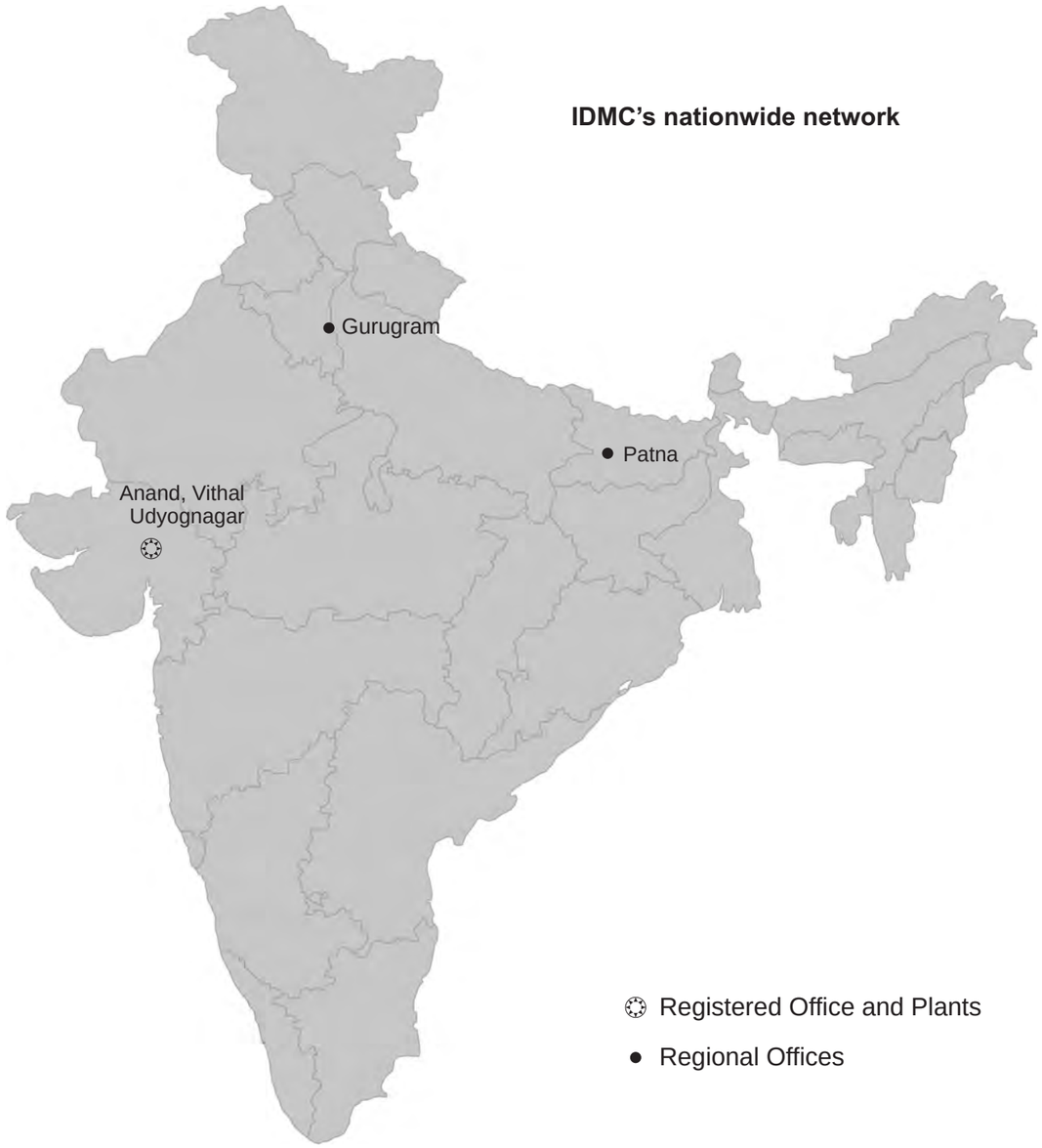
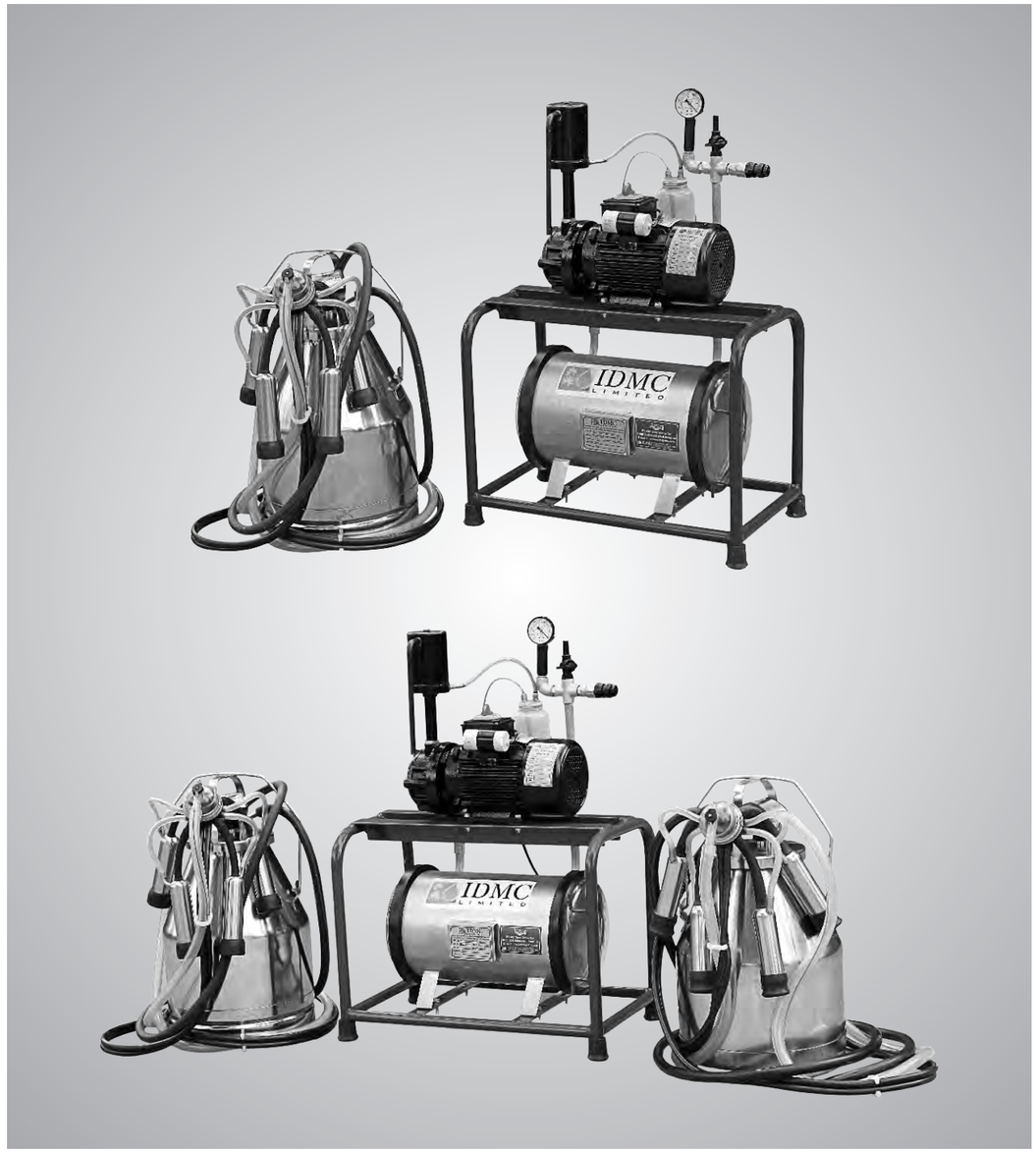


IDMC LIMITED

124-128, GIDC Estate, Vithal Udyognagar 388 121, Anand district, Gujarat, India,
Ph: +91-2692-220521, 236375 idmc@idmc.com www.idmc.com Toll free:1800-103-3567
Gurugram: +91-124-4931370, Patna: +91-9934360635

conquestmktg/1000/10/2019

Installation, Operation and Maintenance Manual of **Bucket Milking Machines**



Doc.: CEDAD / BMM Issue: 01

Foreword

Thank you for buying IDMC's Bucket Milking Machine.

This manual will provide you assistance in installation, operation and maintenance of the Milking Machine.

It will be helpful in obtaining optimum performance of the machine and useful in buying genuine spare parts or accessories.

Please read this manual carefully prior to installation, operation and maintenance of the Milking Machine and keep it for future reference.

IDMC reserves the right to change the given specifications without any obligation to update the publications that are already published.

If you have a query, please call on IDMC's 24×7 helpline no. 1800-103-3567.

Table of contents

Warning

- Never connect electric plug-pin of the milking machine to the electrical switch board during any external cleaning of the vacuum pump assembly due to hazard of electric shock & fire.
- Never touch the electrical motor and the vacuum pump with bare hands during and after milking operation due to hazard of hot burn because of hot metal surfaces.
- Never spray/spill water, milk or other solution directly on to the motor and pulsator of the milking machine.
- IDMC make milking machine is designed for milking cow's.

Warning symbols


Danger! Warning! Caution! Read instructions carefully, safety hazard for people.


Danger! Fall / Hit hazard due to suspended loads.


Danger! Mechanical hazard of crush and cut due to rotating and moving parts.


Danger! Mechanical hazard of crush and cut due to moving parts.


Danger! Electric hazard of shock & fire.


Danger! Chemical hazard of burn due to highly corrosive substances (Class E).


Danger! Explosion hazard due to high pressure and explosives.


Danger! Toxic hazard of blindness, lungs damage, burn, death due to toxicity of gas or chemical (Class D1A).


Warning! Hot burn hazard due to high temperature of solids-metal surface / powder / liquids / gases / steam.


Warning! Cold burn (Frostbite) hazard due to extremely low temperature of solids- metal surface / powder / liquids / gases.


Caution! Always wear helmet and goggle.


Caution! Always wear hand gloves as appropriate - rubber / heat-cold resistant…etc.


Caution! Always wear safety shoes.


Caution! Always wear gas-mask or self-contained breathing apparatus (SCBA) on toxic substance lines and areas like ammonia.

Warranty

IDMC ensures that the product supplied is as per specifications and is free from defective material and faulty workmanship. Our liability in respect of any failure is limited to repair or replacement of parts only, to the extent that are attributable to or arise solely from faulty workmanship or defective material.

This warranty is applicable only for the products manufactured by IDMC Limited.

The terms and conditions of the warranty are as follows;

Warranty period:

The warranty period shall be 12 months from the date of commissioning at the end user or 18 months from the date of dispatch from our plant to the authorized IDMC distributor or customer, whichever is earlier.

Scope of warranty:

The warranty is limited to material defect and quality of workmanship only.

The warranty shall not apply to those parts where failures are caused due to:

- Incorrect installations and due care not taken during start-up procedures.
- Incorrect usage and not operating the product for defined application, specified materials to be handled, material handled contains foreign objects debris which can damage equipment or its constituent parts or choke/jam entire product or system.
- Not ensuring prerequisites, deemed utilities and operating conditions, as specified.
- Not performing timely cleaning (CIP/SIP) as per procedures and time-frame.
- Failure to perform proper and timely maintenance measures as per instructions.
- Use of inappropriate tools, tackles and spares.
- Unauthorized modifications, alterations, tampering, wrong assembly during maintenance and incorrect operating conditions.

