senses and compares voltages and adjusts exciter field excitation until desired output voltage is developed.

ADVANTAGES OF PMG EXCITATION SYSTEM:

1) Better motor starting characteristics with lower transient voltage dips.

2) Better co-ordination with relay under sustained short circuit condition.

3) Since the Power to AVR is supplied from the PMG, isolation from AC Generator output terminals, harmonic currents from the load are prevented from passing to the AVR. This reduces output voltage distortion.

4) The process of initial voltage build up is very positive in this system, as residual magnetism is no longer continually depended upon.

3.0 OPERATING PARAMETERS:

3.1 VOLTAGE

Generators suitable for following voltages are manufactured depending on the customers requirement
50 Hz - 3ph - 415, 380, 208 & 190 Volts, 1ph - 230, 220, 115 & 110 volts 60 Hz - 3ph - 600, 480, 277 & 240 volts, 1ph - 240 volts.

3.2 FREQUENCY

Generators are suitable for 50 Hz/ 60 Hz ie. 1500 rpm/ 1800 rpm.

3.3 POWER FACTOR

Standard machines are designed suitable for 0.8pf (lag) for lower power factor refer to manufacturer. For higher power factors from 0.8pf (lag) to 1(UPF) please check for engine capabilities while loading.

3.4 ENVIRONMENT

Generators are suitable for 40º C ambient temperature and altitudes upto 1000 meters above sea level. For operations beyond this limitation please refer to manufacturer.

3.5 MOTOR STARTING CAPACITY

Suitable for motor starting current upto 2.5 times of the AC generator rated current.

3.6 OVERLOAD

The AC Generators are designed to withstand 10 % overload for one hour in every 12 hours of rated load operation and 50% over load for 30 seconds as specified in relevant standards.

3.7 SHORT CIRCUIT

AC Generators are designed to withstand the short circuit current of three times the rated current for three seconds. The exciter is liberally designed to cater to the excitation requirement under such conditions.

3.8 MECHANCIAL FEATURES

- Degree of protection IP 23, cooling IC 01.
- B 15 mounting type, with SAE-3, SAE-2, SAE-1, SAE-0 single bearing B3 for double bearing type.
- Suitable for bi-directional rotation.
- Top mounted terminal box with a provision for customer cable termination on both sides.
- Plastic/Aluminium fan for reliable and efficient cooling.
- Dynamically balanced rotor to minimize vibration.
- Long-life sealed lubricated/ externally lubricated bearings.
- Over speed @ 1.2 times rated rpm for 2 minutes.
- Rotor with damper winding for stability.

3.9 INSULATION

- Stator and rotor windings are with class 'H' insulationand class 'H' temperature rise ie. 125º by resistance method over an ambient 40º with optimum designed body temperature can reach upto 90º.
- Epoxy gel coat on overhangs.

3.10 HARMONICS

- THD less than 1.8% @ no load.
- 2/3 chording to reduce harmonics.

3.11 OUTPUT TERMINALS

- Six leads are brought to the terminal box and connected to four terminals.
- Twelve lead reconnectable facility - optional

3.12 OPTIONAL ACCESSORIES

- RTD type Winding Temp. Detectors (WTD), Bearing Temp. Detector (BTD). on 140 kVA and above.
- Space heaters (anti condensation heaters).
- Double coat Epoxy painting

- CT for parallel operation, (QDC) for 250 kVA and above standard.
- PMG for 250 kVA and above for lower rating refer to manufacture.
- Metering CT's.

3.13 Voltage Regulation

The steady state voltage accuracy will be ± 0.8% at 0.8 to unity p.f from no load to full load and this is independent of the temperature, voltage, load and power factor within the limits specified. The voltage regulator will keep the generator voltage constant without undue overheating of its component and under consideration of speed drop to the extent of 4 % of rated speed. The response time of regulation is less than 75 milliseconds.

4.0 AUTOMATIC VOLTAGE REGULATOR

Kirloskar Green (TAVR) automatic voltage regulators are in wide range for wide application. Our AVR have the following specifications.

- Encapsulated components for weather protection, Compact and rugged construction.
- Solid state, Fast response to the load changes.
- Build up from a very low residual voltage – about 2.5 v (L-N)

4.1 FEATURES Voltage adjustment:

A potentiometer is provided in the AVR for voltage adjustment up to ±5% of rated voltage. Provision is made for connecting external potentiometer in the AVR for any remote adjustment. Refer AVR Connection diagram for details. for adjustment beyond ± 5% refer to the manufacture.

4.2 Stability Adjustment: Normally sealed after setting at works

The AVR include stability circuit to provide the good steady state and transient performance of the generator.

A potentiometer is provided to reduce the voltage hunting under no-load condition. Procedure to set STAB pot is as follows:

- Turn the STAB pot clockwise to increase stability i.e., to reduce the oscillation.

4.3 Under frequency Roll off (UFRO): Normally sealed after setting at works

A Potentiometer is provided to protect the AC Generator from the sustained low speed operation. AVR will reduce the voltage proportional to the speed below the set value. Procedure to set FRO circuit is as follows: First run the generator at speed corresponding to 46 Hz, turn the FRO pot by few turns clockwise and ensure voltage does not increase. Now turn the pot slowly anticlockwise till reaching a particular point at which the voltage will start reducing. Stop turning at this point and turn the pot clockwise by two turns till normal voltage is restored. • For 60 Hz operationreset the FRO pot to 56 Hz.

The AVR incorporates an under speed protect circuit which gives a Volts/ Hz characteristics when the generator speed falls below a presentable value the red LED gives indication that the UFRO circuit is operating

4.4 Quadrature droop compensation (QDC) Adjustment: for parallel operation

Droop Adjustment:

Generator intended for parallel operation are to be fitted with a quadrature droop CT. CT is connected to Q1, Q2 on the AVR with ratios of rated current: 5Amps, 1% accuracy,5 VA burden.

A potentiometer is provided to adjust the variable droop for parallel operation of AC generators. Follow the CT connections as per the AVR connection diagram. Procedure to set QDC pot is as follows:

- Turn the QDC pot clockwise to increase droop.

4.5 Accessory Input: for 250 kVA and above AC generators

An analog input (A1& A2) is provided to connect to the DC current source device. It is designed to accept DC signal up to ± 4.5 Volts.

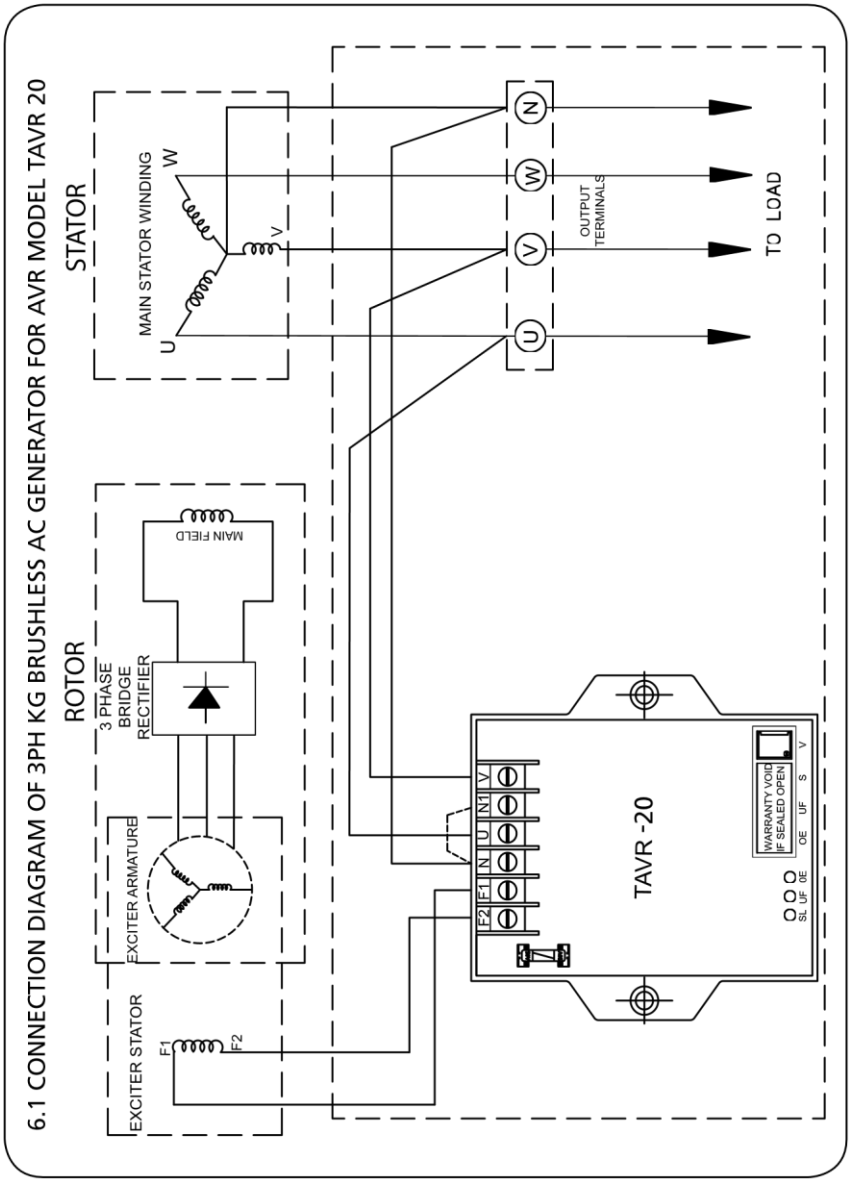
5.0 AVR MODELS

SLNO	PARAMETER	TAVR -20	TAVR -30	TAVR -18 (PMG)
1	Voltage adjustment	√	√	√
2	Stability adjustment	√	√	√

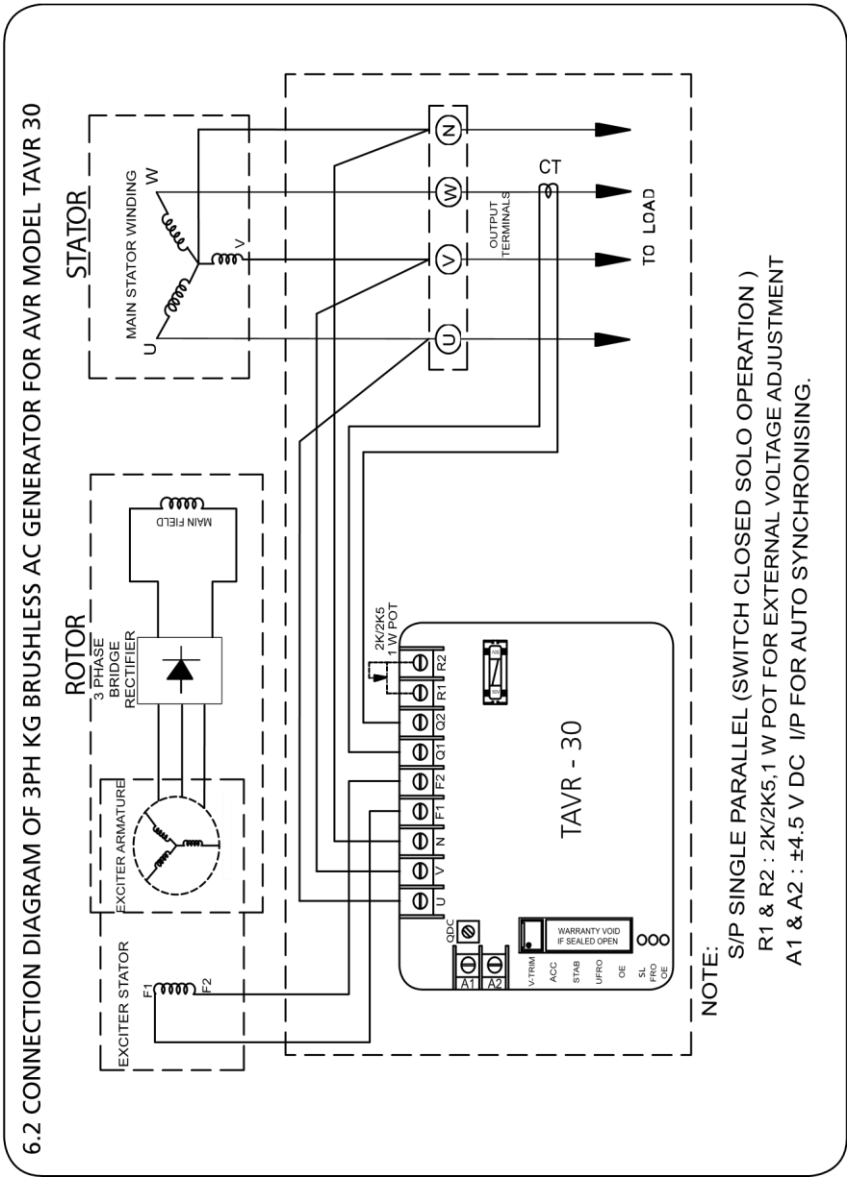
3	Under frequency roll off adjustment	√	√	√
4	Remote voltage adjustment	☒	√	√
5	Over Excitation adjustment	√	√	√
6	Accessory (DC input)	☒	√	√
7	Quadrature Droop	☒	√	√
8	Sense Loss indication	√	√	√
9	Over excitation indication	√	√	√
10	Under frequency roll off	√	√	√
11	Frequency roll of indicator	√	√	√
12	Used on frames	KG164 - KG254	KG284 - KG354	KG284 - KG354
13	Ratings	5 - 200 kVA	250 - 650 kVA	250 - 650 kVA

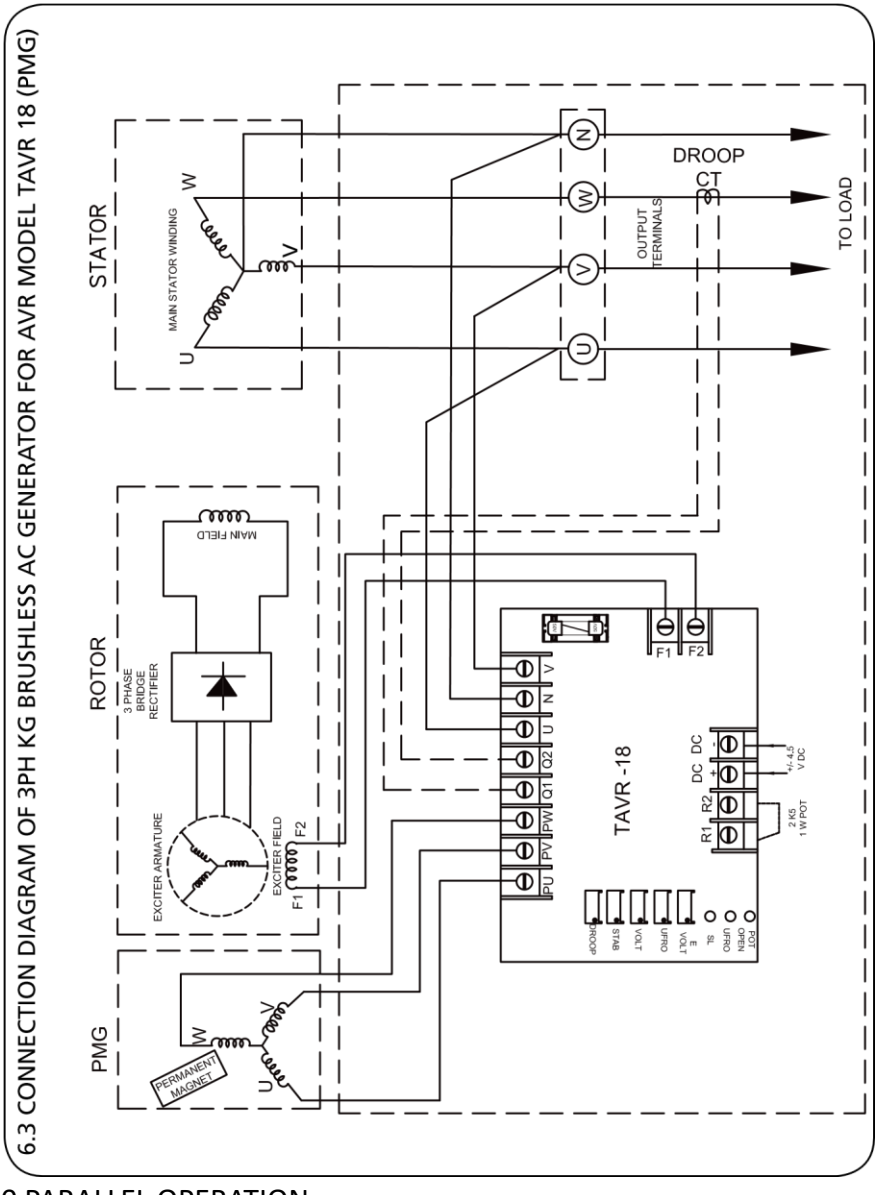
6.0 CONNECTION DIAGRAM OF 3PH BRUSHLESS AC GENERATOR

6.1 CONNECTION DIAGRAM OF 3PH KG BRUSHLESS AC GENERATOR FOR AVR MODEL TAVR 20



Note: For Single Phase short 'N' & 'N1' & Do not connect 'V'


