



OPERATORS MANUAL FOR ROCKCRETER HSA GROUT PLANT



SOUTH AFRICAN SHOTCRETE TECHNOLOGY
Designed to perform, the power to succeed!

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As part of our policy of constant product development and improvement information and specifications contained in this document are liable to change.

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1. SAFETY PROCEDURES

Recommended items to keep pumping safe:

- a. Hard hats.
- b. Safety goggles.
- c. Dust masks in confined spaces or unventilated areas.
- d. Good lighting.
- e. Whip check cables and chain safety couplings on air supply hoses.
- f. Rubber gloves to protect workmen with skins sensitive to cement burns (also use barrier cream).
- g. Sturdy and safe lifting devices, platforms and scaffolding for those many pumping operations that are performed off the ground. All platforms should be equipped with safety rails.
- h. A qualified electrician must do all electrical connections.
- i. Do not remove the screen/sieve supplied on the hopper whilst the machine is in operation.
- j. Do not carry out any maintenance whilst the air or electrical connections are connected to the machine.
- k. Do not poke or prod any instrument of any sort into the hopper whilst the machine is in operation.
- l. Use safety straps on all grout hose connections.
- m. Keep arms, hands, fingers etc away from moving parts.
- n. Disconnect power/air before attempting to clean or repair equipment.

2. TECHNICAL SPECIFICATIONS

ROCKCRETER HSA GROUT PLANT	
Dimensions	
Length	2350 mm
Width	1300 mm
Height	2000 mm
Weight	+900 kg
High Shear Mixer	
Electric motor	7.5kW
Mixing capacity	100 L
Rotation speed	1450 Rpm
Internal flow system	900 L/min
Approximate capacity	5 m ³ /h
Water connection	1" Bsp
Liquid temperature	Max 40 °C
Agitator	
Electric motor	2.2kW
Mixing capacity	400 L
Rotation speed	35 Rpm
Grout pump	
Electric motor	11kW
Max flow	64 L/min
Max grout pressure	40 bar
Output diameter	1-1/4"

3. PRINCIPLES OF OPERATION

NOTE:

The principles of operation offered herein are intended as an aid to help the operator identify some of the factors that need to be taken into consideration when mixing and pumping cementitious grouts. Because wide varieties of materials are available for many different applications, it is important the operator becomes familiar with the specific characteristics of the material he intends using.

3.1 General Description

1. The Grout Plant comprises of a High Shear mixer, Agitator tank and Pump Assembly.
2. The mixer comprises of a single vortex mixing tank with a high shear pump driven by an electric motor.
3. The unit is capable of mixing ratios of up to 1:3 by weight to produce pumpable high strength grout mixtures.
4. The grout mixture is repeatedly recirculated through the high shear pump that breaks down any clusters of dry ingredients to ensure that all the dry material and water is completely mixed.
5. The vortex action inside the mixing tank rapidly feeds the mixture into the high shear pump and speeds up the mixing process.
6. The cementitious grout agitator tank is designed to keep the mixed grout moving and prevent the mixture from settling and hardening. Once the grout is mixed, it is stored in the agitator tank where a set of paddles or blades gently stirs the mixture to keep it smooth and ready for use. This ensures the grout remains consistent and lumps do not form while waiting to be applied and easy to pump.
7. The grout pump assembly with a positive displacement rotor-stator pump delivers cementitious grout at a steady, controlled flow. The rotor-stator system gently moves the grout through the pump without pulsing, ensuring a smooth, consistent supply for injection or placement on site.

3.2 Materials

1. Among the commercially manufactured materials available in today's market are materials for structural repairs, floor toppings, high strength non-shrink grouts, special linings and other specialty materials.
2. Each of these materials has unique characteristics, which must be well understood to insure a successful application.

3.3 Flow

1. In general, most materials need to be a flowable or pourable consistency for successful pumping. This means that if the material can be poured out of a pail or bucket, it can likely be pumped.

3.4 Setting Time

1. Some materials contain accelerating admixtures to reduce the setting time. This is particularly true of repair mortars and other spray applied materials so that strength gain can be fairly rapid. It is important to keep moving when using these types of materials.
2. Once the material is mixed, it must be pumped immediately and kept in motion and subsequent batches must be mixed and pumped as rapidly as possible. Any delays in the application process could result in plugged hoses and equipment.
3. Temperature also has an effect upon these materials to the extent that exposure of the hose to the sun on a hot day will accelerate the set time even more, therefore this should be avoided. It may even be necessary in some cases to cool the material, the mix water, or even the hose itself.