Exclusion:

The warranty shall not be applicable to;

- Shelf-life items- rubber liner, rubber and plastic tubes, seals, gasket, O-rings, belts and other rubber parts.
- Normal wear & tear parts-seals, bushes, bearings, blades and shafts.
- Electrical and electronic instruments and components.
- Damage due to product abuse or accidents or natural calamities or disasters.
- Product when exposed to direct heat, splashing of liquids, acids and fumes.

Limits:

Warranty shall be limited to the repair or replacement of the defective material. IDMC shall not be responsible for any consequential losses or damages arising out of transportation, installation, assembly, operation, malfunctioning or failure of the product.

Return of defective material:

Any claim under the warranty clause is to be made with IDMC, with details of defects and the circumstances that caused the problem. All claims are to be quoted with the product name, model/type, manufacturing year, serial number, defective part name and material number (item code).

Before sending any damaged material to IDMC for repair or replacement, customer shall obtain an approval in writing from IDMC. All such materials shall be properly packed to prevent damage during transit. The packing cost, freight and insurance for return of such material shall be borne by the customer.

IDMC shall bear the ex-works cost of the replacement parts, packing and forwarding, tax and duties, insurance and domestic (within India) freight cost.

All defective part(s), being replaced, shall be the property of IDMC. Hence the part (s) shall not be retained by customer and shall be immediately sent back to IDMC.

IDMC may agree to send replacement material before receiving the defective material from customer. It shall be customer's responsibility to send back the replaced items to IDMC at his cost and risk, within a week's time; failing to do so, IDMC shall raise an invoice for the replaced items.

General Information

Bucket Milking Machines manufactured by IDMC are fully made in India.

Bucket Milking Machines:

- Are easy to operate.
- Provide efficient, hygienic and consistent milking.
- Are gentle to the teat and udder tissue.
- Are Faster and better in milking than hand milking.
- Have low maintenance.
- Give near natural feeling to the animal
- Are quick, complete and safe for milking of cows.

The potential milk yield of a herd depends on the skills used in selection, breeding and reproduction of the dairy cow. The extent to which this potential is achieved depends largely on the level of nutrition of the cows and their freedom from disease. All these factors affect the secretion or formation of milk in the udder. However, milk yields are not only affected by milk secretion; there must also be efficient milk ejection and milk removal from the udder. While these latter effects are less obvious and less well understood, there is clear evidence that milk removal is no less important than secretion. Put simply, a cow cannot secret more milk into the udder than is removed from it.

1. Handling

The individual vacuum system and the can cluster assembly are packed separately in corrugated carton boxes which can be handled manually.

The individual components are packed and a packing list of the material is enclosed in each box. Check if the content of each box is as per the packing list.

1.1. Manual Handling:

While handling the product manually, ensure that it is held properly and does not slip from hands. Also ensure that the persons are wearing safety shoes and gloves. Refer figure 1.1

Figure 1.1: Manual handling

DANGER: During hoisting and transportation, take caution to prevent harm to people and damage to material.

2. Installation

2.1. Receipt of product and inspection checks:

At IDMC, the product is packed and loaded intact and safely on the carrier. Any damage during shipping is to be charged to the transporter/customer's account. Hence, please inspect the product consignment thoroughly upon arrival, especially the assembly and the number of packs as per the shipping document.

The following documents are provided with the Milking Machine:

- Packing List.
- IOM Instructions manual.

You are also requested to inspect and report the following:

- Any apparent damage on the packing and/or product should be reported to the transporter.
- Check the content of the packing like components, consumables and manuals and missing items sould be reported with photographs of packing within two working days of receipt of consignment.

Please follow the handling instruction properly:

- It is advisable to unpack the product at the place of installation.
- In the event the product is unpacked at receipt stores or any other site other than where it is to be installed then re-pack the milking machine as it is, ensuring protection covers are put and then handled in packed condition to avoid damage before transporting it to the desired site.
- Unloading and installation of the milking machine is not in IDMC's scope unless and otherwise specified in the purchase order.
- Please follow handling instructions properly. Any damage occurred to the product during unloading or installation shall be the responsibility of the customer.
- It is also important to check any damage to the internal cabling & switch box of the unit prior to installation.

Warnings:

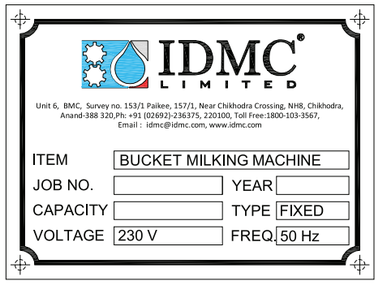
IDMC will not be liable for any deterioration and damage due to transportation or unpacking. Visually check that the packaging is intact and the vacuum system or the can cluster assembly is not damaged.

2.2 Identification & technical data

A) Milking Machine identification:

This operation and maintenance manual is specifically for the IDMC Fixed type bucket milking machine with single can cluster or double can clusters.

B) Name Plate:



The nameplate on the milking machine indicates the following:

Item : Bucket Milking Machine

Job no : Manufacturing serial number of the machine, it needs to be referred in any communication.

Year : Year of manufacturing

Type : Fixed, indicating this machine is to be installed at one point and not meant to be transported around the cow shed.

Voltage : 220 V

Frequency : 50 Hz

2.2. Positioning and commissioning:

The Milking Machine assembly should be installed in a convenient place where single phase electrical connection is available, preferable outside the cowshed where the cows are tied up. It is best located near a window; so that the smoke generated by the vacuum pump goes outside.

As shown in the figure no. 2.1, the vacuum pump assembly ① & ② is first installed. The 40 mm PVC pipe ③ is then attached to the tank outlet. A bend is placed at 1.8-meter height and the vacuum line is then installed in the cowshed or milking shed, preferably above the shoulder height of the animal.

Install the regulator ④ as close as possible to the vacuum pump assembly and then install the vacuum gauge at a suitable and visible location.

The vacuum taps are usually installed as one tap in between every two cows so that the cows can be milked from both directions as shown in the figure 2.2 (a), (b), (c) and (d).

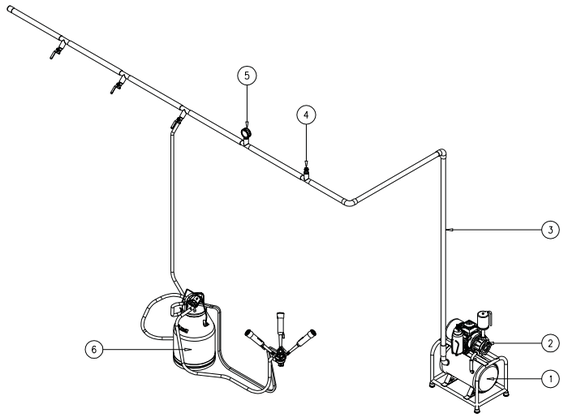


Figure: 2.1: Milking Machine Installation

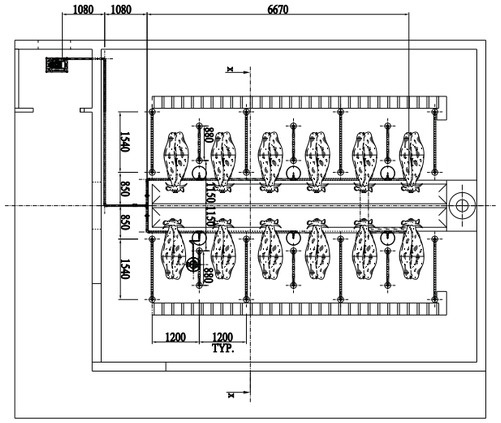


Figure: 2.2: (a) Milking Machine Installation Schematic in cow shed-with dimensions

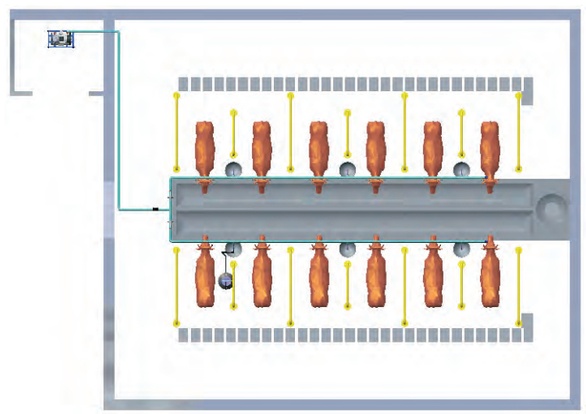


Figure: 2.2: (b) Milking Machine Installation Schematic in cow shed-Plan

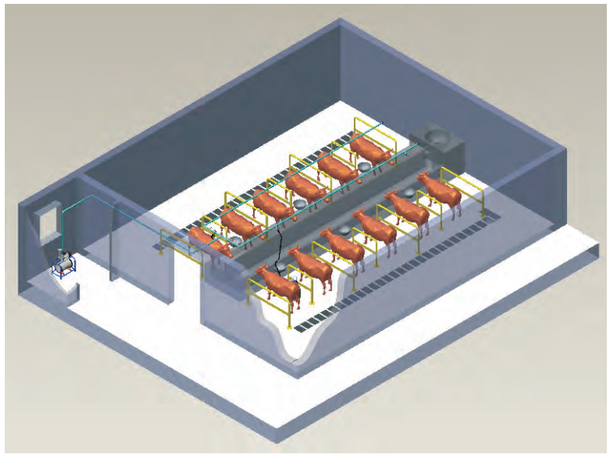


Figure: 2.2 (C) Milking Machine Installation Schematic in cow shed-isometric view

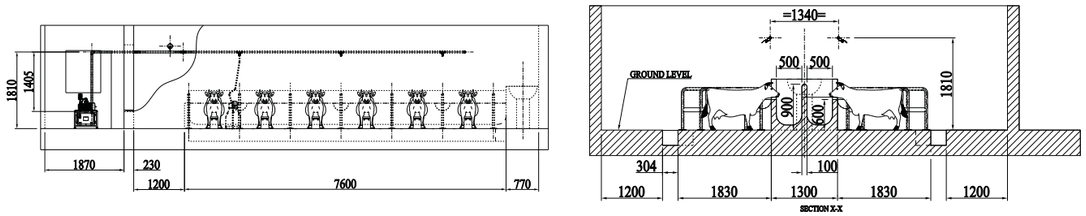


Figure: 2.2: (d) Milking Machine Installation Schematic in cow shed-sectional view

2.4. Milking Machine Start Up

- Ensure the power connection is properly earthed.
- Ensure the oil bottle has oil.
- Ensure that all milking taps are closed.
- Turn the vacuum pump 'ON'.
- After switching 'ON' the pump, check that lubricating oil is properly flowing out of the oil bottle and returning to the oil bottle as shown in the figure 2.3.
- Check the vacuum gauge on the pipeline is indicating a pressure within the range marked on the gauge (between 46 and 48 kpa).

Figure No:2.3: Minimum and maximum levels in the oil bottle.