6.2 CONNECTION DIAGRAM OF 3PH KG BRUSHLESS AC GENERATOR FOR AVR MODEL TAVR 30
STATOR
MAIN STATOR WINDING
U
V
W
ROTOR
3 PHASE BRIDGE RECTIFIER
MAIN FIELD
EXCITER ARMATURE
EXCITER STATOR
F1
F2
OUTPUT TERMINALS
U
V
W
N
CT
TO LOAD
2K/2K5 1 W POT
TAVR - 30
U V N F1 F2 Q1 Q2 R1 R2
QDC
A1 A2
V-TRIM ACC STAB UFRO OE SL FRO OE
WARRANTY VOID IF SEALED OPEN
NOTE:
S/P SINGLE PARALLEL (SWITCH CLOSED SOLO OPERATION)
R1 & R2 : 2K/2K5,1 W POT FOR EXTERNAL VOLTAGE ADJUSTMENT
A1 & A2 : ±4.5 V DC I/P FOR AUTO SYNCHRONISING.



7.0 PARALLEL OPERATION

7.1 PARALLELING BASICS

The following points are basic criteria which must be met before two units can be paralleled.

THIS IS GENERAL INSTRUCTIONS FOR PARALLELING OPERATION.

1. Additional paralleling circuitry
   A. Voltage regulator-QDC circuitary
   B. Current transformer rated current : 5 Amps
   C. The driving engines should have the same speed droop characteristics and the governors should be adjusted to give the same speed droop. D. Proper Switchgear
2. The voltage and frequency must be the same for all sets with voltages in phase.
3. The voltage droop characteristics of the individual generators should be similar.
4. The generators must have the same phase rotation.

Before operating generator sets in parallel, each set should be checked by starting, operating, and adjusting the sets as individual units before attempting paralleling.

7.2 PARALLEL OPERATION (with other similar generators only)

AC Generator rotors are equipped with damper cage winding suitable for parallel operation with other similar AC Generators provided with damper cage and drooping characteristics. The parallel operation with other makes of AC Generators should be referred to us for confirmation. Provision is made in the AVR for connecting the secondary of Quadrature Compensation Current Transformer (connected in W-Phase) with the secondary current of 5A for proper reactive load sharing. Paralleling with other generator sets and / or with the utility power grid offers a number of advantages. Multiple unit installations increase power capacity; they can be added or removed from the line depending on the load requirements; they can be better maintained and repaired (since single source breakdown would mean total loss of power), and they often provide more reliable, efficient, and economical operation.

7.2.1 PRIME MOVER

The prime mover provides the speed and torque which will be necessary to keep the machines in synchronized operation. A governor controls the prime mover's speed.
The governor will directly control the watt or kW output and frequency of the unit.

7.2.2 VOLTAGE REGULATOR

The voltage regulator controls the generator output voltage and the reactive power supplied by the generator. When two or more ac generators operate in parallel, the voltage regulator must have paralleling provisions (either internally or external to the regulator) to control the reactive or VAR load while it is in parallel operation. A separate paralleling current transformer is required to sense the reactive current and signal the voltage regulator. This additional paralleling circuitry is absolutely necessary to control the reactive current flowing between the generator sets.

7.2.3 SWITCHGEAR

There are additional relays and breaker controls that are necessary to insure safe, trouble free operation of paralleled units. Reverse power relays monitor the direction of power flow to insure that the generator is delivering power, not accepting it.

These power relays control breakers, which are a means of connecting and disconnecting the generator from the load. The total system can include overvoltage, over-current protection, under frequency protection, power factor correction provision and a variety of associated control equipment from manual switchgear to microprocessors. The amount of control gear and level of sophistication will be determined by the needs and requirements of the particular application.

7.2.4 REACTIVE LOAD CONTROL

When two identical generators are operating together in parallel and an unbalance occurs in field excitation, circulating currents begin to flow between the generators. This current will appear as a lagging power factor or inductive load to the highly excited generator and as a leading power factor or capacitive load to the generator with the lower field current. This is known as the reactive circulating current and there are two methods of controlling it in parallel operation:

1. Reactive droop compensation. (Formerly known as parallel droop compensation.) The bus voltage droops, or decreases, as the reactive lagging power factor load is increased.

2. Reactive differential compensation.(Formerly known as cross current compensation.) The reactive differential compensation circuit allows parallel generators to share reactive loads with no decrease or droop in generator voltage.

The circuit must meet the following criteria:

A) All paralleling current transformers for all the generators being paralleled must be included in the secondary interconnection loop.

B) When different size generators are paralleled all paralleling current transformers must have the same proportional ratios that give approximately the same secondary current.

C) Voltage regulator paralleling circuitry must be the same.

D) Current transformer secondary and the generator lines must be isolated electrically.

Because of the above criteria, reactive differential compensation cannot be used when paralleling with the utility power grid. There is no limit, however, in the number of generators that can be included in this type of circuit.

1. NOTE: For parallel operation with GRID standard AVR will not be suitable, refer to manufacturer for this requirement

8.0 ASSEMBLY OF GENERATOR TO PRIME MOVER:

8.1 GENERATOR MOUNTING – SINGLE BEARING:

Single bearing generators are provided with an SAE flywheel adapter and flexible drivediscs. Very close tolerances are maintained in the manufacture of the generator so that the alignment procedure is extremely simple. A coupling hub is shrunk on the shaft and special steel drive discs are bolted to the hub. Holes are provided in the periphery of the coupling disc, which correspond to tapped holes in the flywheel. The outside diameter of the discs fits in a rabbet in the flywheel so that concentricity is assured in all cases. Ensure endplay available.

The SAE adapter and the flywheel housing are designed to match each other with no further alignment necessary. Shims may be necessary under the feet of the generator to insure a solid mounting.

8.2 GENERATOR MOUNTING – DOUBLE BEARING:

Two bearing generators are provided with a shaft extension and key way. For direct coupled sets the assembler furnishes a flexible coupling which is installed between the driver and the generator shaft.

IMPORTANT: Aligning the two machines as accurately as possible will reduce vibration, increase-bearing life, and insures minimum coupling wear. It may be necessary to shim the generator feet for proper support and alignment. Consult the coupling manufacturer's instructions for alignment specifications and procedures.

9.0 GENERATOR ERECTION AND ASSEMBLY:

9.1 DELIVERY AND STORAGE

Upon receipt of the generator, it is recommended that it should be carefully examined for possible damage incurred in shipment. The generator was given to the Freight Company in good condition, and they are responsible for the product from our dock to yours. Any damage should be noted on the freight bill before accepting the shipment. Claims for damages must be promptly filed with the Freight Company.

The AC Generator must be stored in a clean and dry place to avoid entry of moisture and the harmful dusts as otherwise the insulation resistance of the windings will get affected.

In order to prevent compression pits in the bearings, the AC Generator should be stored in vibration free premises.

9.2 LOCATION

The AC Generator shall be installed where there is sufficient circulation of freshair. i.e. ambient temperature never exceeds 40°C for the normal rating. For higher temperature, a deration factor should be applied. Further the room must be dry and the machine must be easily accessible.

Vibration of the AC Generator should be with in values specified in IS: 4722. If vibration is more, then the levels of the AC Generator feet should be checked with the help of dial indicator and corrected.

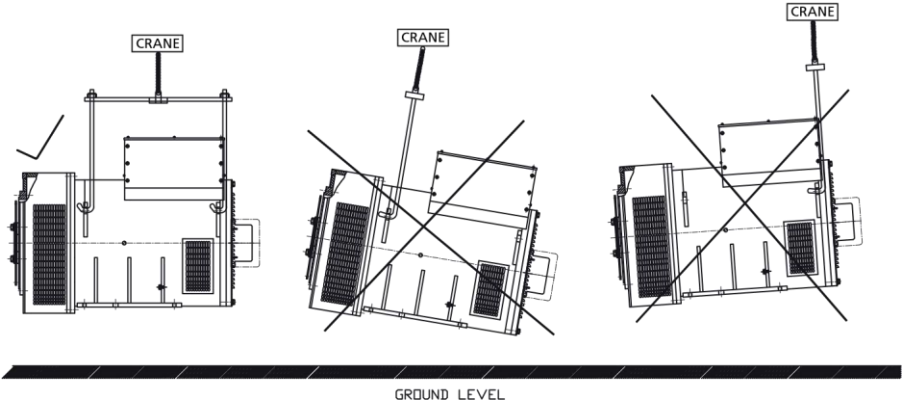
Care should be taken that exhaust of diesel engine does not get mixed with the air inlet of the AC Generator.

9.3 FOUNDATION

The machine should be mounted on a foundation / base frame, which may be of steel structure or concrete platform. The foundation / base frame must be well designed for adequate rigidity and long life, taking into consideration the dynamic loading under abnormal running of the machine, vibration resulting from running machinery and other relevant factors. Care must be taken to ensure that the surface to which the machine is bolted down is aligned and leveled in all directions prior to mounting the machine.

9.4 INSTALLATION

Make sure that the air inlet and outlet openings are clear without any obstruction. The AC Generators are intended for horizontal mounting and direct-drive through flexible coupling in case of double bearing machine and with coupling disc in single bearing machine; the tapped holes provided in the shaft end/hub can be used for fitting coupling.



9.5 ALIGNMENT

Measuring the concentricity and parallelism of the coupling shall carefully align the AC Generator and the prime mover. The difference between the two coupling halves shall not exceed 0.1mm.

9.6 DIRECTION OF ROTATION

The AC Generator can be driven in either direction of rotation. For the standard phase sequence U-V-W, the rotation is clockwise looking from the drive end of the AC Generator, for anticlockwise rotation; transpose phases V and W to get U-W-V phase sequence.

9.7 TERMINATIONS AND SWITCHGEAR

Standard termination consists of four terminals, three-phase and a neutral. Correct size of cable glands should be chosen.

The switchgear should include all those required for the operation of the AC Generator and the same is not in the scope of supply of generator manufacturer as such. Adequate protection system has to be provided to protect and to isolate the generator during any malfunction.

For the optimum performance, the current in the three lines should be equal. However unbalance of up to 25% may be allowed for short period without exceeding the rated current. Voltage regulation and other performance characteristics are not guaranteed for unbalance and nonlinear loads.

10. COMMISSIONING CHECKS:

10.1 INSULATION CHECKS:

If the machine is stored for long period or is suspected to be damp, the insulation resistance of the winding should be checked. While checking the insulation resistance of the winding it must be ensured that all the connections to the AVR and rotating rectifier assembly are removed.

The insulation resistances of all windings are to be checked using a 500V megger before the AC Generator is put into operation. The insulation resistance of the winding and earth should be greater than 2 Mega ohm. If the resistance is less than this value, connect 230V, single phase supply to space heater terminals is provided inside the terminal box for 1 or 2 hours. Again recheck for IR value. Alternative methods to improve IR Value are as follows :-

Disconnect the AVR from the terminals, short circuit the three stator output terminals through a cable capable of carrying the rated current and also provide an ammeter to monitor the current flowing in the short circuit terminals. Connect a 24V battery to the field winding (F1 & F2) terminals of the exciter stator with respect to the polarities in series with a rheostat of about 10 ohms and 250W, with a switching system kept in open position.

Run the generator to its rated speed and adjust its excitation through the rheostat after closing the switch in order to obtain the rated current in the short-circuited terminals. After getting heated up stop the prime mover and again measure the insulation resistance value.

Another method of improving IR value of winding is to circulate the hot air through the machine. Placing heaters inside or near the machine may do it. Care should be taken to see that temperature of no part of the winding exceeds 90°C (194°F) total temperature by thermometer.

10.2 CONNECTION CHECKS

Most of the problems that arise during operation are due to wrong, loose or snapped connections from AVR/switchgear to the machine. Hence, it is important to check these connections thoroughly.

The connection between AVR and the generator terminal should be checked as per the connection diagram.

10.3 RESIDUAL VOLTAGE CHECKS

The minimum residual voltage at the generator terminals required for positive buildup is about 2.5V between line to neutral with the generator running at rated speed. If the machine does not build up due to low or loss of residual magnetism, the following procedure is applied to recharge the ac generator. Stop the Engine and disconnect the AVR connections. Flash the Exciter field by connecting 12/24V battery with F1 connected to positive and F2 to negative terminal of the battery for 10 - 15 seconds. Failures to build up voltage refer ' Trouble Shooting Chart'.

Do Not Megger or Flash test the Generator Windings unless all leads to the

AVR have been disconnected.

10.4 RATED VOLTAGE AND BALANCED VOLTAGE CHECKS

The generator is started and run at its rated speed. Whenever manual control of voltage is provided as a feature, the generator should be excited on no load manually, till the rated voltage is developed between line to line. The voltage balance on the three lines of the generator should be checked.

Do Not Start the Generator with Load On

Removal of pot sealing in AVR warranty void.

11. RECOMMENDED SPARES:

1. Automatic Voltage Regulator(AVR)	-1 No
2. Bearing NDE	-1 No
3. Rotating Rectifier Assembly (RRA)	-1 Set
4. Wound Exciter Rotor	-1 No
5. Wound Exciter Stator	-1 No
6. Terminal Bar	-1 No

12. SERVICING TIPS

12.1 Rotor Removal

1. Remove NDE front cover.
2. Remove the screws of NDE bearing cap.
3. Disconnect exciter stator winding leads from AVR.
4. Unbolt the NDE end shield from the stator body and jack the NDE end shield with the help of suitable bolts.
5. Take out the Rotor towards the DE side along with the Fan & bearing from the stator body.
6. Re-assemble the Rotor in reverse order.

12.2 Rotating Rectifier Assembly Removal

1. Disconnect the RRA connections from Main Rotor and exciter Rotor.
2. Unbolt the RRA from the Exciter Rotor with the help of suitable spanners.
3. Withdraw the RRA assembly towards the NDE side.
4. Refit the RRA on Exciter Rotor in reverse order.