3.5 Pumping Distance

1. Pumping distances should always be kept to a minimum, and hoses should run as straight as possible no matter what material is being used.
2. Sometimes circumstances require longer than usual hose lengths, when this occurs, every effort should be made to use every advantage possible to insure a successful application. Some materials simply cannot be pumped long distances, so it's best to know the proposed material characteristics before attempting a production procedure.

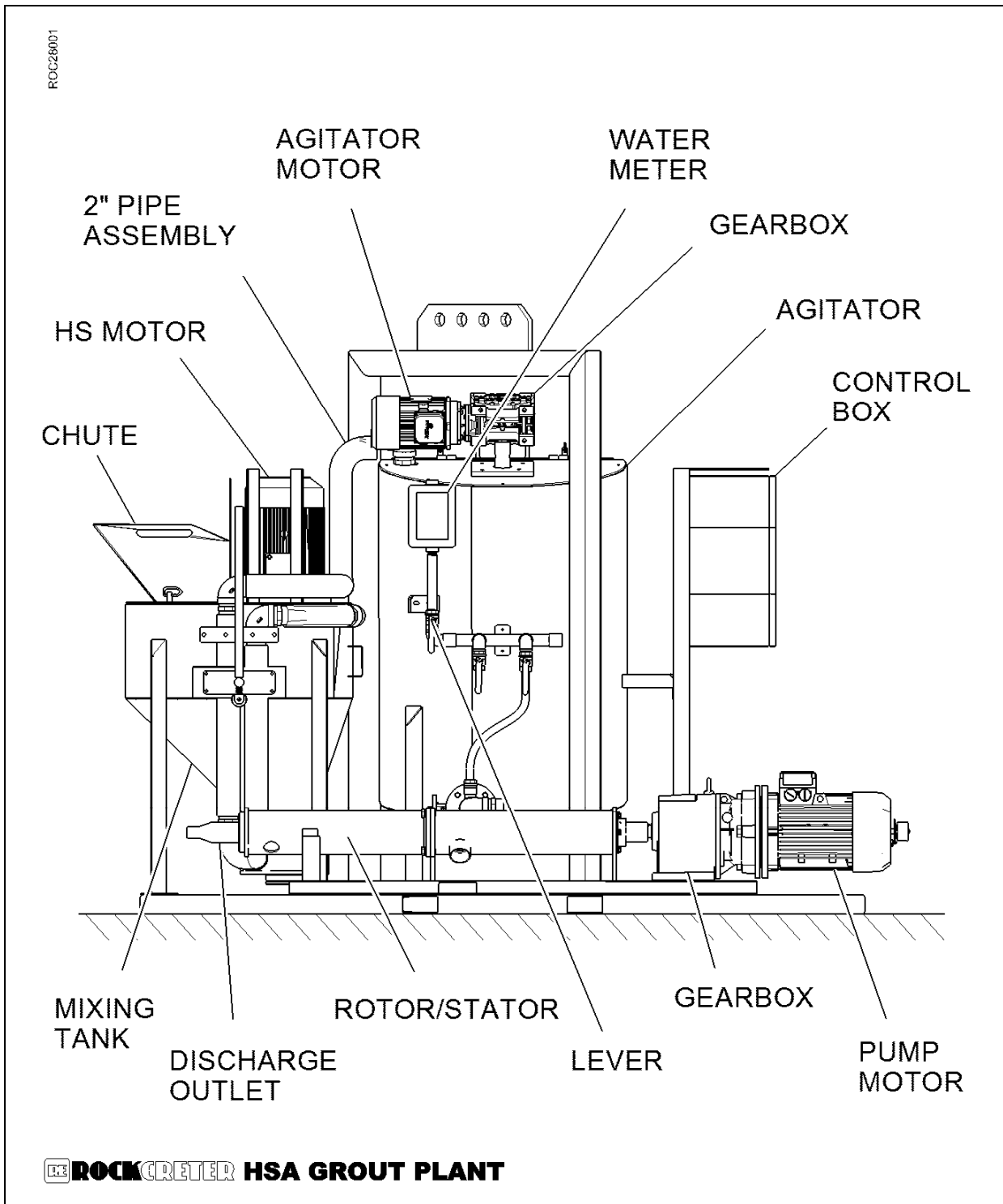


Figure 1

4. OPERATING PROCEDURES

4.1 Set- Up

1. Check for any loose fasteners or fluid leaks.
2. Check for any component wear.
3. Secure the chute onto the top of the mixing tank.
4. Connect the motor cable to the power out connector.
5. Connect the power cable to the main power in connector.
6. Connect the power cable to an appropriate power source.
7. Make sure there is enough water in the mixing tank to cover the pump.