3. Technical specifications

Milking Machine Specifications:

Bucket Milking Machine	**Model-Single Bucket**	**Model-Double Bucket**
Type	Fixed	Fixed
No. of Milking Cluster	One	Two
No. of Milking Bucket	One	Two
Vacuum System		
Vacuum Tank-Material and Capacity	Hot Dip Galvanized, Minimum capacity 15 ltr, Transparent Lid (1 No.)	
Electric Motor with cable	1 HP Single Phase, 1440 RPM with ON-OFF switch, Voltage - 220 V, Frequency 50Hz (1 No).	
Vacuum Pump	Direct Coupled, Oil Lubricated, 190 LPM (1 No.)	
Vacuum Line fittings (Vacuum pipe line is not included in the scope of supply)	40 mm, 6 Kg density PVC pipe fittings Vacuum	
Vacuum Regulator	Spring Loaded vacuum 42 to 48 Kpa adjustable (1 No)	
Vacuum Gauge	Dial Type, 0 to (-)100 Kpa/(-) 360 mm Hg range (1 No)	
Vacuum Valves / Taps	Brass ball valves (½") with MS nipples, 3 nos.	Brass ball valves (1/2")with MS nipples, 5 nos
Can Cluster Assembly		
Milking Bucket (Can) with Lid		
Quantity	One	Two
Milk Bucket (Can) material of construction	AISI 304, 1 mm Thk (1 No.)	AISI 304, 1 mm Thk (2 Nos.)
Can Lid	AISI 304, 1 mm Thk, with rubber gasket (1 No.)	AISI 304, 1 mm Thk, with rubber gasket (2 Nos.)
Can Capacity	25 lit	25 lit each (Total 50 lit)
Can Finishing	Seamless finish	
Can handle	With one carrying handle and one tilting handle	
Milking Cluster / Claw (Quantity)	1 no.	2 nos.
Cluster weight/ Claw volume	2000 gram minimum/ 150 CC minimum transparent, With air admission hole	
Liner (Material & Quantity)	Nontoxic, Food grade, complying to FDA standards,4 nos.	Nontoxic, Food grade, complying to FDA standards,8 nos.
Teat cups (material & Quantity)	SS 304 suitable to liners, 4 nos.	SS 304 suitable to liners, 8 nos.
Tubing	One set of short pulsation tube, twin pulsation tube, vacuum hose and transparent milk hose all nontoxic, food grade, complying FDA standards	
Pulsator - Mounted on can lid with adaptor / check valves (settings & quantity)	Pneumatic pulsator complete with can lid adaptor, with factory setting of pulsation rate: 65-70 ppm and pulsation rate of 60:40, 1 no.	Pneumatic pulsator complete with can lid adaptor, with factory setting of pulsation rate: 65-70 ppm and pulsation rate of 60:40, 2 nos.
Brush Set for cleaning	Long brush for milk tube & short brush for rubber liner.	

4. Working Principle

4.1. Milking Principles and Machine Milking:

Milk Extraction-

Milk is produced by the mother for its young one and so instinctively the calf is able to extract milk and this produces the best response from the dam resulting in very efficient milk removal. While suckling, the presence of the calf produces a very good milk ejection and the milk can be extracted by overcoming the barrier of the teat opening. The ejection of milk from the secretory tissues creates a small intra mammary pressure within the udder. When the calf suckles, it partially sucks open the teat opening and partly squeezes the milk out. The calf has to intermittently stop suckling and squeezing to swallow the milk.

Hand milking is performed by massaging and pulling down on the teats of the udder and squirting the milk into a bucket. Three main methods are used for hand milking and are pictured in Figure 4.1, 4.2 and 4.3

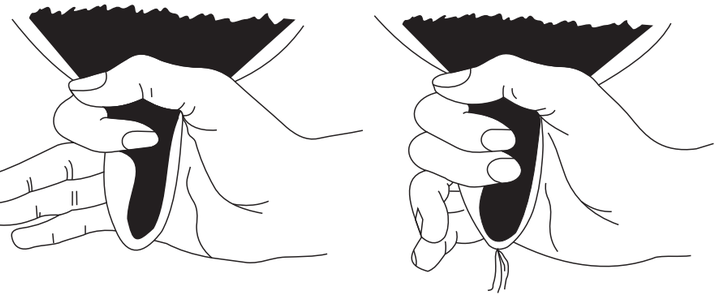


Figure 4.1: Full hand Milking

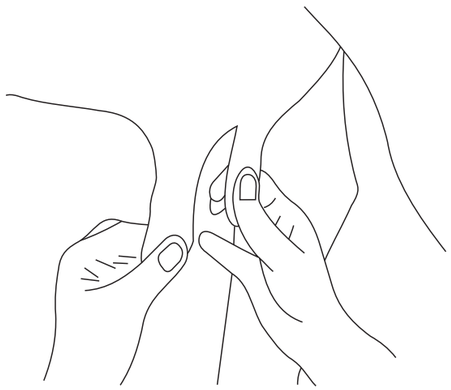


Figure 4.2: Stripping method

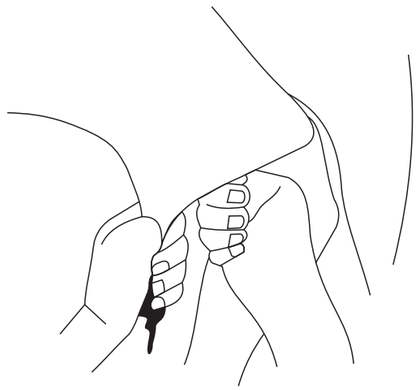


Figure 4.3: Knuckling method

Machine Milking Technology:

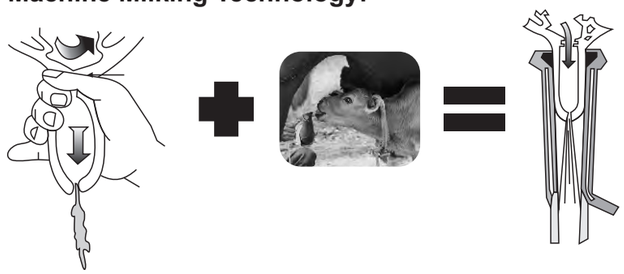


Figure 4.4: Machine milking provides the suckling effect of the calf and the massaging effect during hand milking.

- The milking machine effectively performs the function of applying vacuum pressure and suckling like a calf and also applying positive pressure and massaging like in hand milking as shown in figure 4.4.
- The main function of machine milking is to milk cows completely, gently and quickly with no adverse effects on udder health or the raw milk quality.
- Machine Milking is a complex but convenient interaction between the cow, the machine and the milker, where each factor has an equally important role to play. The cow has to cooperate and produce good milk ejection. The milker has to understand the process of milking and be sensitive to the cow. The milker has to also understand the milking machine and constantly fine-tune it as per the requirement of the cow.
- The installation is essentially an enclosed pipeline system that connects various vessels and components, providing flow paths for air and milk. The system is kept under constant vacuum which enables movement of both air and milk in the milk pipe lines and vacuum pipe lines. The pulsator which alternates between vacuum and atmospheric pressure helps in opening and closing the teat opening, thus gently sucking out the milk like a calf and massaging the teat intermittently, causing the milk to flow into the system.
- The milking technique has a considerable influence on milk yield, milking time and the health of cow's udder. All these factors are of great importance for economic milk production.
- Poor milking may influence udder health by causing injuries to the udder. These injuries are often followed by udder infection (mastitis). Mastitis causes great losses to farmers due to lower milk yields, more work during milking on account of having to treat the cows for mastitis, separately milking the cows and also separating the milk.
- Milking constitutes major part of the total work in a cow shed (50-60%). Learning how to use the milking machine to save time and effort can help in improving farm economics and will be of comfort to the farm workers.
- The udder can never be completely emptied. Even after careful milking, there will always be some milk left in the udder. The milk which is left in the alveoli area which is the secretory tissue after milking, is called residual milk. This milk cannot be extracted even after hand stripping for long, it can only be removed if a supra-physiological dose of oxytocin is administered to the animal. Higher proportion of residual milk over a period of time will reduce the milk yield of cows. On the other hand, we can reduce the amount of residual milk by proper preparation of the cow leading to a good milk ejection and by using a correct milking technique. The cow then cooperates by milking quickly, provided of course, that the milking machine has enough capacity to keep up with the milk flow during this short time.

4.2. Systems of Bucket Milking Machine:

The fixed type bucket milking machines are designed to milk the cows “In Place”, where they are. The Bucket Milking Machine consists broadly of two systems:

1. Vacuum System and
2. Can Cluster System.

1. Vacuum System consists of the follow components:

a. Vacuum pump assembly which consists of the vacuum pump, electric motor, switch, oil feeder bottle assembly, silencer assembly and vacuum tank assembly (reservoir to stabilize the vacuum and maintain an effective reserve).

b. Vacuum regulator that is mounted close to the vacuum tank.

c. Vacuum gauge that is mounted in the vacuum line in the cow shed/barn so that it is clearly visible to the operator.

d. Vacuum pipe that is installed at a height that is easily reachable to the operator and is out of the way of the cows. It should have one vacuum tap to connect the bucket in between two cows alternatively.

2. Can Cluster System consists of the following components:

1. Milk-Can (Bucket) of 25-liter capacity specially designed for the bucket milking machines having a rounded bottom so that it is easily cleanable. It is devoid of junctions and crevices where milk residue can accumulate. A Can Cover is a lid that is specially designed to suit the milking machine Can which has outlets for installing the pulsator, a milk hose and a vacuum inlet.

   The teat when it is full of milk, is sucked open with the help of vacuum in the teat cup liner. The space between teat cup and the liner is connected to the pulsator with the help of a short pulsation tube. The pulsator continuously alternates between atmospheric air and vacuum.

   Figure 4.5 shows the situation when the pulsator is open to vacuum, causing the liner to be in equilibrium as there is vacuum, both inside and outside the liner, resulting in opening of the teat and drawing out of the milk.

   Figure 4.6 shows that the pulsator is open to air, where there is vacuum inside the liner but atmospheric pressure outside the liner, resulting in liner collapsing around the teat, gently compressing the teat end or massaging the teat end.

2. A single instance when the pulsator releases air and vacuum alternately into the space between the rubber liner and the teat cup is called a pulse.The number of such pulses per minute is called the pulsation rate. The pulsation rate is set between 65 to 70 pulses per minute. The percentage of time within each pulse where the liner is open and milking the cow is called the milking (suction) phase and similarly percentage of time the liner is closed and is massaging the teat is called the massage phase. The ratio of suction to massage phase is set at 60:40 in pulsator.
3. Milk flows from the milking unit to the Can and the Can fills up while milking one or two cows depending on the yield. Subsequently the Can must be opened and carried to the Milk Tank and emptied.