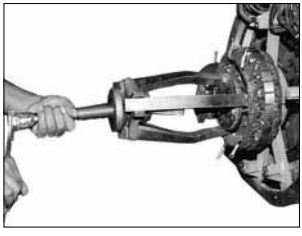
12.3 EXCITER ROTOR REMOVAL

1. Remove bearing from the shaft using suitable bearing puller.
2. Remove RRA from the exciter rotor.
3. Fix suitable fixture to studs provided in exciter rotor.
4. Pull out the exciter rotor from the shaft with suitable puller towards the NDE side.

RRA REMOVAL

12.4 Exciter Stator Removal

1. Disconnect the exciter stator winding leads from AVR.
2. Unbolt the NDE shield from the stator body.
3. Unbolt the exciter stator core from NDE shield.
4. Refit the exciter stator in reverse order.



BEARING REMOVAL

NDE END SHIELD REMOVAL.

EXCITER ROTOR REMOVAL

13. FAULT FINDING CHART

Fault	Cause	Rectification
1. No voltage from generator	Defective Voltmeter	Check voltmeter & replace
	Excitation circuit open	Check for loose connection
	Incorrect excitation circuit connection	Check for proper connection

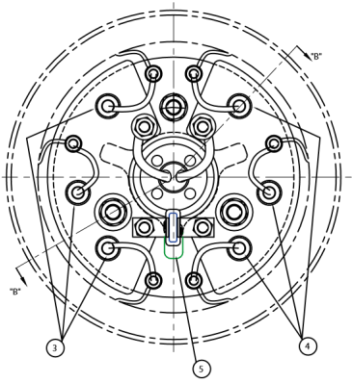
	Low residual voltage	Check for residual voltage. If residual voltage is less than 2.5 volts (L –N), field flashing required for few seconds.
		Field Flashing procedure : 1. Disconnect regulator connections 2. Connect 12 / 24 V battery keeping F1 to Positive and F2 to Negative terminal of exciter stator.
	Grounded exciter field	Check and correct
	Rotating rectifier faulty	Check rotating diodes
	Fuses in AVR failed	Replace fuses
	AVR Defective	Replace AVR
2. Voltage developed but excitation current is high	Rotating Diode faulty	Check rotating diodes and replace faulty diodes
	Prime mover	Adjust prime mover
	Prime mover speed is low	Adjust prime mover speed to rated speed
3. Low Voltage build up	V – Trim Pot incorrectly set.	Adjust Voltage by V – Trim Pot in AVR
	Low prime mover speed	Adjust prime mover speed to rated speed
4. Voltage - High	Loose OR No- connection to ' U ' terminals of the AVR	Check and correct
	Incorrect Voltage setting	Adjust Voltage by V – Trim Pot in AVR
	AVR defective	Replace AVR
5. Voltage fluctuation	Speed fluctuation of the prime mover	Set the speed of the prime mover
	Incorrect setting of stability Pot	Adjust stability Pot in AVR
	Leading load power factor	Correct the power factor
	Load hunting, fluctuates rapidly	Check and reduce the non – linear load.
	High percentage of Non – linear load	Rectification

6. Over heating of generator	Over loading of generator	Check the load and correct. To be in line with name plate rating.
	Blocking of ventilation passage	Check ventilation and clean passage if necessary
	Low speed on load	Adjust prime mover speed
	Low load power factor	Reduce the load
	Generator operating at very high voltage	Check voltage and adjust
	High percentage of non – linear load	Check and reduce non – linear load
7. Excessive vibration and noise	Poor alignment	Re – align properly
	Coupling and foundation bolts loose	Tighten the bolts
	Bearing defective	Replace bearings
8. Over heating of bearing	Incorrect assembly of bearing	Re – assemble correctly
	Bearing damaged	Replace bearing
9. Generator does not share kW load proportionately	Prime mover speed droop improperly set	Set prime mover speed properly. Droop (Governor) characteristic of engines.
10. Generator does not share kVAr load proportionately	Quadrature droop incorrect	Set quadrature droop correctly by QDC Pot in AVR
	QDC – CT polarity reversed	Interchange CT secondary
	QDC – CT are not in W - phase	Check and rectify.

14. ROTATING RECTIFIER ASSEMBLY :

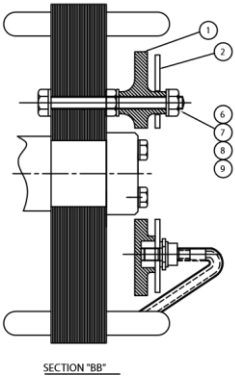
ROTATING RECTIFIER ASSEMBLY

Ref . No.	Description	Quantity
1	Base Plate	1
2	Al. Plate	2
3	Forward Diode	3
4	Reverse Diode	3
5	Varistor	1



ROTATING RECTIFIER ASSEMBLY

Ref. No.	Description	Quantity
1	Hub	1
2	AL. Plate	2
3	Forword Diode	3
4	Reverse Diode	3
5	Varistor	1
6	Hex. Bolt	3
7	Hex. Nut	3
8	Plain Washer	3
9	Lock Washer	3



SECTION "BB"

15. RECOMMENDED TORQUE VALUES FOR BOLTS & SCREWS IN A C GENERATOR ASSEMBLY.

15.1 The Hexagonal Head Screws & Socket Head Cap Screws in A C Generator Assembly have to be tightened to Torque Values as stated in Table below unless called for otherwise in the relevant Drawing / Specification.

	UNIT	M6	M8	M10	M12	M16	M20	M24
Torque Value	N.m	10	25	50	90	220	440	750
	Kgf.m	1.0	2.5	5.0	9.0	22.0	44.0	75.0

15.2 The Terminal board Stud in A C Generator Assembly has to be tightened to torque values as stated in table below.

Sl No.	Frame	Stud Size	Torque in

			N.m	kgf.m
1	164	M6	6	0.6
2	184, 204,224 A, B, C, D, E	M8	10	1.0
3	224F, G, H	M10	26	2.6
4	254,284L, 284C, 354	M12	46	4.6

15.3 Hexagonal Head Screws & Socket Head Cap Screws in A C Generator Aluminium Body Assembly have to be tightened to Torque Values as stated in table below unless called for otherwise in the relevant Drawing / Specification.

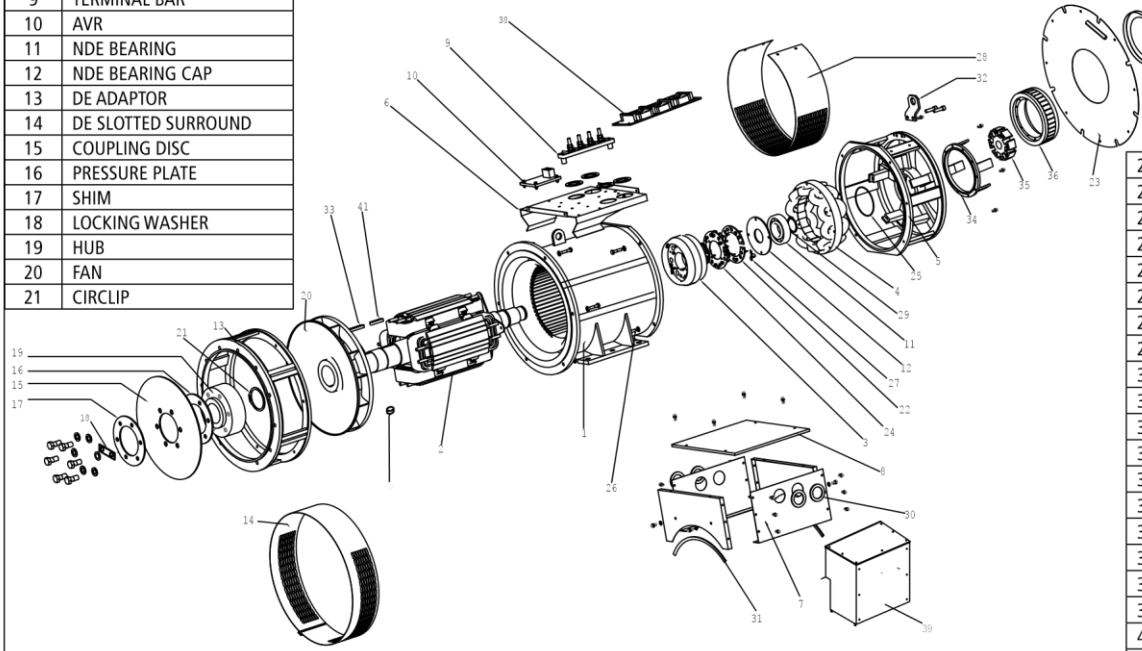
ALUMINIUM BODY (FOR 164 / 184)				
		AVR TO BODY FIXING	TERMINAL BAR TO BODY FIXING	BODY TO DE ADAPTOR & END SHIELD FIXING
	UNIT	M5	M6	M8
Torque Value	N.m	2.0	5.0	25
	kgf.m	0.2	0.5	2.5

15.4 RRA Base Studs has to be tightened to a Torque Value of 5 N.m / 0.5 kgf.m

Note : Tightening Torque tolerance is ± 10% for all the above

16. EXPLODED VIEW OF KG BRUSHLESS AC GENERATOR SINGLE BEARING

1	STATOR ASSEMBLY
2	ROTOR ASSEMBLY
3	EXCITER ROTOR
4	EXCITER STATOR
5	END SHIELD
6	PLATFORM-TB
7	TERMINAL BOX SIDE COVER
8	TOP COVER-TB
9	TERMINAL BAR
10	AVR
11	NDE BEARING
12	NDE BEARING CAP
13	DE ADAPTOR
14	DE SLOTTED SURROUND
15	COUPLING DISC
16	PRESSURE PLATE
17	SHIM
18	LOCKING WASHER
19	HUB
20	FAN
21	CIRCLIP



22	DIODE ANODE/CATHODE
23	NDE FRONT COVER
24	RRA BASE
25	0 RING
26	EARTHING BOLT
27	VARISTOR
28	NDE SLOTTED SURROUND
29	CIRCLIP FOR BEARING
30	GROMMET
31	GASKET FOR TERMINAL BOX
32	LIFTING HOOK
33	EXTENSION KEY
34	PMG STATOR FRAME
35	PMG ROTOR
36	PMG STATOR
37	PMG COVER
38	CT
39	SPREADER BOX (OPTIONAL)
40	FAN KEY
41	EXCITER ROTOR KEY

17. WARRANTY CERTIFICATE

Ref No. Date:

This is to certify that the AC Generator mentioned here under is warranted against inherent manufacturing defects under normal use and preventive maintenance. The AC generator or its components will be repaired free of cost if failed due to inherent manufacturing defects within a period of 18 calendar months from the date of commissioning or 24 calendar months from the date of dispatch whichever is earlier.

FRAME	kVA/ PHASE	RPM	MACHINE NO	ENGINE MAKE & TYPE

The above machine conforms strictly to the specification referred and if it is found defective during the above period, it will be rectified / replaced / repaired free of cost by us / by our authorized service center on receipt of the defective product.

Refer Warranty Clause for more details

For Kirloskar Oil Engines Limited.,

Authorized Signatory

Name &
Address of the OEM/Dealer: (Seal)

Name &
Address of Customer

OEM's Invoice No: Date of commissioning:

18. WARRANTY CLAUSE

1. The AC Generator will be repaired free of cost with in the warranty period, if it goes out of order due to inherent manufacturing defects.
2. The period of warranty is for EIGHTEEN calendar months from the date of commissioning or TWENTY FOUR calendar months from the date of dispatch whichever is earlier.
3. The warranty is subject to conditions that the AC Generator is returned to our works or authorized service center as directed, intact and without any alterations/additions/repairs done or attempted.
4. The warranty is applicable for AC Generators under normal use and preventive maintenance.
5. The warranty does not cover normal wear and tear or damages caused by accidents or wrong handling or due to improper installation and maintenance.

   NOTE: - In order to provide efficient & correct services, our authorized technician should be allowed to inspect, analyse and assess the failure/ causes of failure at the site. Your co-operation in this regard helps us to serve you better.

This sheet to be sent for availing the warranty to the address below.

19. AC GENERATOR REGISTRATION FORM (ARF)-

1. Name and Address of user (s) : - _____

_____

_____

PIN::_____

Ph:_____ Fax: _____

2. Rating and M/c Number of the AC GENERATOR:

   a. Rating _____ kVA b. Machine Number _____

3. Name and address of the agency from which you have purchased the AC Generator.

Name: _____

_____ _____

_____ _____

PIN:_____ Ph:_____ Fax: _____

1. Date of Commissioning d ☐ m ☐ y ☐

2. Nature of power application from the AC Generator
(Please tick in the appropriate box)

Standby / Emergency power generation ☐ Captive Power Generation Others ☐
(Please specify below) ☐ ☐

3. Whether the voltage buildup was proper or not? Yes No. ☐ Unsatisfactory ☐

4. Quality of power available from the Brushless AC Generator:
Satisfactory

If unsatisfied, please elaborate:

Signature Name & Company of Commisioning Engineer Signature of Customer

Date:

Place:

BOOK - POST

To.

M/s. Kirloskar Oil Engines Ltd.,
Product Support Department,
#45, Nagarur, Huskur Road, off Tumkur Road, Bangalore - 562 123
Ph: 91-080-2371 7801-7, Fax: 91-080-2371 7808
E-mail: psd.blr@tridentp.com

Postage Stamp

--

SERVICEHISTORYCARD

Date	Type Complaint	ActionTaken	PartsReplaced	Result	Repairwork Doneby	Dateof Completion

KIRLOSKAR OIL ENGINES LIMITED
A Kirloskar Group Company
Khadki, Pune - 411 003.
Tel: +91(20) 2581 0341
Fax: +91 (20) 2581 3208/ 2581 0209
E-mail: k-gensets@koel.co.in

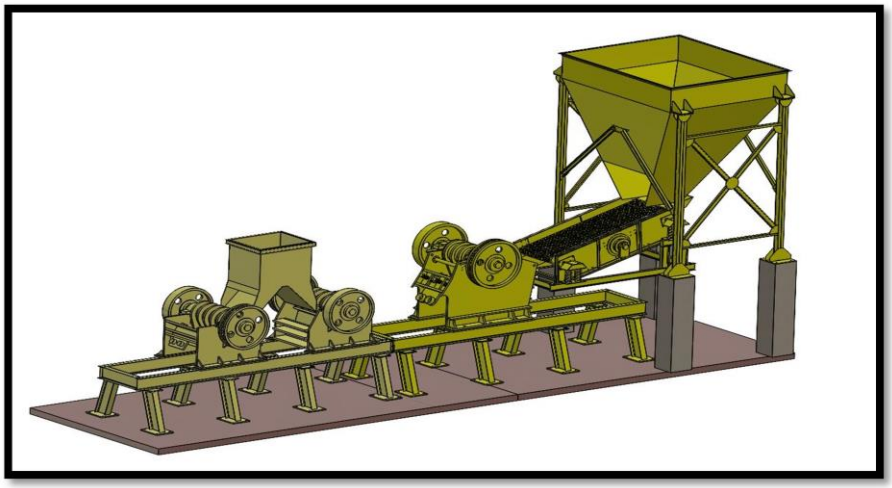
Website: www.kirloskar.com

Enriching Lives

AKONA ENGINEERING PVT LTD.