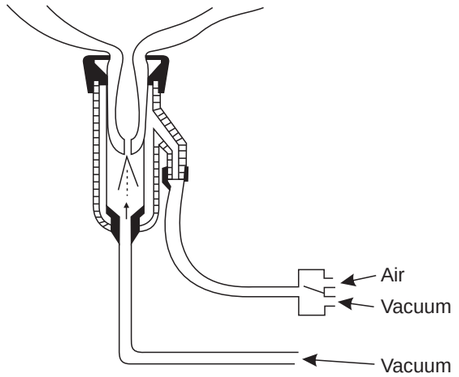


Figure 4.5: Suction phase

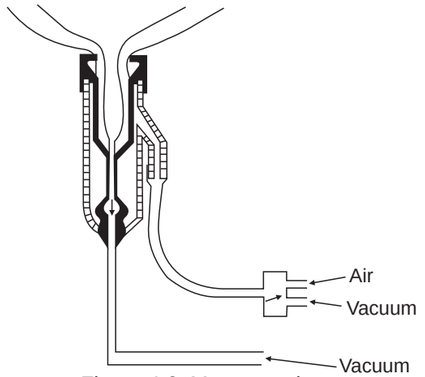


Figure 4.6: Massage phase

4.3. Application:

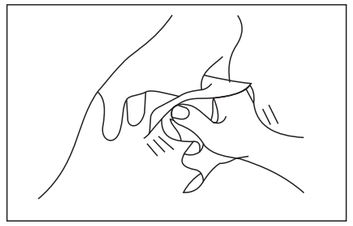
IDMC’s bucket milking machines are suitable for milking cows

5. Operation

Daily Milking Procedure:

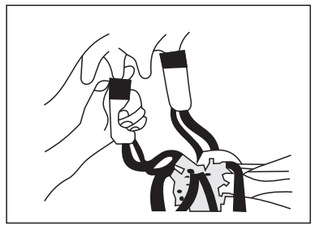
- Plan the order of milking
  - First milk young lactating cows and healthy cows.
  - Then Milk cows that kick, those which are freshly calved and lastly those having mastitis.

Preparing the Animal for Milking. Refer Figure 5.1:



• Clean the udder and teats.
• Wipe it with clean cloth.

• Milk some drops of milk in the fore milk strip cup.



• Attach the teat cups of the milking machine.

Figure 5.1: Preparation routines for machine milking

Milking Process:

- Clean teat ends by washing with clean water and drying with a separate clean cloth for each cow. Do not use the same cloth for cleaning the teats of more than one cow.
- Always use fresh water for each cow so as to prevent cow to cow infection.
- Never milk on wet teats as the microorganism in the water will enter the secretory tissue and cause mastitis and also contaminate the milk.
- Pre-stimulation provided during cleaning and drying of the teats produces an active milk ejection, causing the milk stored in the secretory tissue of the udder to be let down into the cisternal area and teats, from where it can be milked or removed by the machine.
- Control milking of the first squirts of milk from each teat into a black bottomed strip-cup to check if the milk has clots, flakes, blood or pus which are indicative of udder infection, and in case these are seen don't machine milk the cow. Hand milk such cows after the milking of the herd and call a veterinarian to treat the animals. It is recommended to keep a Cow Mastitis Test kit (California Mastitis Test Kit) and test all cows for subclinical mastitis at least once in a fortnight.

Precautions to be taken before starting milking process:

- Be sure the liners and teat cups are optimally sized for the cow's teats. Liners are available as per suitable sizes on request.
- Always check the vacuum pressure before starting machine milking process. The appropriate milking vacuum pressure levels are 42 to 48 Kpa.
- Attach the clusters only when the cow has sufficiently let down.
- The milking tubes should be properly stretched and should not sag.
- Hold the cluster set with left hand and turn it upside down. Open the shut-off valve.
- Hold teat cups with right hand and attach the furthest teat first and the closest teat last.
- Habituate the cow to be milked from both the right-hand side and the left-hand side.

- Make sure the milking units are not attached sideways. Figure 5.2 (a) shows the wrong method of attaching milking unit side ways. If the milking units are attached sideways they tend to incompletely milk the quarter udder which faces the bucket and can result in mastitis. Figure 5.2 (b) shows the right method of attaching milking units, they should be attached either from the front of the cow or between the two legs of the cow to give the milking unit correct dynamic balancing. During milking, attention has to be paid for any squawks or slip's or even kick-off's. The Milker need not sit close to the animal continuously, he can prepare another animal or attach another milking unit on a prepared animal.
- When the milk flow into the transparent bowl stops, gently lay your hand of the claw and provide downward and backward traction to machine strip and remove the left over milk.
- When milk has stopped flowing into the transparent claw bowl even after machine stripping, feel the udder to see if the animals has been milked well. After this, gently release the shut-off valve to shut-off position.

Figure: 5.2: (a) Wrong method of attaching milking unit side ways

Figure: 5.2: (b) Right method of attaching milking unit between legs

Steps in milking routines with milking machines:

IDMC's recommend practice to milk with the existing procedure of feeding concentrates.

Step-1: Prepare animal number ❶ &❶. Refer Figure 5.3.

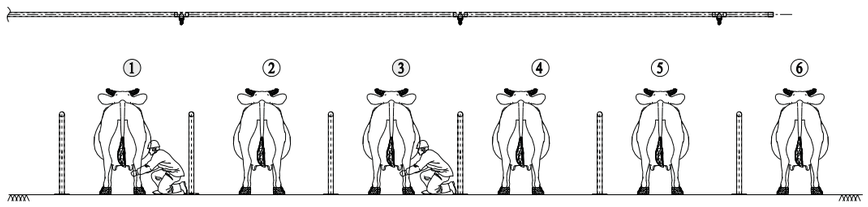


Figure: 5.3

Step-2: Attach the milking cluster to animals❶&❶. Refer Figure 5.4.

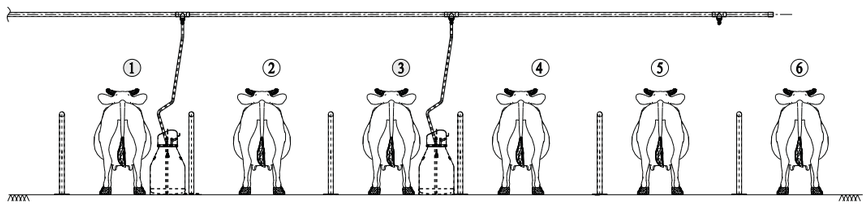


Figure 5.4

Step-3: Wait and watch while the cows are being milked. Refer Figure 5.5.

Figure 5.5: Attentive Milker

- A well-prepared cow lets down in about 30 seconds to one minute, it takes around this time for the milk flow to increase and milk to be visible & flowing in the claw & milk tube.
- Do not be in a hurry to finish the milking.
- Some cows can take longer to let down, make allowance for this.
- Keep a close watch. If there are liner slips and noises, re-adjust the cluster.
- Cows get disturbed easily due to noises and kick off the cluster. This has a direct effect on the milk yield and could result in breakages in the milking unit.
- Main milk flow usually takes about 3 to 4 min after milk ejection.
- Towards the end of milking in the last 2 to 3 min's in several cows, the fore quarters become empty and the teat cups slip. If so, readjust the teat cups. Allow the cluster to milk out the quarters with higher milk yields.

Step-4: Prepare animal number ❶ &❶. Refer Figure 5.6.

- When cows number ❶ and ❶ are being milked, prepare cow number ❶ and ❶ as per suggested preparation routines, refer figure 5.1 and figure 5.6

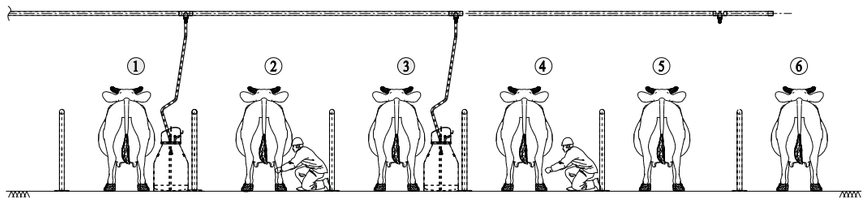


Figure 5.6: Prepare next 2 cows number 2 & 4 for milking while cow no. 1 & 3 being milked

Step-5: Machine strip animals. Refer Figure 5.7.

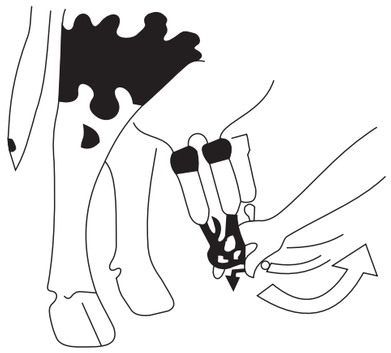


Figure 5.7: Machine Stripping

Machine Stripping.

- When milk has stopped flowing into the transparent claw bowl, feel the udder to see if the animal has been milked well. To maximize yield, strip the teats manually keeping cluster attached.

- This is an important function while machine milking especially while milking crossbred cows and desi cows. Because of the teat shape and disproportionate milk in different quarters in some animals there is a large strip yield.
- It is important to empty the cow's udder as efficiently as possible. Large quantities of residual milk in cows could affect milk yield.
- The strip milk contains a much higher fat content than the main milk and this is the reason why most of the farmers in India would like to empty the udder as efficiently as possible.

Step-6: Attach the milking unit to cow number ❶ and ❶ and follow step number 3 & 4 and step 5 for preparing next alternate two cows.

Step-7: Removal of cluster assembly after every milking cycle. Refer Figure 5.8.

- Make sure that the cow has no milk left in the udder.
- Shut the claw valve with your finger using the right hand.
- Surround the cluster with your left hand and gently release air into teatcup closest to your left hand fingers.
- The cluster will fall on to your left hand. Ensure that the teatcups do not touch the floor or suck in manure or other dirt and bacteria.
- After complete milking, turn-off the tap of claw and take off the cluster set.

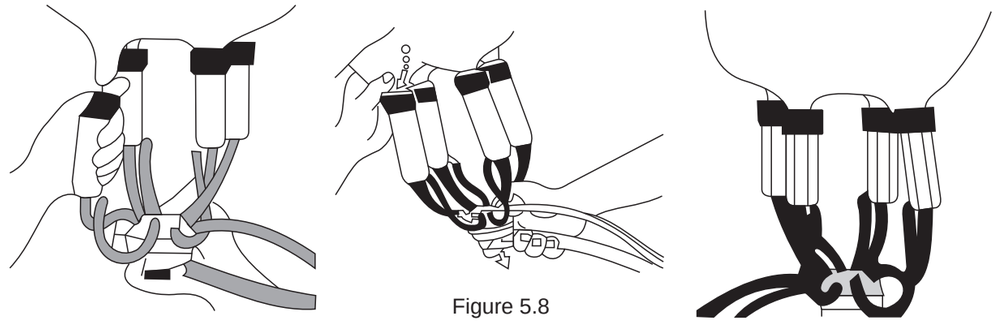


Figure 5.8

WARNING:

Never leave the cluster on the floor so as to avoid damage to cluster and to

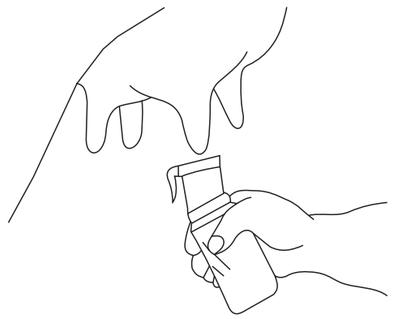


Figure 5.9

6. Cleaning (Cleaning-in-Place)

Steps in cleaning Bucket Milking Machines:

Figure 6.1

Step-1: Rinse the milking cluster with clean cold water – this will take away most of the milk residue.

Step-2: Take a spare bucket full of warm water (18 to 20 lts @ 60 to 70 ^{0}C) and add alkali detergent to it. Turn on the vacuum pump, connect the empty milking bucket and suck all the water in the spare bucket through the cluster by inserting three teat cups in the spare bucket and keeping one teat cup outside so that the water enters along with air and enough turbulence is created.