3

ILLUSTRATED PARTS CATALOGUE FOR BOTH ENGINE AND EQUIPMENT OF AKONA MAKE STONE CRUSHER MODEL:-AJC-50 CAPACITY:-50 TPH



AKONA ENGINEERING PVT LTD.

H.O.:- A-455, HINDON VIHAR, MEERUT ROAD GHAZIABABD-201001 (U.P) INDIA MFG. UNIT - :- PLOT NO.- 219, VILLAGE -RAIPUR, TEHSIL BHAGWANPUR, ROORKEE-247661 (U.Kh.)

MOB: - +91-9891949701, +91-9958695766

SERVICE MAIL -:- as_tender@akonaindia.com

Web: - www.akonaindia.com

AKONA ENGINEERING PVT LTD.

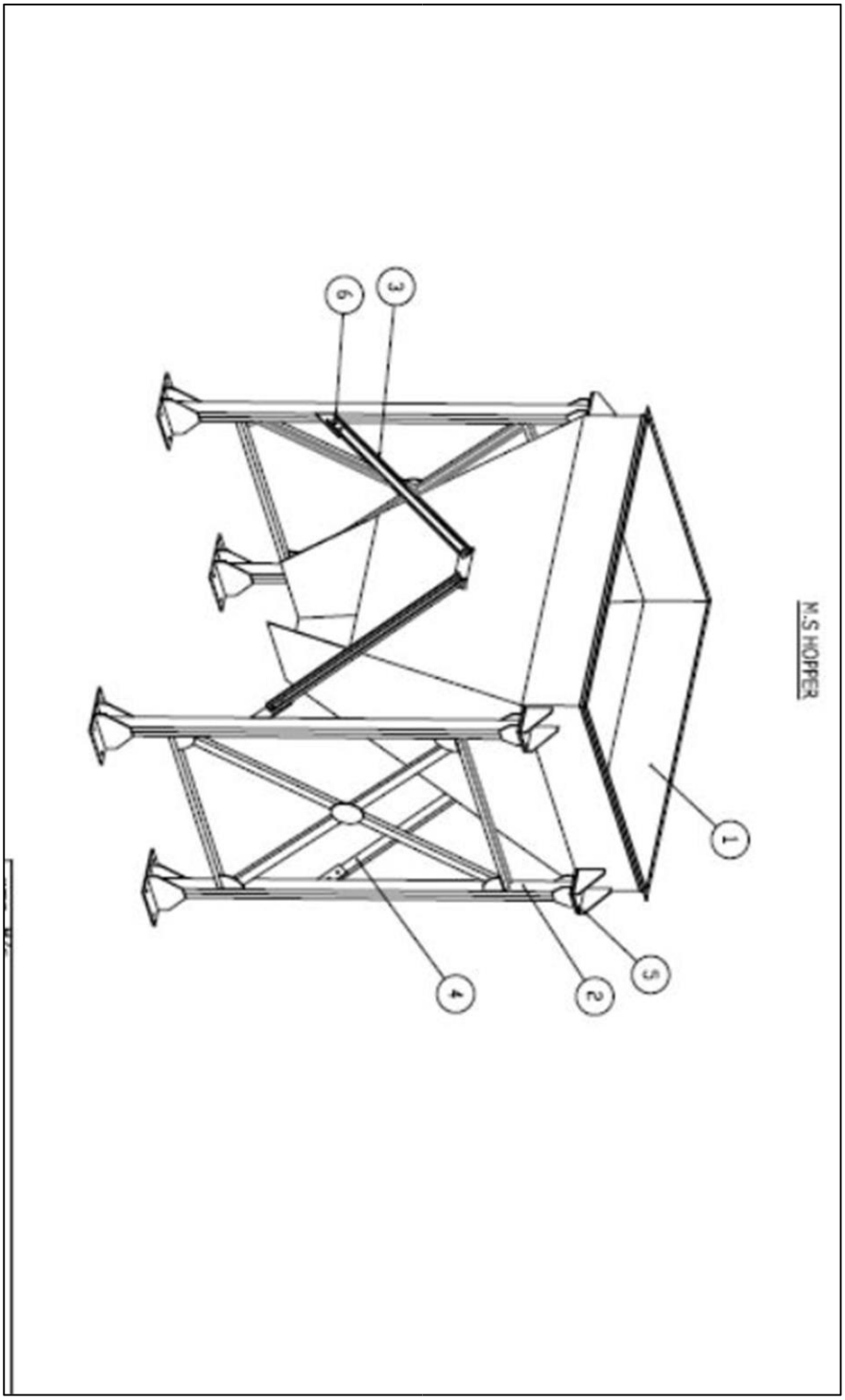
50 TPH STONE CRUSHER PLANT MODEL- AJC-50 -MACHINE UNIT

1. M.S HOPPER 30 TON -01 NO.
2. GRIZZLY FEEDER -10X4 -01 NO.
3. JAW CRUSHER PRIMARY -20X30 SKID MOUNT -01 NO.
4. JAW CRUSHER SECONDARY -6X36-SKID MOUNT -02 NOS.
5. VIBRATING SCREEN -16X5 -01 NO.
6. CONVEYORS
   - I. CONVEYOR 10.5MX500MM B/W ASSEMBLY -04 NOS.
   - II. CONVEYOR 12 MX800MM B/W ASSEMBLY -01 NO.
   - III. CONVEYOR 18 MX800MM B/W ASSEMBLY-01 NO.
   - IV. CONVEYOR 10.5 MX800MM B/W ASSEMBLY-01 NO.
   - V. CONVEYOR 6 MX500MM B/W ASSEMBLY-01 NO.

SPARE PARTS MANUAL INDEX OF –AJC-50

S.NO.	ASSEMBLY NAME	ASSEMBLY CODE	QTY.	PAGE NO.	REMARKS
1	M.S HOPPER	AJC-H-A01	1		
2	PRIMARY JAW CRUSHER	AJC -PJ-A02	1		
3	GRIZZLY FEEDER	AJC -GF-A03	1		
4	SECONDARY JAW CRUSHER	AJC -SJ-A04	2		
5	VIBRATING SCREEN	AJC -VS-A05	1		
6	CONVEYOR-500X10.5M	AJC -DC-A06	4		
7	CONVEYOR-500X6M	AJC -SC-A07	1		
8	CONVEYOR-800X12M	AJC -BC1-A08	1		
9	CONVEYOR-800X18M	AJC -BC2-A09	1		
10	CONVEYOR-800X10.5M	AJC -BC3-A10	1		

1-M.S HOPPER -30 TON

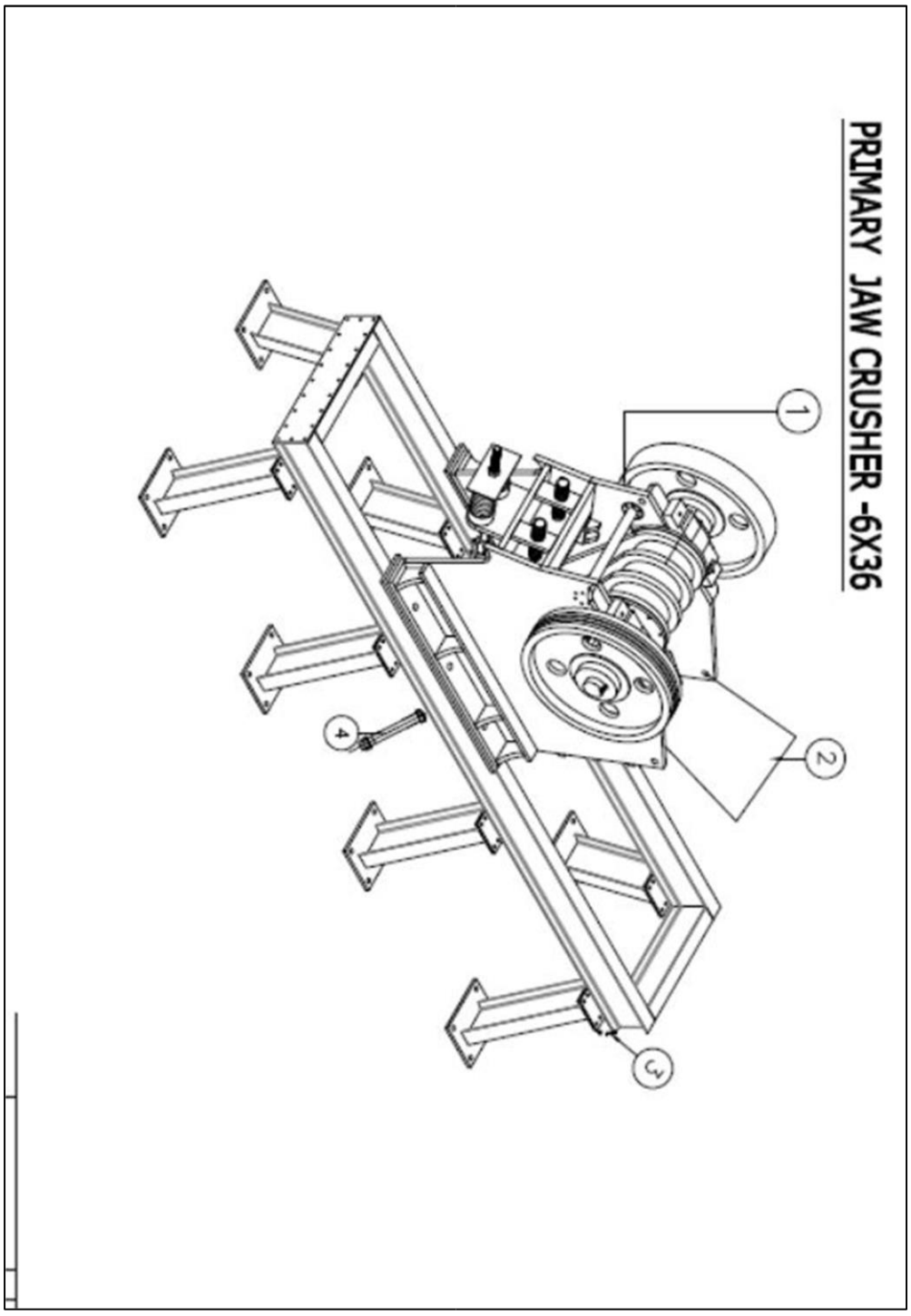


AKONA ENGINEERING PVT LTD.

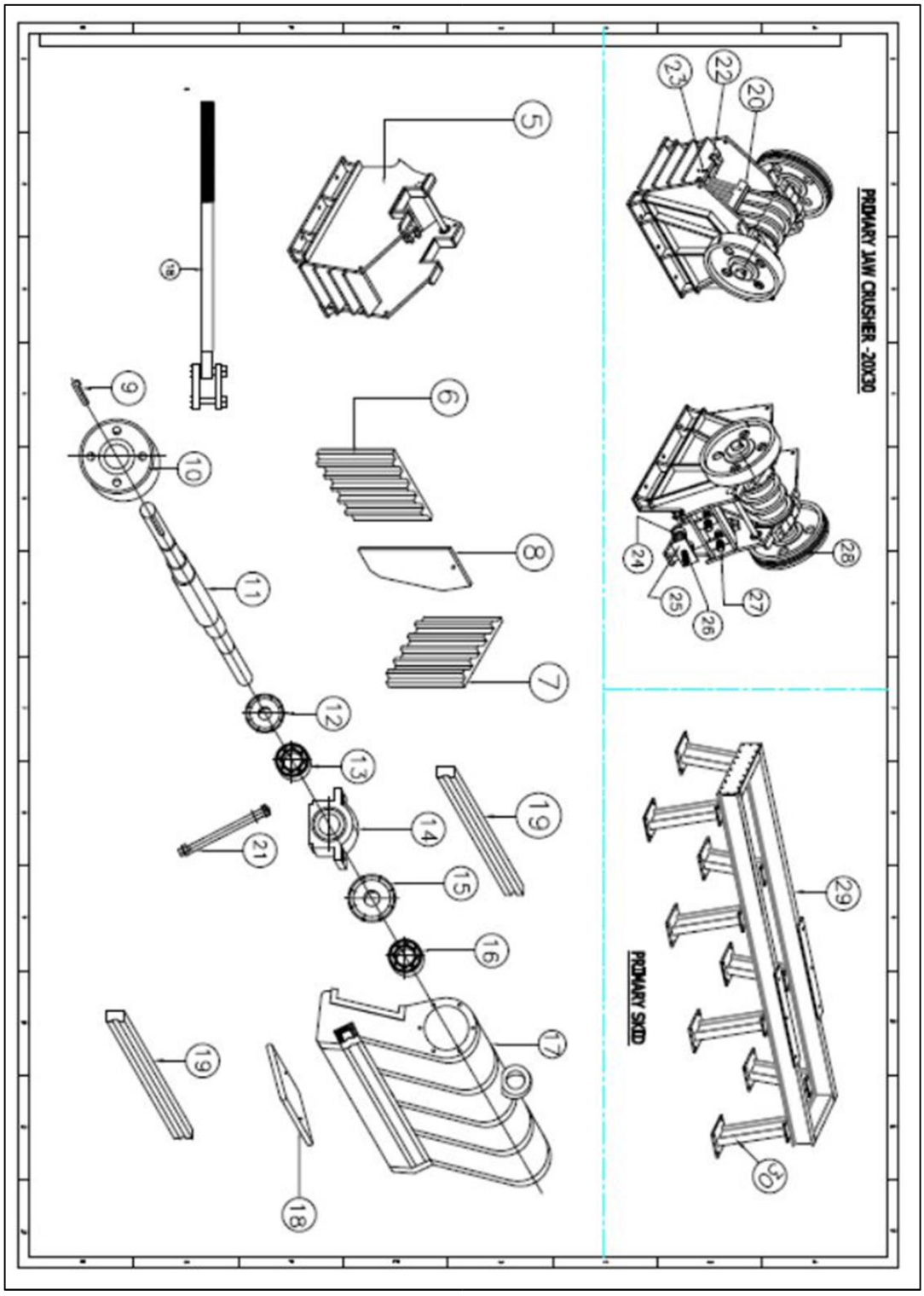
1-M.S HOPPER –AJC-50-H-A01

S.No.	Part No.	Part Name	Description	Qty.	Remark
1	AJC -H-A01-01	M.S HOPER FABRICATED	30 TON	1	
2	AJC -H-A01-02	SIDE LEG ASSLY	4M	2	
3	AJC -H-A01-03	FRONT BRASSING	STD.	2	
4	AJC -H-A01-04	REAR BRASSING	STD.	2	
5	AJC -H-A01-05	JOINT NUT BOLT	6SX3”	16	
6	AJC -H-A01-06	BRASING JOINT BOLT NUT	5SX2”	16	

2-PRIMARY STATION (CRUSHER 20X30) – AJC -H-A01



2-PRIMARY STATION (CRUSHER 20X30) – AJC -H-A01



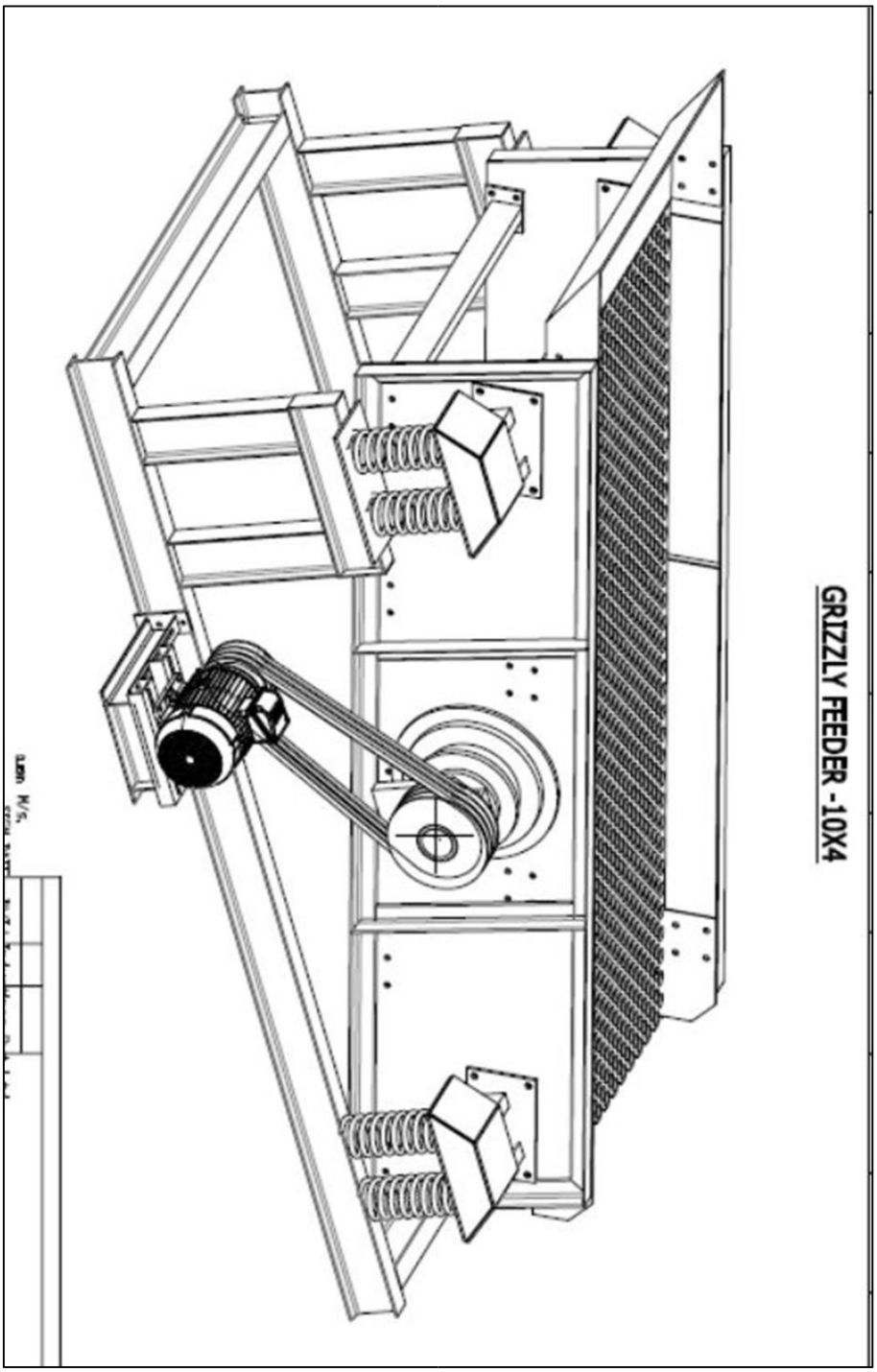
AKONA ENGINEERING PVT LTD.

2-PRIMARY STATION (CRUSHER 20X30) –AJC-PJ-A02

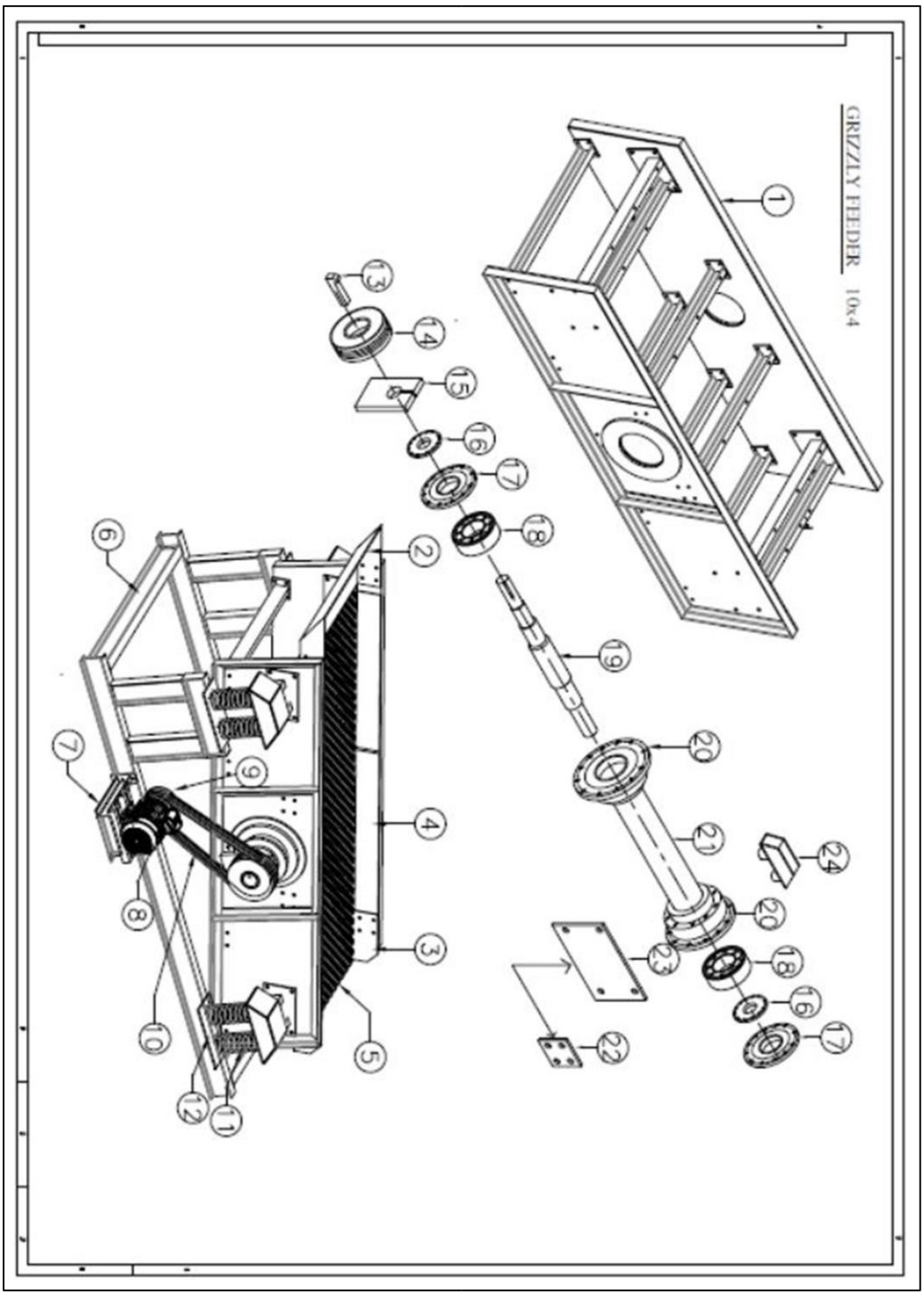
S.No.	Part No.	Part Name	Description	Qty.	Remark
1	AJC -PJ-A02-07	PRIMARY JAW CRUSHER	20X30ST	01	
2	AJC -PJ-A02-08	INLET CHHUTE	STD.	01	
3	AJC -PJ-A02-09	CRUSHER FOUNDATION BOLT	STD.	06	
4	AJC -PJ-A02-10	SKID LEG NUT BOLT	6SX3”	32	
5	AJC -PJ-A02-11	CRUSHER BODY WELDED	20X30 SIZE	01	
6	AJC -PJ-A02-12	FIX JAW PLATE	STD-20X30	01	
7	AJC -PJ-A02-13	SWING JAW PLATE	STD-20X30	01	
8	AJC -PJ-A02-14	SIDE PLATE	STD-20X30	02	LHS&RHS
9	AJC -PJ-A02-15	FLYWHEEL KEY	1”	02	
10	AJC -PJ-A02-16	FLYWHEEL	45”	01	
11	AJC -PJ-A02-17	CAM SHAFT	STD-20X30	01	
12	AJC -PJ-A02-18	CAM SHAFT BKT COVER	STD.20X30	02	
13	AJC -PJ-A02-19	BRACKET BEARING		02	
14	AJC -PJ-A02-20	CAM SHAFT BKT	STD-20X30M/C	02	
15	AJC -PJ-A02-21	PITMEN COVER	AS PITMEN	02	
16	AJC -PJ-A02-22	PITMEN BEARING		02	
17	AJC -PJ-A02-23	PITMEN WELDED	20X30M/C	01	
18	AJC -PJ-A02-24	TOGGLE PLATE	20X30M/C	01	
19	AJC -PJ-A02-25	TOGGLE BEARING	90X480	02	
20	AJC -PJ-A02-26	SWING JAW PLATE TIGHT PLT.	-	01	
21	AJC -PJ-A02-27	SWING JAW PLATE BOLT NUT	-	02	
22	AJC -PJ-A02-28	FIX JAW TIGHTEN BLOCK		02	
23	AJC -PJ-A02-29	TIGHTEN BLOCK BOLT NUT		02	
24	AJC -PJ-A02-30	TIE ROD SPRING	14”	02	
25	AJC -PJ-A02-31	SPRING PLATE	-	01	
26	AJC -PJ-A02-32	TIE ROD NUT	-	01	
27	AJC -PJ-A02-33	TOGGLE ADJUSTING SCREW	-	02	
28	AJC -PJ-A02-34	FLYWHEEL GROOVE	-	01	
29	AJC -PJ-A02-35	PRIMARY JAW SKID	-	01	
30	AJC -PJ-A02-36	SKID LEG	-	08	
31	AJC -PJ-A02-38	TIE ROD	-	01	

32	AJC -PJ-A02-39	MOTOR	75 H.P	01	NOT IN DWG
33	AJC -PJ-A02-39	CRUSHER PULLEY	-	01	NOT IN DWG
34	AJC -PJ-A02-40	V-BELT	-	03	NOT IN DWG

3-GRIZZLY FEEDER (10X4) – AJC -GF-A03



3-GRIZZLY FEEDER (10X4) – AJC -GF-A03

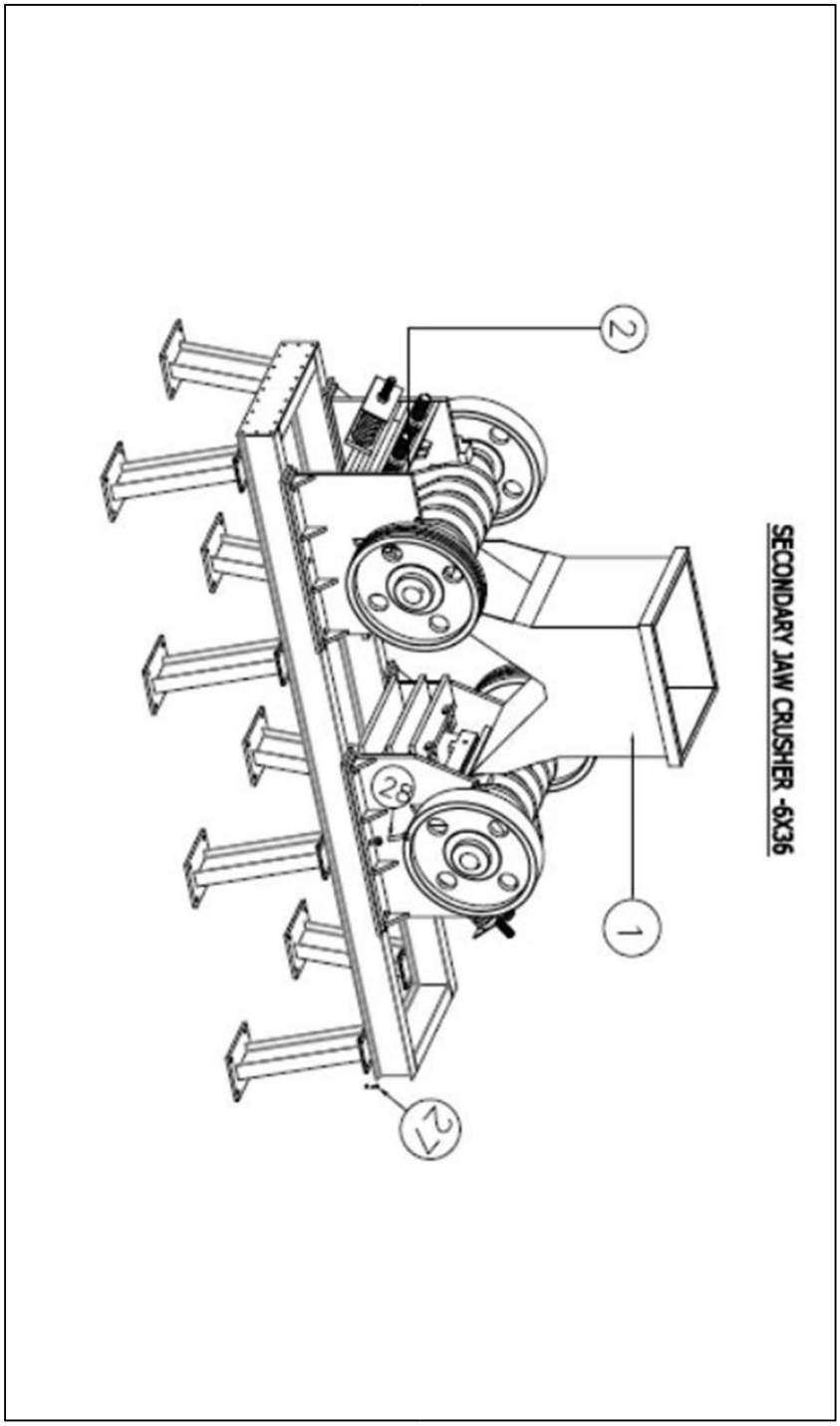


AKONA ENGINEERING PVT LTD.