Step-3: Empty the detergent water in the milking bucket back into the spare bucket and repeat the procedure three to four times till the water is warm enough.

Step-4: Rinse once again with normal clean water.

Step-5: Rinse the inside of the Can Cover, remove the gasket and rinse it. Take care that the pulsator is not falling or getting immersed in to the water.

Step-6: Check the claw and the liner if they are clean, if not clean, use the brush set to clean it.

Step-7: Wash the Milk Buckets (Cans) and invert them for draining and drying.

Step-8: Hang the Clusters and the Can Covers in a protected place away from sunlight until it dries.

Cleaning frequency and method:

Frequency of cleaning	Part of milking machine	Cleaning method
Every day – At every completion of milking cycle generally in the morning and evening.	Milk Bucket/Can, teat cup liners, milk pipe lines (inside).	With hot water and mild basic detergent.
Weekly	Regulator, milking unit cluster, milk pipe lines (inside & outside).	With hot water
Monthly	Pulsator, milking machine stand, receiver tank and vacuum gauge…etc.	With clean dry cloth

7. General trouble shooting and remedies

Study the maintenance instructions carefully before replacing worn parts.

No.	Trouble	Problem Cause	Remedy
1	No system vacuum pressure	Regulator knob might have been disturbed.	Regulator should be adjusted back to normal position.
		Pump vanes/segments worn-out	Replace the vanes/blades.
		Poor oil circulation in the pump	Fill oil in bottle as per specified min./max. level and check the inlets are not choked to ensure oil circulation
		Valve to the receiver tank from the pump, if any, might be shutoff.	Valve of receiver should be opened.
		Drain plug of receiver might be loose or worn/damaged.	Drain plug should be tightly closed or replace drain valve if worn/damaged.
		Vacuum gauge might not be working.	Replace Vacuum gauge.
		Slide of pulsator adapter on the can lid may be unplugged / leaking.	Plug the pulsator adapter.
		Rubber gasket of the receiver tank could be leaking.	Check and replace gasket if damaged.
		Pump & receiver connection is loose.	Tighten pump & receiver connection.
2	Vacuum pressure generated more than specified limit	Regulator might be malfunctioning.	Replace regulator.
		Pressure regulator not set at milking pressure 42 to 48 Kpa.	Set the vacuum pressure with vacuum regulator.
3	Pulsator not working	Water, milk or cleaning solution might have entered into the pulsator.	Pulsator should be disassembled cleaned and re-assembled.
		Diaphragms or other parts may be damaged.	Replace diaphragms or other worn out parts.
4	Vacuum levels are as specified even then milking is not possible	Vacuum valve might be shut off on the pipe line.	Open the vacuum valve.
		Rubber liner could be cut or damaged.	Replace rubber liner.
		Bucket lid rubber gasket could be damaged or loose.	Replace bucket lid rubber gasket.
5	No vacuum pressure in the bucket	Milk bucket/Can lid gasket might be loose or damaged.	Change the milk can lid gasket.
		Vacuum Line valves are open	Close line valves
6	Vacuum pressure is too high	Pressure regulator is set at higher milking pressure.	Set the vacuum pressure by vacuum regulator.
		Regulator may be damaged.	Change the regulator.
7	Vacuum pump is too noisy & getting hot	The bearing of the electrical motor could be worn out.	Check the bearing and replace it.
		Too high vacuum pressure at the pump gauge.	Regulate the vacuum by knob and set desired pressure by observing on vacuum gauge.
		Oil flow insufficient.	Ensure oil in bottles and no choking in line.

No.	Trouble	Problem Cause	Remedy
8	The pump motor operating at a low speed (RPM)	Voltage fluctuation.	Check the input power supply voltage.
9	Pulsation rate goes Down/Up	Setting could have changed/disturbed.	Set pulse rate by adjusting the Hex Socket Allen Bolt and counting the pulse with the help of a watch.
10	Static oil level in the oil bottle (Very low oil consumption)	Oil density increased.	Replace the oil.
		The flow setting in oil bottle is not correctly adjusted.	Set oil flow by loosening or tightening the capillary pipe from oil bottle Or by adjusting the wick in case of wick type bottles.
11	Oil flow can appear to flow away from the end shield nipple back to lubricator	Oil flow nipple could be clogged.	Replace the oil flow nipple
13	Milking unit or Cluster has a low suction pressure / vacuum	Air leakage at the cluster due to lose connections or damaged rubber parts.	Tighten the connection/parts of cluster. Replace damaged rubber parts.
14	Milk and cleaning solution flowing out into the vacuum tank	The float valve in the can cover is not functioning.	Replace the float valve in the bucket.
15	Oil is leaking out of the vacuum pump into the vacuum tank	The NRV in the vacuum tank is not functioning.	Replace the NRV.
16	High oil consumption	The flow setting in oil bottle is not correctly adjusted.	Set oil flow by tightening the capillary pipe from oil bottle Or by adjusting the wick in case of wick type bottles.
		Leakage between brass nipple or nozzle or hardening of the tubing.	Check & tighten the brass nipples/nozzles OR replace oil circulation tubes.

8. Maintenance

Component	Weekly	Monthly	Six-Monthly
Vacuum Pump Assembly:			
Vacuum Pump	Check and maintain the oil levels (min. and max.) in bottle.	Check the oil colour, if it is dark replace the oil.	- -
Receiver tank	- -	Dry the receiver interior with a wet cloth, there should not be any milk, water, oil or foreign matter.	- -
Drain valve	- -	Dismantle and clean the valve.	- -
Vacuum Pipe line	- -	Check if there are any leakages in the vacuum taps and rectify the leaking taps.	- -
Vacuum regulator	- -	Dismantle and clean the valve	- -
Vacuum gauge	- -	Clean the outer shell	- -
Can & Cluster assembly:			
Milk Claw	Check and Clean the air bleeder vent with the cleaning pin provided.	- -	All rubber parts have to be replaced
Rubber tubes and liners	Clean manually with brushes	- -	All rubber parts have to be replaced
Pulsator	- -	Dismantle and clean	All rubber parts have to be replaced

9. Product exploded/section views, part-list and recommended spares

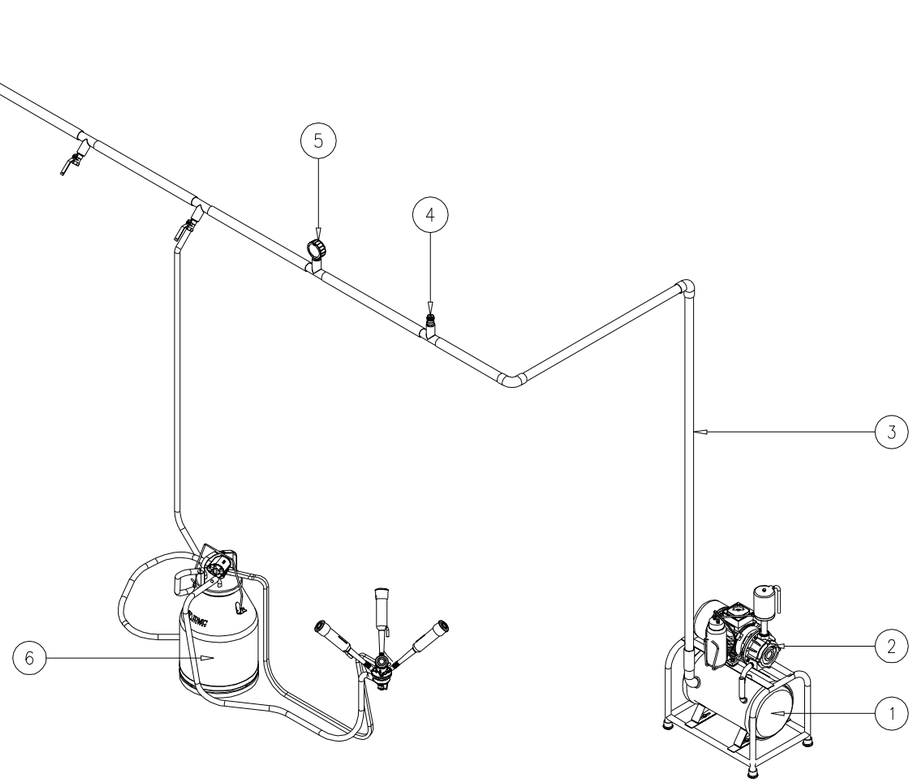


Figure 9.1
MLMF1000A00100L000
BUCKET MILKING MACHINE

BILL OF MATERIAL - BUCKET MILKING MACHINE (Refer Figure 9.1)				
PART NO.	**DESCRIPTION**	**QTY**	**UOM**	**MATERIAL NUMBER**
1	Vacuum Receiver Tank	1	EA	MLA0A0000000000000
2	Vacuum Pump	1	EA	MLC0A000L20000A000
3	Vacuum Pipe Assembly	1	EA	Not in scope of supply
4#	**Vacuum Regulator**	**1**	**EA**	**MLS0000L0040000000**
5#	**Pressure Gauge**	**1**	**EA**	**MLS000000125000000**
6	Bucket Assembly	1	EA	MLA0B0000000000000
NOTE:	Recommended Spares are as shown in **bold and #** mark above.			