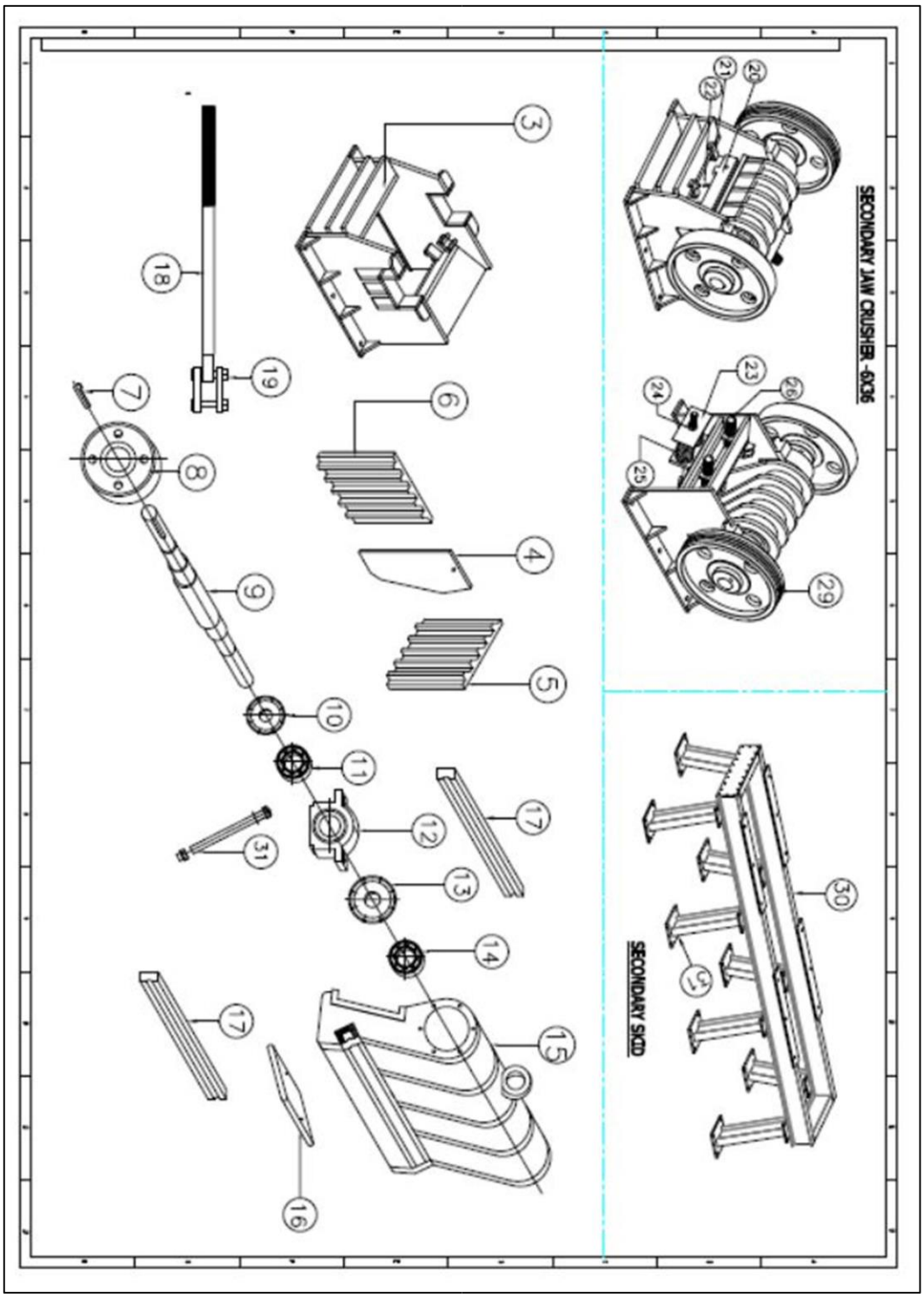
3-GRIZZLY FEEDER (10X4) – AJC -GF-A03

S.No.	Part No.	Part Name	Description	Qty.	Remark
1	AJC -GF-A03-41	GRIZZLY BODY BOLTED	10X4	01	
2	AJC -GF-A03-42	INLET CHHUTE	-	01	
3	AJC -GF-A03-43	OUTLET PLATE	-	02	
4	AJC -GF-A03-44	SIDE PLATE OF GRIZZLY	TH-10MM	02	LHS&RHS
5	AJC -GF-A03-45	SCREEN JALI OF GRIZZLY	TH-10MM,-H-15	01	
6	AJC -GF-A03-46	STR. FRAME OF GRIZZLY	IB-175X85	01	
7	AJC -GF-A03-47	MOTOR STAND	-	01	
8	AJC -GF-A03-48	MOTOR	10 H.P	01	
9	AJC -GF-A03-49	MOTOR PULLEY	-	01	
10	AJC -GF-A03-50	V-BELT	-	02	
11	AJC -GF-A03-51	SPRING	14”	08	
12	AJC -GF-A03-52	SPRING PLATE	-	02	
13	AJC -GF-A03-53	KEY OF SHAFT PULLEY	-	01	
14	AJC -GF-A03-54	SHAFT PULLEY	C3-13”	01	
15	AJC -GF-A03-55	BLANCE WEIGHT	-	02	
16	AJC -GF-A03-56	HOUSING CAP	-	02	
17	AJC -GF-A03-57	BEARING HOUSING	-	02	
18	AJC -GF-A03-58	SHAFT BEARING	-	02	
19	AJC -GF-A03-59	GRIZZLY SHAFT	STD.-10X4	01	
20	AJC -GF-A03-60	END HOUSING	-	02	
21	AJC -GF-A03-61	SHAFT PIPE	-	01	
22	AJC -GF-A03-62	CROSS PALTE	120X150X10	14	
23	AJC -GF-A03-63	CROSS PALTE	450X230X10	04	
24	AJC -GF-A03-64	SPRING BKT	-	04	

4-SECONDAY STATION (6X36 JAW CRUSHER) – AJC -SJ-A04



4-SECONDAY STATION (6X36 JAW CRUSHER) – AJC -SJ-A04



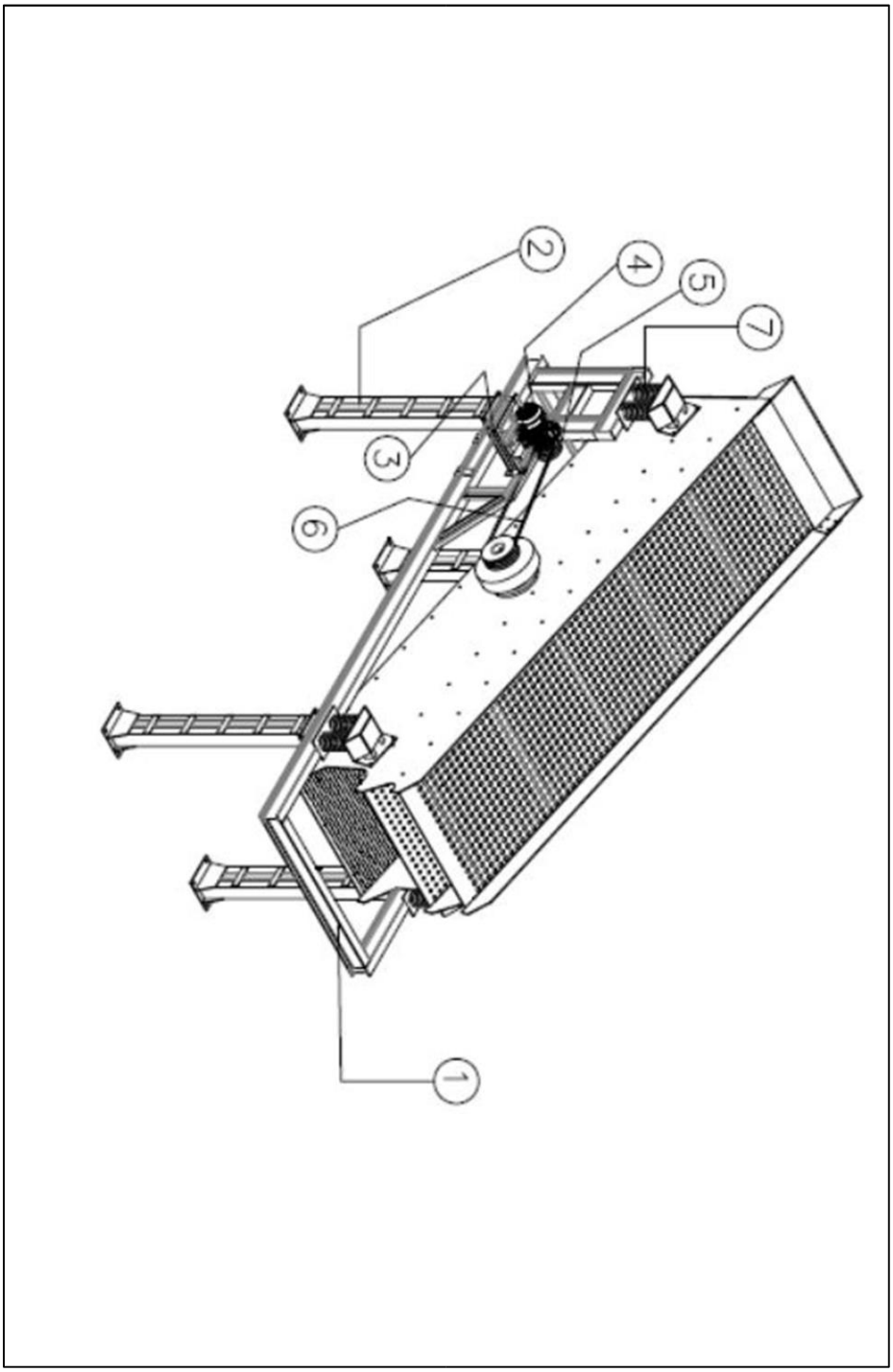
4-SECONDAY STATION (6X36 JAW CRUSHER) – AJC -SJ-A04

S.No.	Part No.	Part Name	Description	Qty.	Remark
1	AJC -SJ-A04-65	Y-CHHUTE	-	1	
2	AJC -SJ-A04-66	SECONDARY JAW CRUSHER	6X36	2	
3	AJC -SJ-A04-67	JAW CRUSHER BODY WELDED	3X36	1	
4	AJC -SJ-A04-68	SIDE PLATE	STD-6X36	02	LHS&RHS
5	AJC -SJ-A04-69	SWIM JAW PLATE	STD-6X36	01	
6	AJC -SJ-A04-70	FIX JAW PLATE	STD-6X36	01	
7	AJC -SJ-A04-71	FLY WHEEL KEY	-	02	
8	AJC -SJ-A04-72	FLYWHEEL	-	01	
9	AJC -SJ-A04-73	CAM SHAFT	STD-6X36	01	
10	AJC -SJ-A04-74	BKT COVER	-	02	
11	AJC -SJ-A04-75	BKT BEARING	-	02	
12	AJC -SJ-A04-76	SHAFT BRACKET	-	02	
13	AJC -SJ-A04-77	PITMEN COVER	-	02	
14	AJC -SJ-A04-78	PITMEN BEARING	-	02	
15	AJC -SJ-A04-79	PITMEN WELDED	6X36 M/C	01	
16	AJC -SJ-A04-80	TOGGLE PLATE	STD	01	
17	AJC -SJ-A04-81	TOGGLE BEARING	-	02	
18	AJC -SJ-A04-82	TIE ROD	-	01	
19	AJC -SJ-A04-83	TIE ROD BOLT	-	01	
20	AJC -SJ-A04-84	SWIM JAW PLATE TIGHTEN	-	01	
21	AJC -SJ-A04-85	FIX JAW PLATE TIGHTEN	-	02	
22	AJC -SJ-A04-86	TIGHTEN BOLT NUT	-	02	
23	AJC -SJ-A04-87	SPRING PLATE	-	01	
24	AJC -SJ-A04-88	TIE ROD NUT	-	01	
25	AJC -SJ-A04-89	TIE ROD SPRING	14”	02	
26	AJC -SJ-A04-90	TOGGLE SCREW	-	02	
27	AJC -SJ-A04-91	SKID LEG NUT BOLT	-	32	
28	AJC -SJ-A04-92	CRUSHER FOUNDATION BOLT	-	06	
29	AJC -SJ-A04-93	FLYWHEEL GROOVE	-	01	
30	AJC -SJ-A04-94	CRUSHER SKID	IB-300	01	
31	AJC -SJ-A04-95	SKID LEG	IB-300	08	

32	AJC -SJ-A04-96	SWIM JAW BOLT NUT	-	02	
33	AJC -SJ-A04-97	MOTOR	40 H.P	01	
34	AJC -SJ-A04-98	MO. PULLEY	-	01	
35	AJC -SJ-A04-99	V-BELT	-	02	

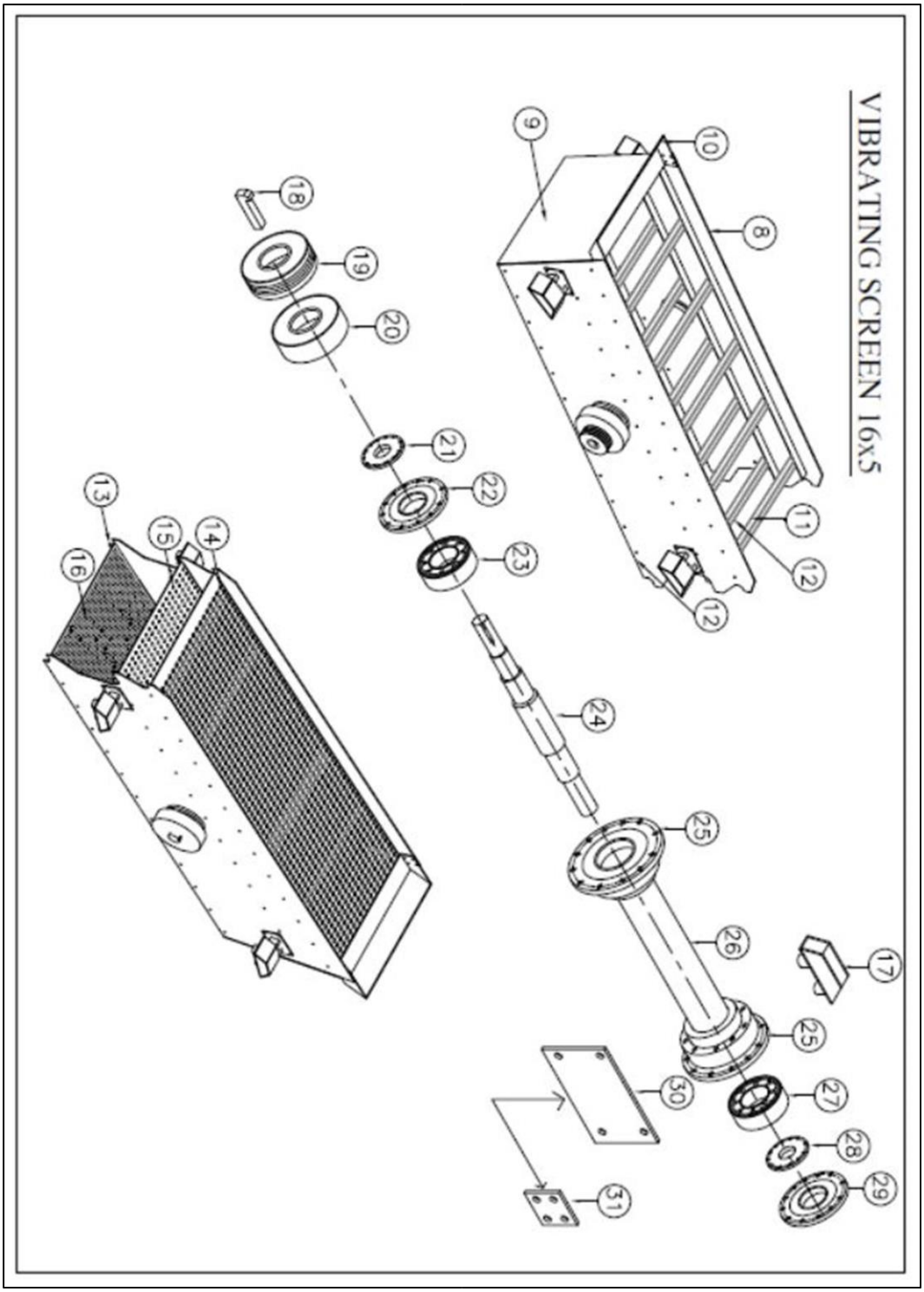
AKONA ENGINEERING PVT
LTD.

5-VIBRATORY SCREEN (16X5) – AJC -VS-A05



AKONA ENGINEERING PVT
LTD.

5-VIBRATORY SCREEN (16X5) – AJC -VS-A05



AKONA ENGINEERING PVT
LTD.