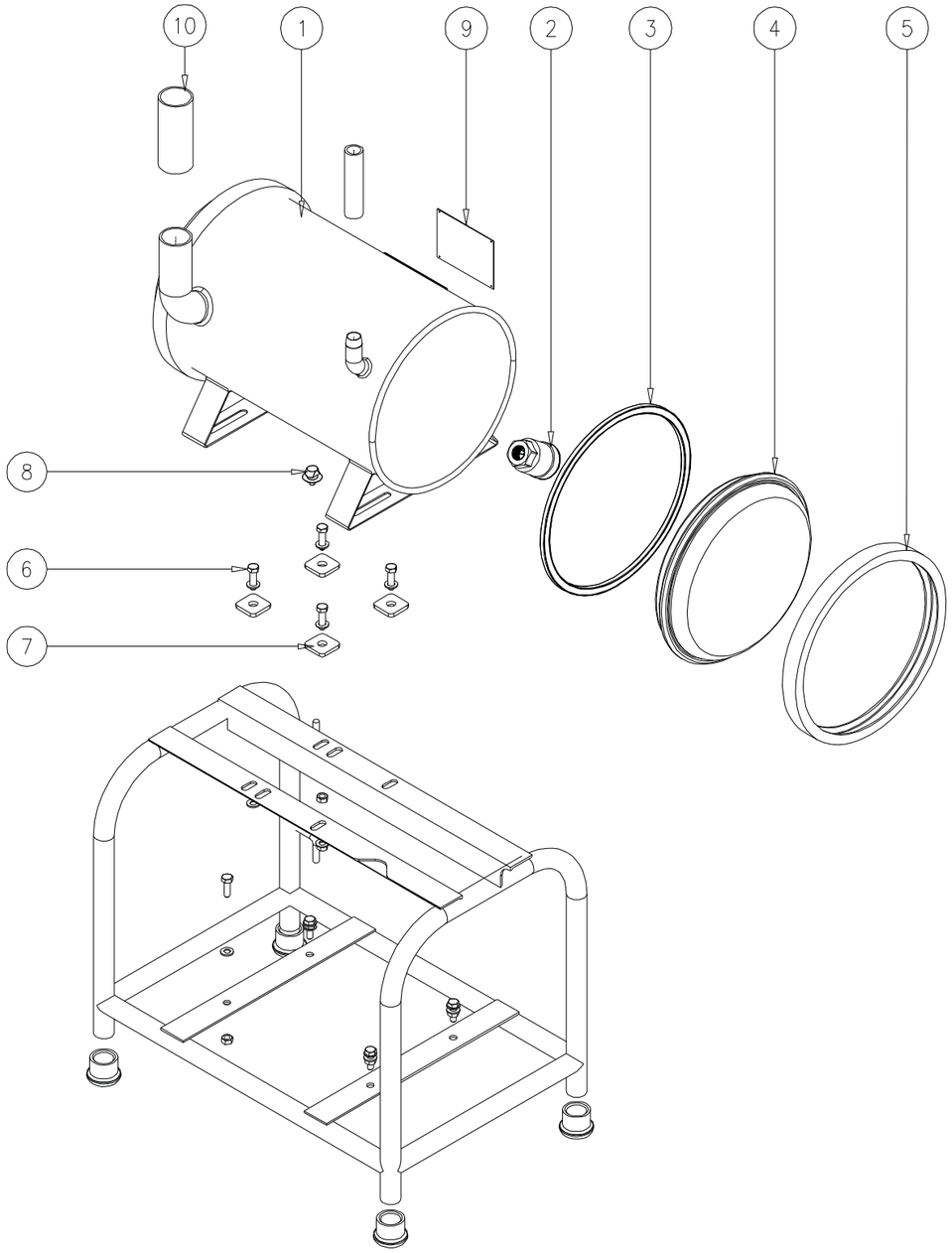


Figure 9.2
MLA0A0000000000000
VACUUM RECEIVER TANK

BILL OF MATERIAL - VACUUM RECEIVER TANK (Refer Figure 9.2)				
PART NO.	**DESCRIPTION**	**QTY**	**UOM**	**MATERIAL NUMBER**
1	Vacuum Receiver Tank	1	EA	MLS0000D0112000000
2#	**Non-Return Valve (NRV)**	**1**	**EA**	**MLS0000H0134000000**
3#	**Side cover Inner gasket**	**2**	**EA**	**MLS0000A0110000000**
4	Side Cover	2	EA	MLS0000Y0111000000
5#	**Side cover Outer gasket**	**2**	**EA**	**MLS0000A0000000000**
6	Plain Washer M8	4	EA	BHX00ISG0830FNW000
7	Vacuum Pump Base Pad	4	EA	MLS0000AA140000000
8#	**Receiver Tank Stopper**	**1**	**EA**	**MLS0000AA133000000**
9	Name Plate size 3"*4"	1	EA	MLCAK00HA003000000
10#	**Rubber Coupling**	**1**	**EA**	**MLCAN00C0000000000**
NOTE:	Recommended Spares are as shown in **bold and #** mark above.			

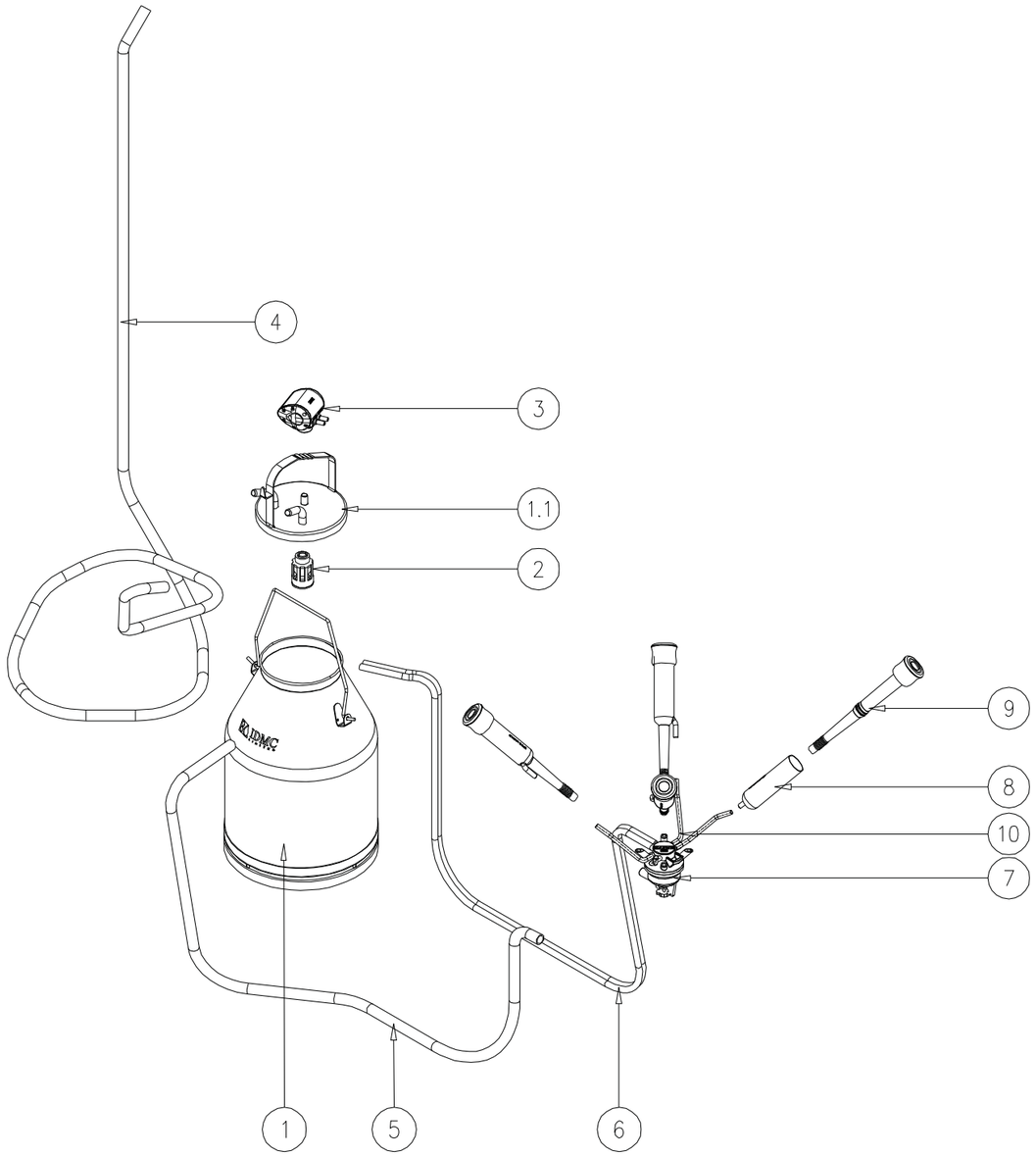


Figure 9.3
MLA0B0000000000000
BUCKET ASSEMBLY

BILL OF MATERIAL - BUCKET ASSEMBLY (Refer Figure 9.3)				
PART NO.	**DESCRIPTION**	**QTY**	**UOM**	**MATERIAL NUMBER**
1	Milk Can	1	EA	MLS080010114006000
1.1	Milk Can Lid	1	EA	MLS080010114006000
2#	**Milk Can Float Valve**	**1**	**EA**	**MLS0000N0133000000**
3	Pulsator	1	EA	MLA0D0000000A00000
4#	**Vacuum Hose Pipe**	**3**	**M**	**MLS000000009000000**
5#	**Milk Tube Transparent**	**2**	**M**	**MLS000000008000000**
6#	**Double Pulsation Tube**	**2**	**M**	**MLCAJ00E0714000000**
7	Milk Claw	1	EA	MLA0E0000000A00000
8	Teat Cup with Liner DIA.17	4	EA	MLCAI004A001B00000
9#	**Rubber Liner**	**4**	**EA**	**MLS0000R0038000000**
10#	**Short Pulse Tube**	**1**	**M**	**MLS000000010000000**
NOTE:	Recommended Spares are as shown in **bold and #** mark above.			