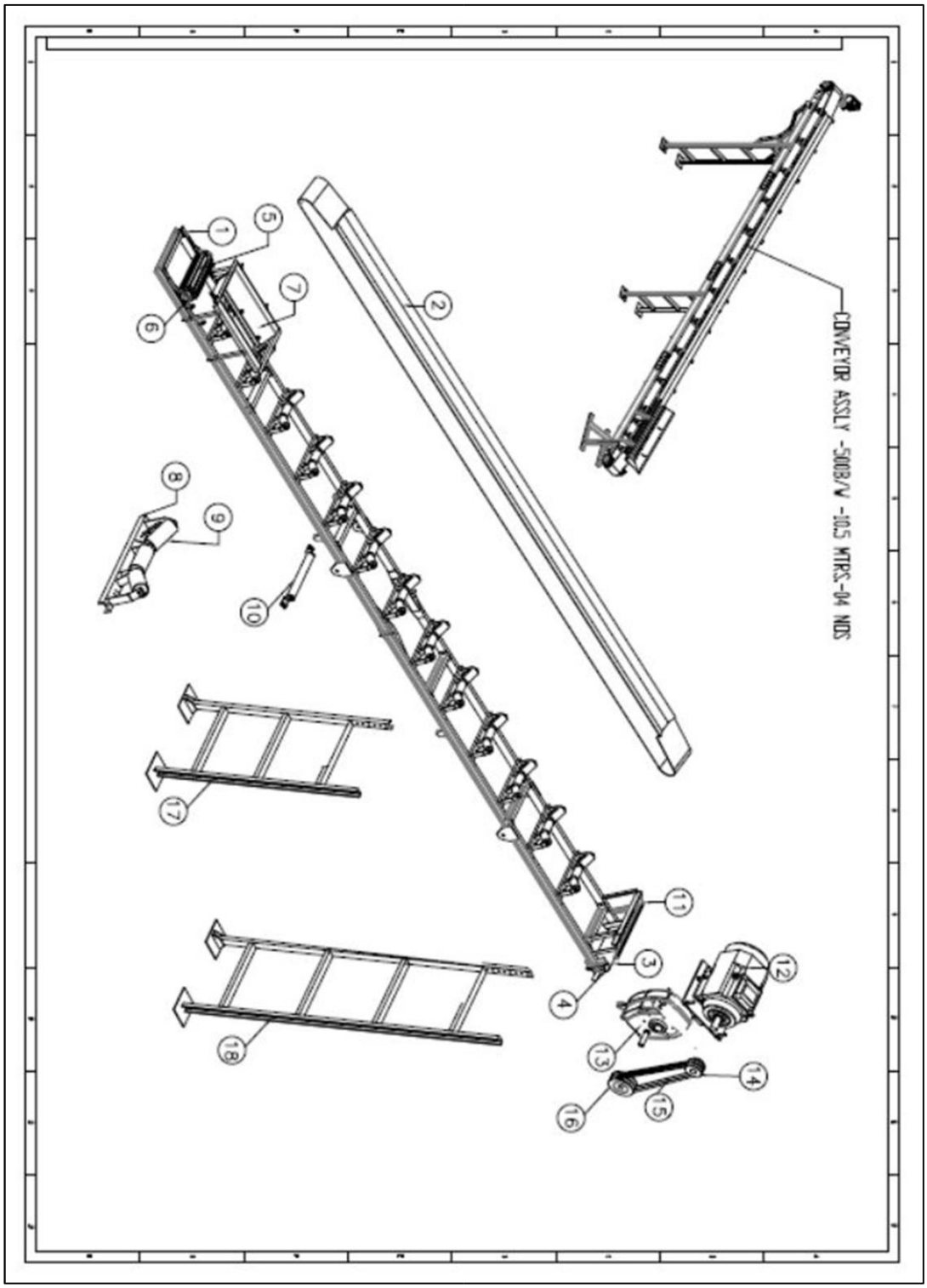
5-VIBRATORY SCREEN (16X5) – AJC -VS-A05

S.No.	Part No.	Part Name	Description	Qty.	Remark
1	AJC -VS-A05-100	SCREEN STRUCTURE	-	01	
2	AJC -VS-A05-101	SCREEN LEG	-	04	
3	AJC -VS-A05-102	MOTOR STAND	-	01	
4	AJC -VS-A05-103	MOTOR	15 H.P	01	
5	AJC -VS-A05-104	MOTOR PULLEY	-	01	
6	ASC-VS-A05-105	V-BELT	-	02	
7	AJC -VS-A05-106	SCREEN SPRING	-	08	
8	AJC -VS-A05-107	SCREEN BOLTD	16X5	01	
9	AJC -VS-A05-108	SCREEN REAR COVER PLATE	-	01	
10	AJC -VS-A05-109	INLET CHHUTE	-	01	
11	AJC -VS-A05-110	TOP SCREEN ANGLE FRAME	-	01	
12	AJC -VS-A05-111	MIDDLE SCREEN ANGLE FRAME	-	01	
13	AJC -VS-A05-112	BOTTOM SCREEN ANGLE FRAME	-	01	
14	AJC -VS-A05-113	TOP DECK SCREEN	D-45	01	
15	AJC -VS-A05-114	MIDDLE DECK SCREEN	D-28	01	
16	AJC -VS-A05-115	BOTTOM DECK SCREEN	D-12	01	
17	AJC -VS-A05-116	SPRING BRACKET	-	04	
18	AJC -VS-A05-117	SCREEN PULLEY KEY	-	01	
19	AJC -VS-A05-118	SCREEN PULLEY	-	01	
20	AJC -VS-A05-119	BALANCE WEIGHT	-	02	
21	AJC -VS-A05-120	BEARING HOUSE COVER	-	01	LHS
22	AJC -VS-A05-121	BEARING HOUSING	-	01	LHS
23	AJC -VS-A05-122	SHAFT BEARING	-	01	LHS
24	AJC -VS-A05-123	SCREEN SHAFT	-	01	
25	AJC -VS-A05-124	END CAP HOUSING	-	01	
26	AJC -VS-A05-125	SHAFT PIPE	-	01	

5-VIBRATORY SCREEN (16X5) – AJC -VS-A05

27	AJC -VS-A05-126	SHAFT BEARING		01	RHS
28	AJC -VS-A05-127	BEARING HOUSE COVER		01	RHS
29	AJC -VS-A05-128	BEARING HOUSING		01	RHS
30	AJC -VS-A05-130	CROSS PLATE		04	
31	AJC -VS-A05-131	CROSS PLATE		05	

6-CONVEYOR ASSLY (10.5X500B/W) – AJC -DC-A06-04 NOS.

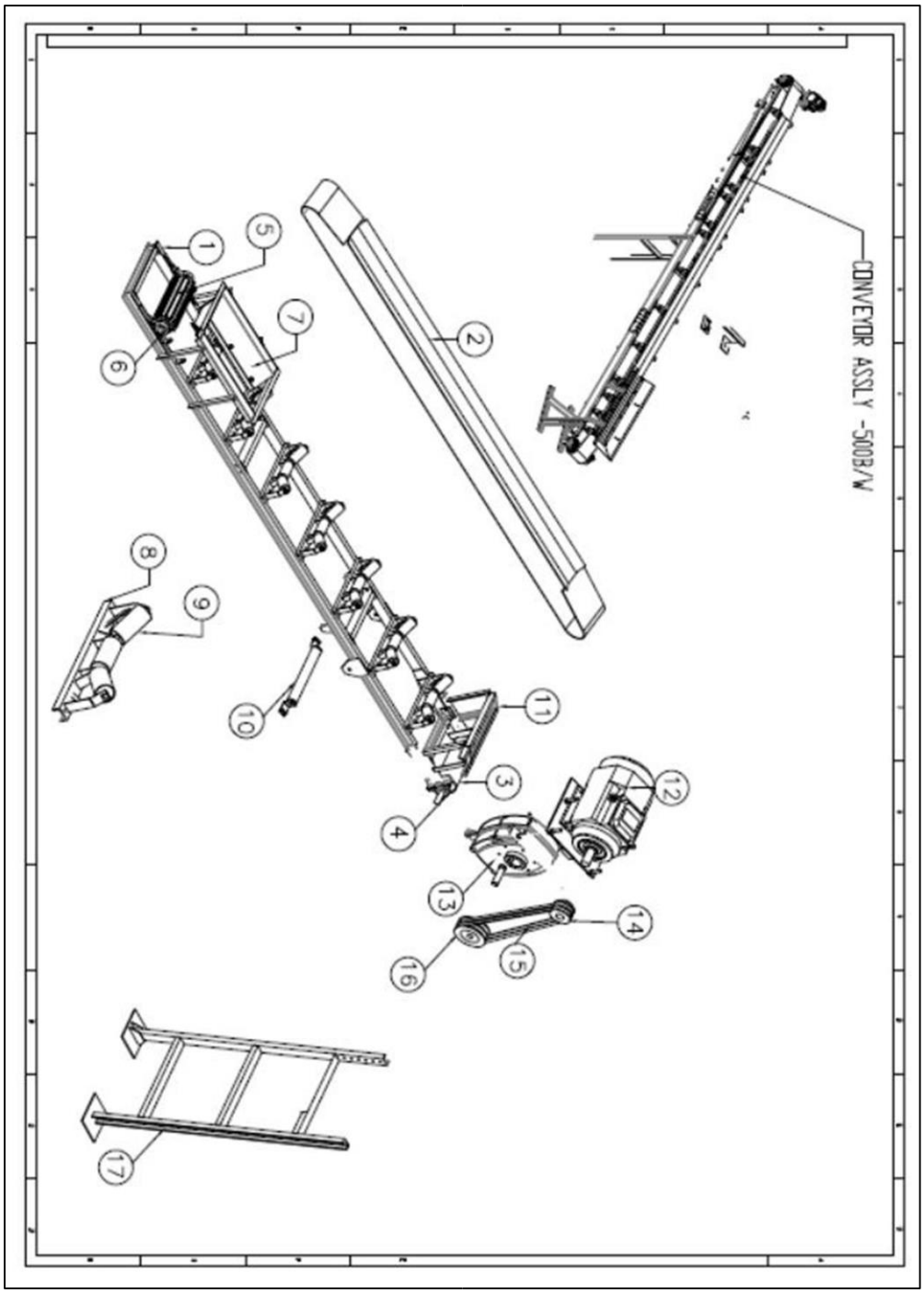


AKONA ENGINEERING PVT LTD.

6-CONVEYOR ASSLY (10.5X500B/W) – AJC -DC-A06-04 NOS.

S.No.	Part No.	Part Name	Description	Qty.	Remark
1	AJC -DC-A06-132	CONVEYOR STRUCTURE	10.MX750MM	01	
2	AJC -DC-A06-133	CONVEYOR BELT	500X23M	01	
3	AJC -DC-A06-134	HEAD DRUM PULLEY	200X550	01	
4	AJC -DC-A06-135	PEDESTAL BEARING	UCP-211	02	
5	AJC -DC-A06-136	TAIL DRUM PULLEY	STD-200	01	
6	AJC -DC-A06-137	TAKE UP	UCP-211	02	
7	AJC -DC-A06-138	INLET CHHUTE	-	01	
8	AJC -DC-A06-139	CARRY STAND	750	11	
9	AJC -DC-A06-140	CARRY ROLLER	7”	33	
10	AJC -DC-A06-141	RETURN ROLLER	-	2	
11	AJC -DC-A06-142	MOTOR STAND	-	01	
12	AJC -DC-A06-143	MOTOR	3 H.P	01	
13	AJC -DC-A06-144	GEAR BOX	D20:1	01	
14	AJC -DC-A06-145	MOTOR PULLEY	B2-4”	01	
15	AJC -DC-A06-146	V-BELT	-	2	
16	AJC -DC-A06-147	GEAR BOX PULLEY	B2-4”	01	
17	AJC -DC-A06-148	CONV STAND SMALL	-	01	
18	AJC -DC-A06-149	CONV STAND SMALL	-	01	
19	AJC -DC-A06-149	GUIDE ROLLER	7”	02	NO IN DWG
20	AJC -DC-A06-149	MOTOR COVER	-	01	NO IN DWG
21	AJC -DC-A06-149	ADJUSTING SCREW	1”X12”	02	NO IN DWG

7-CONVEYOR ASSLY (6 MX500 B/W) – AJC -DC-A06-01 NO.

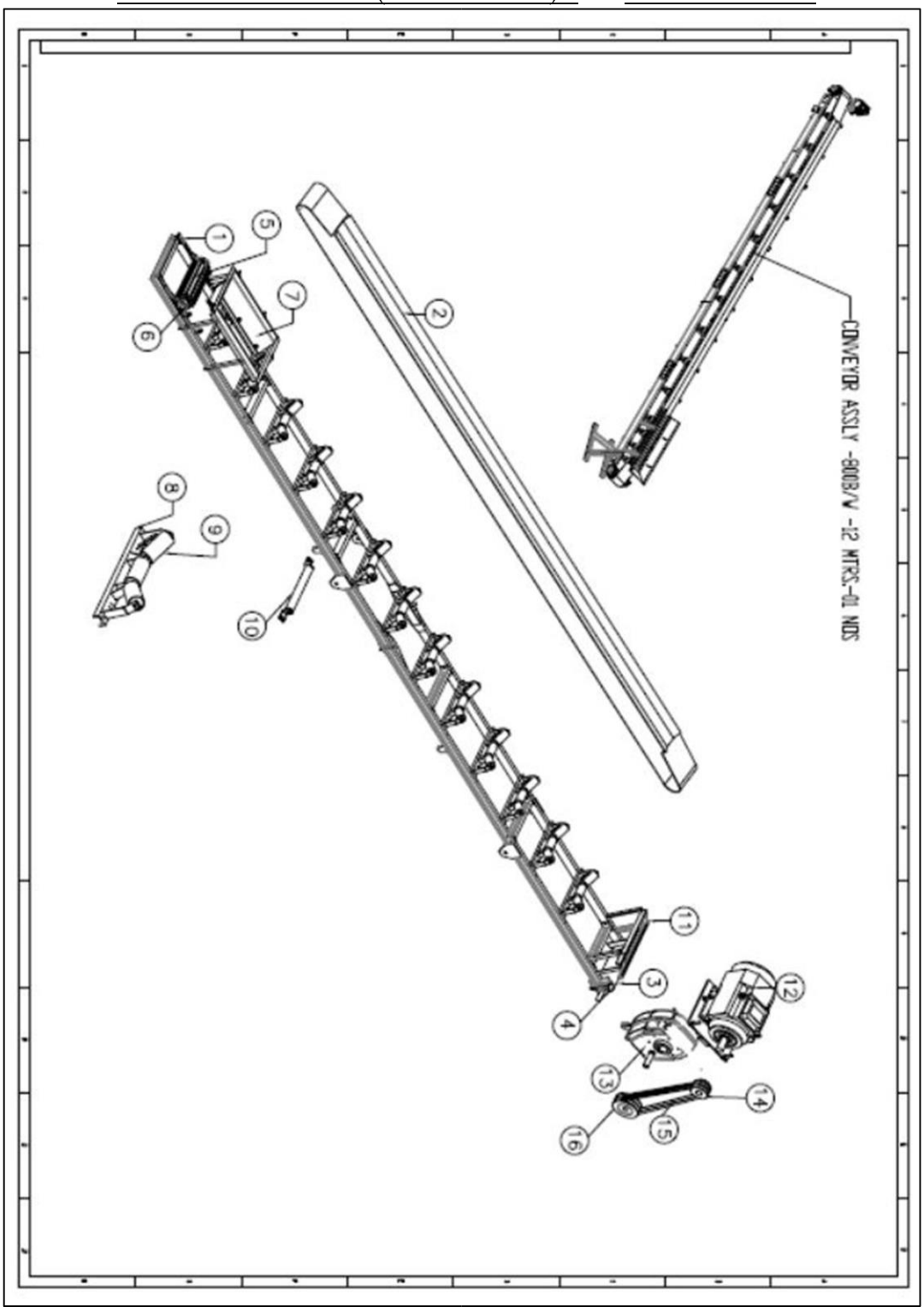


7-CONVEYOR ASSLY (6 MX500 B/W) – AJC -SC-A07-01 NOS.

S.No.	Part No.	Part Name	Description	Qty.	Remark

1	AJC -SC-A07-150	CONVEYOR STRUCTURE	6MX750MM	01	
2	AJC -SC-A07-151	CONVEYOR BELT	500X12M	01	
3	AJC -SC-A07-152	HEAD DRUM PULLEY	200X550	01	
4	AJC -SC-A07-153	PEDESTAL BEARING	UCP-211	02	
5	AJC -SC-A07-154	TAIL DRUM PULLEY	STD-200	01	
6	AJC -SC-A07-155	TAKE UP	UCP-211	02	
7	AJC -SC-A07-156	INLET CHHUTE	-	01	
8	AJC -SC-A07-157	CARRY STAND	750	7	
9	AJC -SC-A07-158	CARRY ROLLER	7”	21	
10	AJC -SC-A07-159	RETURN ROLLER	-	1	
11	AJC -SC-A07-160	MOTOR STAND	-	01	
12	AJC -SC-A07-161	MOTOR	3 H.P	01	
13	AJC -SC-A07-162	GEAR BOX	D20:1	01	
14	AJC -SC-A07-163	MOTOR PULLEY	B2-4”	01	
15	AJC -SC-A07-164	V-BELT	-	2	
16	AJC -SC-A07-165	GEAR BOX PULLEY	B2-4”	01	
17	AJC -SC-A07-166	CONV STAND SMALL	-	01	
18	AJC -SC-A07-167	GUIDE ROLLER	7”	02	NO IN DWG
19	AJC -SC-A07-168	MOTOR COVER	-	01	NO IN DWG
20	AJC -SC-A07-169	ADJUSTING SCREW	1”X12”	02	NO IN DWG

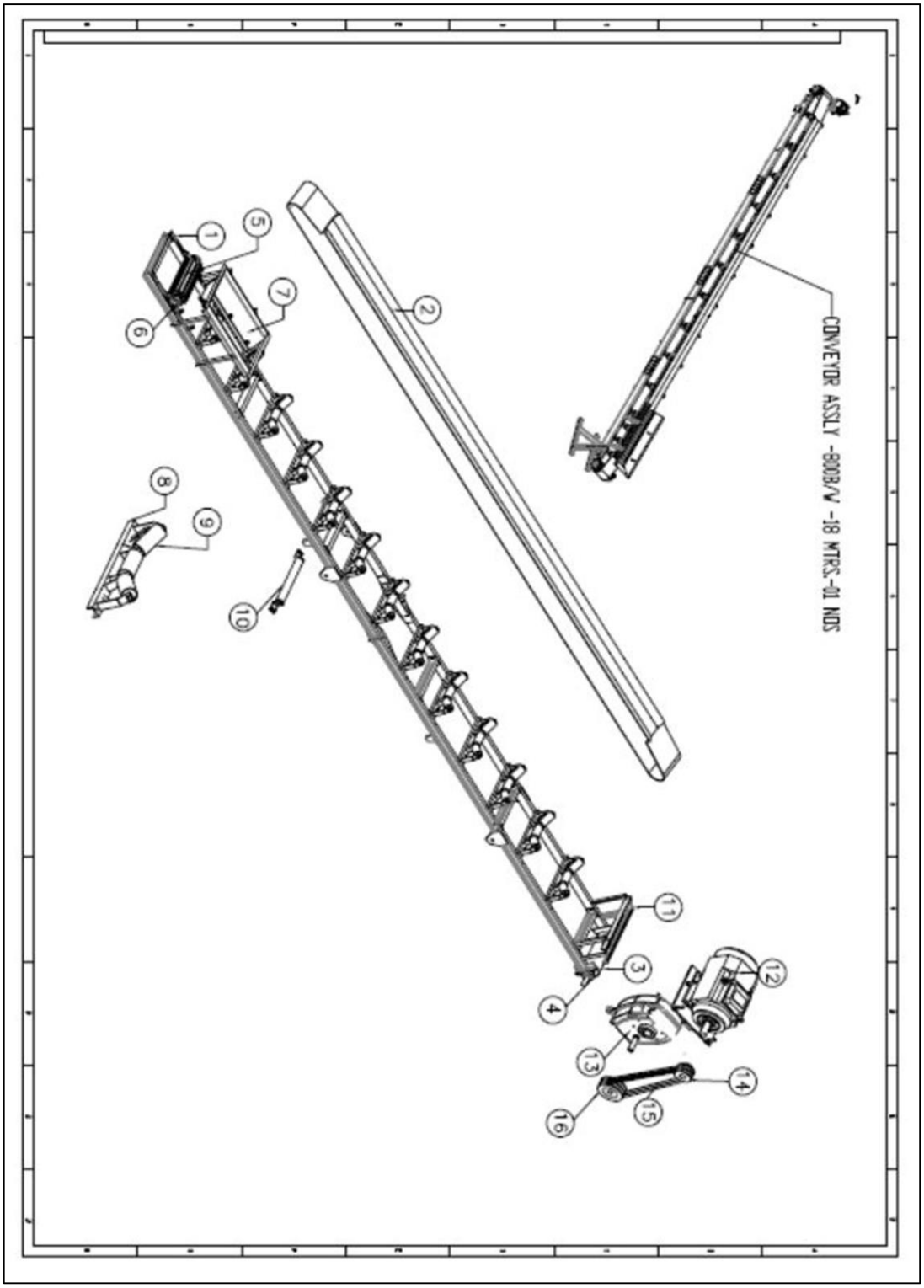
8-CONVEYOR ASSLY (12MX800 B/W) – AJC -BC-A08-01 NO.



8-CONVEYOR ASSLY (12MX800 B/W) – AJC -BC-A08-01 NO.

S.No.	Part No.	Part Name	Description	Qty.	Remark
1	AJC -BC-A08-170	CONVEYOR STRUCTURE	12MX1050MM	01	
2	AJC -BC-A08-171	CONVEYOR BELT	500X23M	01	
3	AJC -BC-A08-172	HEAD DRUM PULLEY	325X850	01	
4	AJC -BC-A08-173	PEDESTAL BEARING	UCP-212	02	
5	AJC -BC-A08-174	TAIL DRUM PULLEY	STD-325X850	01	
6	AJC -BC-A08-175	TAKE UP	UCP-212	02	
7	AJC -BC-A08-176	INLET CHHUTE	-	01	
8	AJC -BC-A08-177	CARRY STAND	1050	15	
9	AJC -BC-A08-178	CARRY ROLLER	11”	45	
10	AJC -BC-A08-179	RETURN ROLLER	850	2	
11	AJC -BC-A08-180	MOTOR STAND	-	01	
12	AJC -BC-A08-181	MOTOR	10H.P	01	
13	AJC -BC-A08-182	GEAR BOX	E20:1	01	
14	AJC -BC-A08-183	MOTOR PULLEY	C2-6”	01	
15	AJC -BC-A08-184	V-BELT	-	2	
16	AJC -BC-A08-185	GEAR BOX PULLEY	C2-6”	01	
17	AJC -BC-A08-186	CONV STAND SMALL	-	01	NO IN DWG
18	AJC -BC-A08-187	GUIDE ROLLER	7”	02	NO IN DWG
19	AJC -BC-A08-189	MOTOR COVER	-	01	NO IN DWG
20	AJC -BC-A08-190	ADJUSTING SCREW	1”X12”	02	NO IN DWG

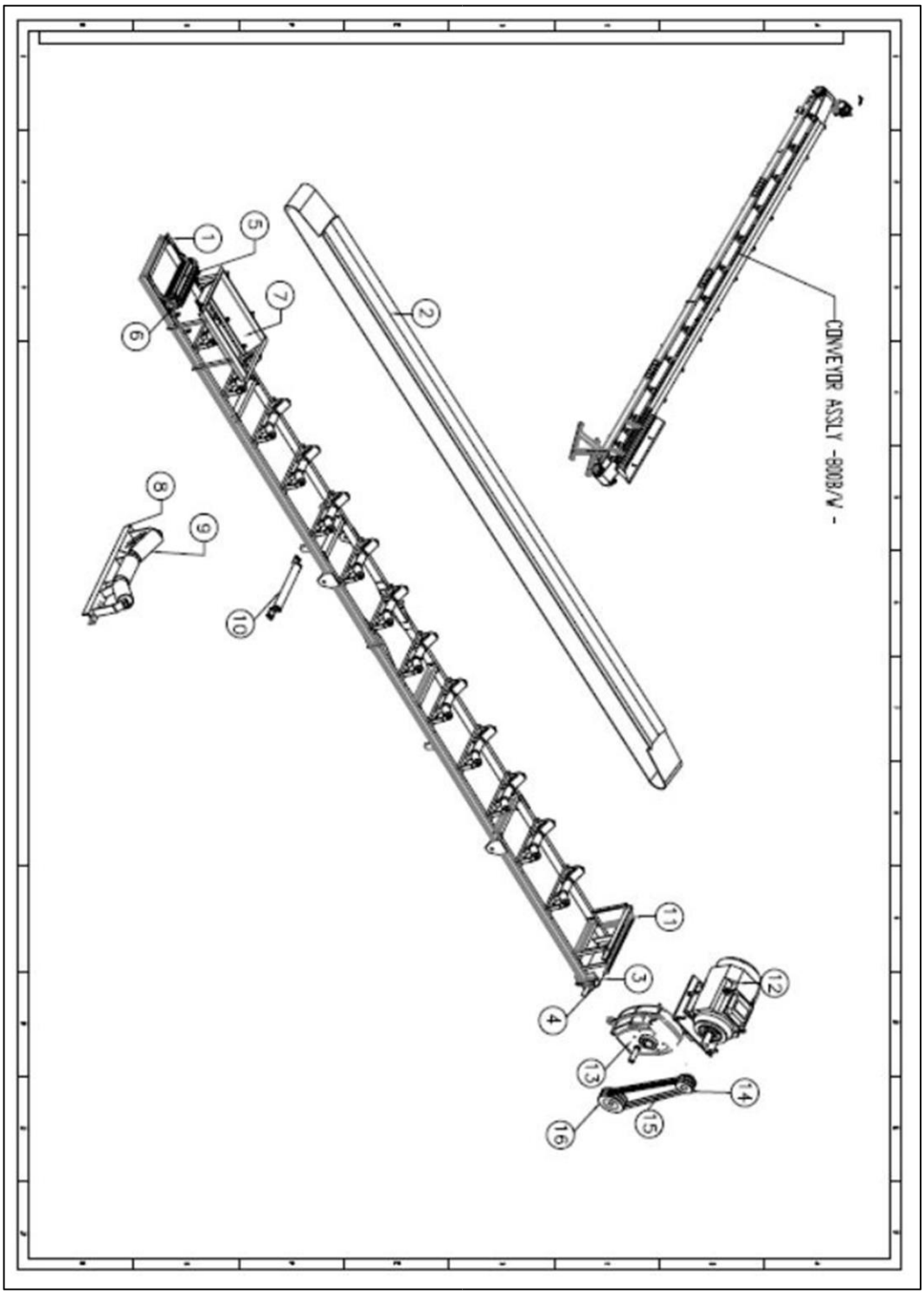
9-CONVEYOR ASSLY (18MX800 B/W) – AJC -BC-A09-01 NO.



9-CONVEYOR ASSLY (18MX800 B/W) – AJC -BC-A09-01 NO.

S.No.	Part No.	Part Name	Description	Qty.	Remark
1	AJC -BC-A09-191	CONVEYOR STRUCTURE	18MX1050MM	01	
2	AJC -BC-A09-192	CONVEYOR BELT	500X36M	01	
3	AJC -BC-A09-193	HEAD DRUM PULLEY	325X850	01	
4	AJC -BC-A09-194	PEDESTAL BEARING	UCP-212	02	
5	AJC -BC-A09-195	TAIL DRUM PULLEY	STD-325X850	01	
6	AJC -BC-A09-196	TAKE UP	UCP-212	02	
7	AJC -BC-A09-197	INLET CHHUTE	-	01	
8	AJC -BC-A09-198	CARRY STAND	1050	21	
9	AJC -BC-A09-199	CARRY ROLLER	11”	63	
10	AJC -BC-A09-201	RETURN ROLLER	850	2	
11	AJC -BC-A09-202	MOTOR STAND	-	01	
12	AJC -BC-A09-203	MOTOR	10H.P	01	
13	AJC -BC-A09-204	GEAR BOX	E20:1	01	
14	AJC -BC-A09-205	MOTOR PULLEY	C2-6”	01	
15	AJC -BC-A09-206	V-BELT	-	2	
16	AJC -BC-A09-207	GEAR BOX PULLEY	C2-6”	01	
17	AJC -BC-A09-208	CONV STAND SMALL	-	01	NO IN DWG
18	AJC -BC-A09-209	GUIDE ROLLER	7”	02	NO IN DWG
19	AJC -BC-A09-210	MOTOR COVER	-	01	NO IN DWG
20	AJC -BC-A09-211	ADJUSTING SCREW	1”X12”	02	NO IN DWG

10-CONVEYOR ASSLY (17 MX800 B/W) – AJC -BC-A10-01 NO.



10-CONVEYOR ASSLY (17 MX800 B/W) –AJC -BC-A10-01 NO.

S.No.	Part No.	Part Name	Description	Qty.	Remark

1	AJC -BC-A10-212	CONVEYOR STRUCTURE	17MX1050MM	01	
2	AJC -BC-A10-213	CONVEYOR BELT	800X34.5M	01	
3	AJC -BC-A10-214	HEAD DRUM PULLEY	325X850	01	
4	AJC -BC-A10-215	PEDESTAL BEARING	UCP-212	02	
5	AJC -BC-A10-216	TAIL DRUM PULLEY	STD-325X850	01	
6	AJC -BC-A10-217	TAKE UP	UCP-212	02	
7	AJC -BC-A10-218	INLET CHHUTE	-	01	
8	AJC -BC-A10-219	CARRY STAND	1050	19	
9	AJC -BC-A10-220	CARRY ROLLER	11”	57	
10	AJC -BC-A10-221	RETURN ROLLER	850	2	
11	AJC -BC-A10-222	MOTOR STAND	-	01	
12	AJC -BC-A10-223	MOTOR	10H.P	01	
13	AJC -BC-A10-224	GEAR BOX	E20:1	01	
14	AJC -BC-A10-225	MOTOR PULLEY	C2-6”	01	
15	AJC -BC-A10-226	V-BELT	-	2	
16	AJC -BC-A10-227	GEAR BOX PULLEY	C2-6”	01	
17	AJC -BC-A10-229	GUIDE ROLLER	7”	02	NO IN DWG
18	AJC -BC-A10-230	MOTOR COVER	-	01	NO IN DWG
19	AJC -BC-A10-231	ADJUSTING SCREW	1”X12”	02	NO IN DWG