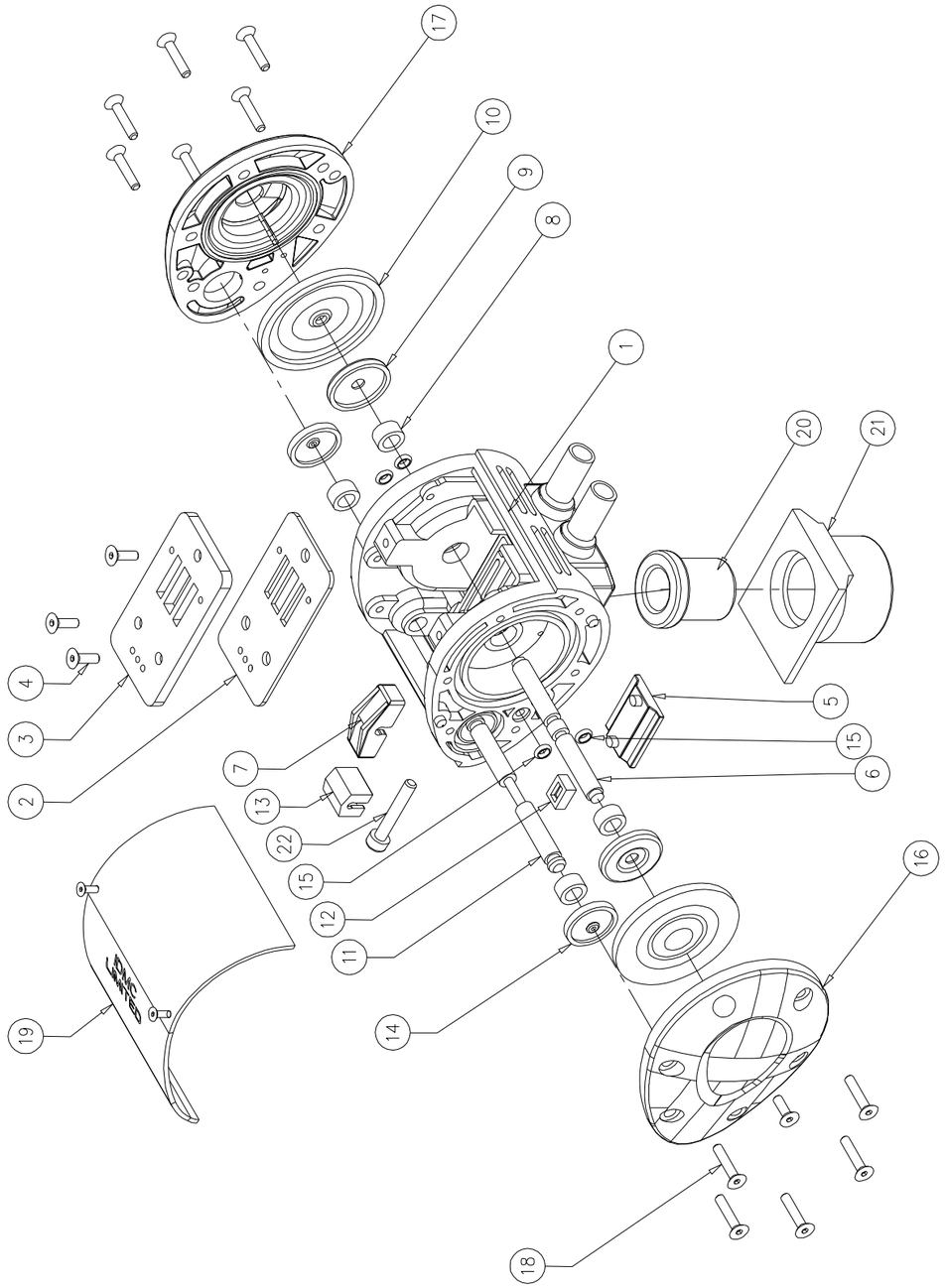


Figure 9.4
MLA0D0000000A00000
PULSATOR

BILL OF MATERIAL - PULSATOR ASSEMBLY (Refer Figure 9.4)				
PART NO.	**DESCRIPTION**	**QTY**	**UOM**	**MATERIAL NUMBER**
1	Pulsator Hub	1	EA	MLC0B00A0000A00000
2#	**Plate Gasket**	**1**	**EA**	**MLC0R00C0000A0C000**
3	Pulsator Plate	1	EA	MLC0V00M0000A0B000
4#	**CSK Head Philips, 6*13, Self**	**3**	**EA**	**TPS0B004061300A000**
5	Primary Slider Base	1	EA	MLC0H00B0000A00000
6	Primary Shaft	1	EA	MLC0T0040000A00000
7	Primary Slider Top	1	EA	MLC0I00B0000A00000
8#	**Primary Rod Bearing**	**4**	**EA**	**MLC0K00B0000A00000**
9	Primary Rod End Cover	2	EA	MLC0J00B0000A00000
10#	**Primary Diaphragm**	**2**	**EA**	**MLC0P00D0000A00000**
11	Secondary Shaft	1	EA	MLC0U0040000A00000
12	Secondary Slider Base	1	EA	MLC0N00B0000A00000
13	Secondary Slider Top	1	EA	MLC0O00B0000A00000
14#	**Secondary Diaphragm**	**2**	**EA**	**MLC0Q00D0000A00000**
15#	**Rubber O-Ring**	**4**	**EA**	**MLC0M00C0025A00000**
16	Pulsator Left Cover	1	EA	MLC0C00A0000A00000
17	Pulsator Right Cover	1	EA	MLC0D00A0000A00000
18#	**Hex Socket Allen Screw (CSK M3*10 Lg)**	**14**	**EA**	**TPS0A004061300A000**
19	Pulsator top Covers	1	EA	MLC0X0040000A00000
20#	**Vacuum Adaptor Rubber**	**1**	**EA**	**MLC0S00E0000A00000**
21	Vacuum Adaptor Body	1	EA	MLC0E00A0000A00000
22#	**Hex SocketAllen Bolt (CSK M4*30Lg)**		**1 EA**	**MLC0Y0040430A00000**
NOTE:	Recommended Spares are as shown in **bold and #** mark above.			

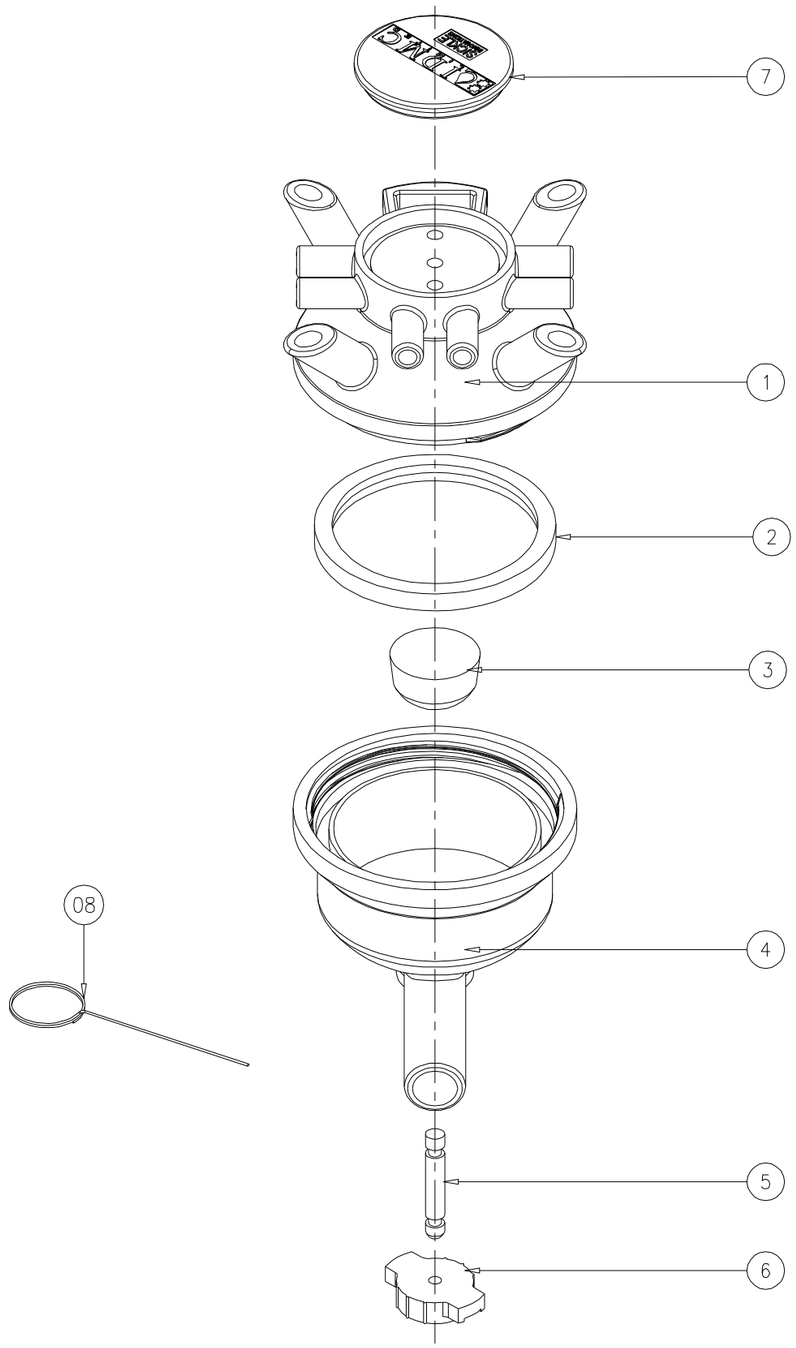


Figure 9.5
MLA0E0000000A00000
MILK CLAW

BILL OF MATERIAL - MILK CLAW ASSEMBLY (Refer Figure 9.5)				
PART NO.	**DESCRIPTION**	**QTY**	**UOM**	**MATERIAL NUMBER**
1	Claw Inlet	1	EA	MLCAG00G0000000000
2#	**Claw Rubber Ring**	**1**	**EA**	**MLCAD00C0000000000**
3#	**Claw Rubber Ball**	**1**	**EA**	**MLCAC00C0000000000**
4#	**Claw Outlet**	**1**	**EA**	**MLCAB00F0000000000**
5#	**Claw Rod**	**1**	**EA**	**MLCAF0040000000000**
6#	**Claw Rubber Knob**	**1**	**EA**	**MLCAE00C0000000000**
7#	**Claw Inlet Bottom Cover**	**1**	**EA**	**MLCAH00G0000000000**
8#	**Claw Air Bleeder Pin, 304**	**1**	**EA**	**MLCA00040000000000**
NOTE:	Recommended Spares are as shown in **bold and #** mark above.			

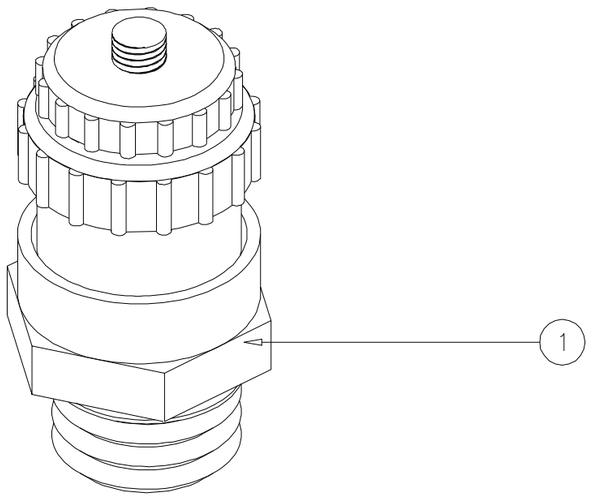


Figure 9.6
MLS000L0040000000
VACUUM REGULATOR

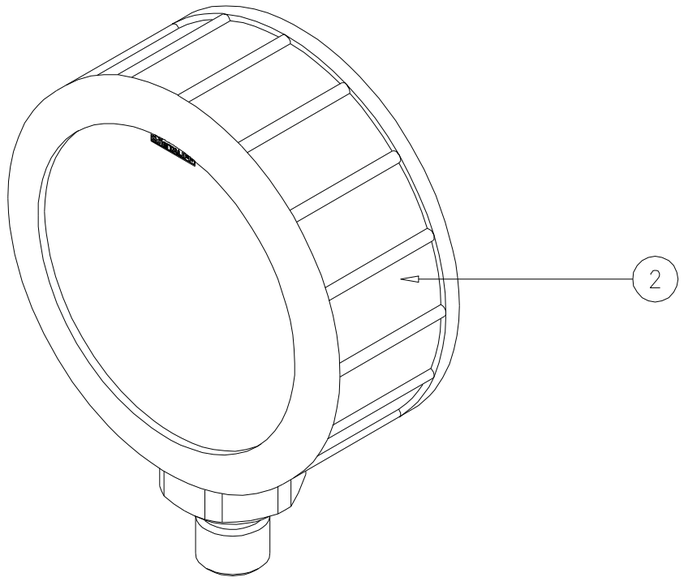


Figure 9.6
MLS000000125000000
PRESSURE GAUGE

BILL OF MATERIAL - VACUUM REGULATOR (Refer Figure 9.6)				
PART NO.	**DESCRIPTION**	**QTY**	**UOM**	**MATERIAL NUMBER**
1#	**Vacuum Regulator**	**1**	**EA**	**MLS0000L0040000000**
2#	**Pressure Gauge**	**1**	**EA**	**MLS000000125000000**
NOTE:	Recommended Spares are as shown in **bold and #** mark above.			

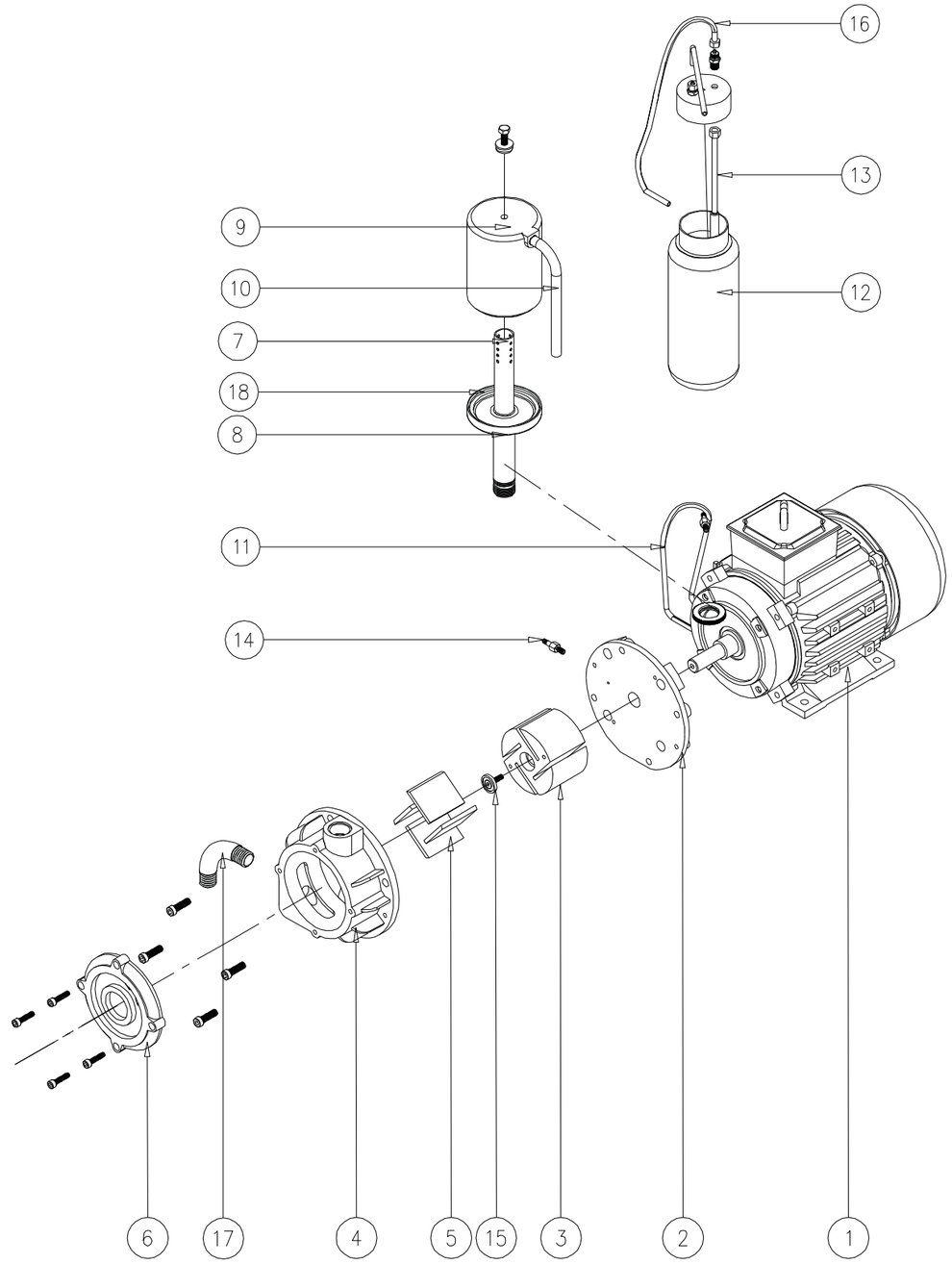


Figure 9.7
VAPA2000C000000000
VACUUM PUMP

BILL OF MATERIAL -VACUUM PUMP (Refer Figure 9.7)				
PART NO.	**DESCRIPTION**	**QTY**	**UOM**	**MATERIAL NUMBER**
1	Motor	1	EA	MLS0000E0142000000
2	Pump End Shield	1	EA	MLS0000E0143000000
3	Pump Rotor	1	EA	MLS0000E0144000000
4	Pump Body	1	EA	MLS0000E0145000000
5#	**Pump Vanes**	**4**	**EA**	**MLS0000F0146000000**
6	Pump Cover	1	EA	MLS0000E0147000000
7	Silencer Pipe	1	EA	MLS0000D0155000000
8	Silencer Base	1	EA	MLS0000G0156000000
9	Silencer Top	1	EA	MLS0000G0157000000
10	Exhaust Pipe	1	EA	MLS0000M0158000000
11#	**Oil Bottle Holder**	**1**	**EA**	**MLS0000M0148000000**
12#	**Oil Bottle**	**1**	**EA**	**MLS0000L0149000000**
13 #	**OPU Unit (OPU-Oil Pick Up unit)**	**1**	**EA**	**MLS0000M0150000000**
14 #	**Brass Connector 1/8" BSP X 6 mm**	**2**	**EA**	**MLS0000B0151000000**
15	Rotor lock Washer	1	EA	MLS0000M0152000000
16#	**Plastic Pipe 4mm X1 Ft**	**2**	**EA**	**MLS0000L0153000000**
17	L- Bend BSP 1	EA MLS0000D0141002000		
18#	**Silencer O-ring**	**1**	**EA**	**MLS0000R0154000000**
NOTE:	Recommended Spares are as shown in **bold and #** mark above.			

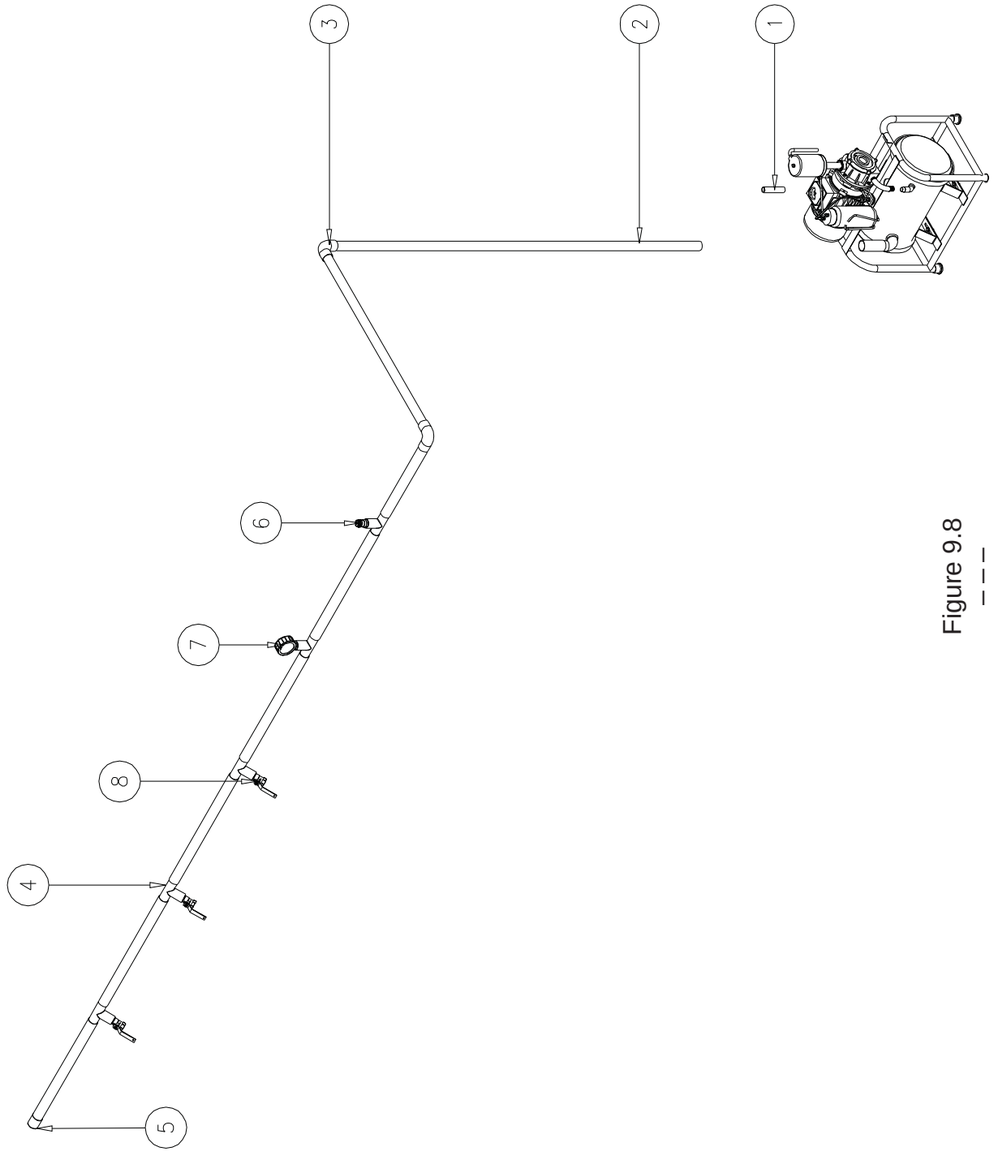


Figure 9.8
– – –
VACUUM PIPE ASSEMBLY

BILL OF MATERIAL -VACUUM PUMP (Refer Figure 9.7)				
PART NO.	**DESCRIPTION**	**QTY**	**UOM**	**MATERIAL NUMBER**
1	Connection pipe between Receiver tank to pump	0.2	M	ICCBL00PA016000000
2	1½" PVC Pipe	1	EA	THIS ITEM IS IN CUSTOMER'S SCOPE
3	1½" PVC Bend	4	EA	MLS0000P0052000000
4	1½"Equal Tee PVC	5	EA	MLS0000P0049000000
5	End Cap, 40 mm OD	1	EA	MLS0000P0051000000
6	Vacuum regulator	1	EA	MLS0000L0040000000
7	Pressure Gauge	1	EA	MLS000000125000000
8#	**½ " Ball Valve, Brass**	**3**	**EA**	**MLS0000C0069000000**
NOTE:	Recommended Spares are as shown in **bold and #** mark above.			

10. Electrical circuit diagram

Motor	:	1 HP
Phase	:	Single Phase
Frame	:	90L
Voltage	:	220
Frequency	:	50Hz
Current	:	6 Amps
Power Factor / Cos Ø	:	0.89
RPM	:	1440

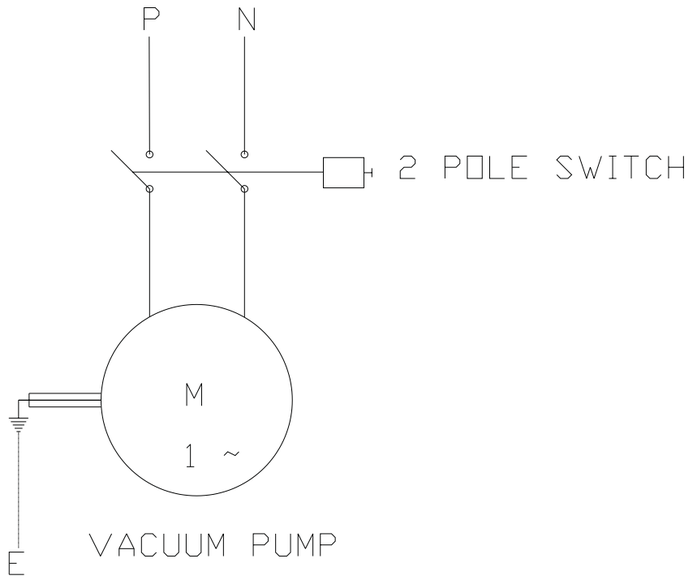


Figure 10.1

11. Health, safety & environmental (HSE) Instructions

- Ensure that the equipment is properly cleaned /flushed (Cleaning-procedures followed) before dismantling.
- Ensure that adequate ventilation and illumination (light) is available at work place.
- Use suitable capacity lifting/handling equipment, tools, tackles and shackles (chains/ropes) that are in good condition for installation and repair work.
- Ensure proper segregation and disposal of all types of wastes like packing material, seals, waste/used oils, parts and leftover materials in accordance with the applicable rules and regulations.
- Follow electrical safety and chemicals safety precautions and prevailing rules as applicable.
- Follow food safety & hygiene requirements and food grade materials as applicable.