4.2 Priming with Water

1. Attach a water feed hose to the water inlet.
2. Make sure the feed lever is in the recirculating position.
3. Fill the mixing tank with water to the required level needed for the mix.
4. Turn the main power disconnect switch to the "ON" position and allow the mixer to run and prime the pump.
5. Discharge the water into the agitator tank with the outlet valve closed. Watch the mixer agitate.
6. Open the valve to the pump section. Pump water directly into the hose line until it comes out the end.

NOTE: Do not run the high shear pump without water. The pump will overheat and cause damage.

4.3 Mixing

1. The feed lever must be in the recirculating position.
2. The mixing tank must contain enough water for the mix ratio (Refer to the mix ratio table).
3. Switch the high shear mixer on.
4. Add the grout mix gradually to the water through the chute.
5. Allow the mixture to recirculate until it has a smooth uniform texture. It may require multiple passes through the high shear pump to completely blend the mixture.
6. The grout is now ready to pump.

NOTE: Cleaning should be done frequently (every few hours depending on the grout mixture used).

4.4 Agitating

1. The agitation tank holds up to 400 L of mixture, discharge from the HS mixer until full.
2. Ensure agitator switch is in the “ON” position to maintain a smooth consistent mixture.

4.5 Pumping

1. Once ready to pump the grout, ensure the lever valve is in the open position.
2. Turn the pump in the forward position, pumping a relatively slow rate using the VSD to adjust.
3. Watch and maintain a smooth pumping procedure.

4.6 Cleaning

NOTE: Failure to flush prior to material curing in the system will result in damage to the system and may require replacement of all system parts in contact with material.

1. Make sure the feed lever is in the recirculating position.
2. Fill the mixing tank with water and let the high shear pump run.
3. Drain the water from the tank.
4. Switch the mixer off and clean the inside of the tank with a hose and brush.
5. Repeat the tank rinse until the discharged water is clear.
6. Clean any grout spillage on the mixer.
7. Turn the main power disconnect switch to OFF.
8. Dispose of all waste material in accordance with local rules and regulations.
9. Ensure lever valve between the agitator tank and pump is in the closed position. Wash out the tank through the drain plug at the bottom of the tank until visibly clean using the hose provided.
10. Open the drain plug on the pump, and then open the lever valve between the agitator tank and the pump. Allow for clean water to fill and flush through the outlet from the 1” hose that feeds from the water manifold. Once clean water is visible, close the outlet, replace drain plug and pump water through the hose using a cleaning ball. Repeat 3-4 times to ensure all grout has been cleared in the hose.

4.7 Shutdown

1. Disconnect from the power supply.

NOTE: In cold environments, water left in the pump system could freeze and damage the equipment. When working in cold environments, drain all water from the pump system to avoid damage.

4.8 General Maintenance

1. Check the seals for leaks
2. Grease bearings.
3. Clean and remove any grout spillage.
4. Check for wear on the hoses and hose connections.
5. Check all fasteners are correctly tightened.

NOTE: General maintenance intervals will depend on the operating conditions. Extremely wet or dusty conditions will require maintenance more often.

4.9 Mix Ratio Table (This is a guide and is for reference only)

Cement To Sand	Water To Cement	Per 50 KG Of Cement	
		Water (L)	Volume (M ³)
1:0	0.42	22.7	0.29
1:1	0.47	25.0	0.47
1:1.25	0.51	27.4	0.52
1:1.5	0.56	29.5	0.59
1:1.75	0.62	32.9	0.63
1:2	0.66	33.7	0.70
1:3	0.85	41.6	0.93
1:4	1.12	54.9	1.20

5. TROUBLESHOOTING

Fault	Cause	Solution
The rotor/stator pump operates, but output is low.	Pump pressure is too low, stator is too loose.	Tighten stator to achieve suitable pumping pressure.
	Pump pressure is too high, Stator is too tight.	Loosen stator to achieve suitable pumping pressure.
	Stator is worn or damaged.	Tighten stator. If low output continues, replace stator.
	Material hose is clogged.	Clean or replace the material hose.
	Applicator or tip is dirty or clogged.	Clean or replace the applicator or tip.
	Large pressure drop in material hose.	Reduce hose length and/or increase diameter.
Pump does not operate.	Material hose or applicator is obstructed.	Clean or replace the hose or applicator.
	Dried material in pump assembly.	Clean or replace the pump assembly.
Poor finish or irregular spray pattern.	Inadequate air assist air pressure	Adjust the air assist air pressure output on the applicator.
Pump is noisy when pumping.	Pumping water without dish soap or a slicking agent.	Add dish soap or a slicking agent to the water.
	Pump is running with no material or fluid in the hopper.	Add material to hopper or shut off pump.
Erratic accelerated speed.	Material supply exhausted.	Refill the hopper and prime pump with material.
Motor is powered but nothing comes out of the hose.	Pump is packed out with dry or cured material.	Disassemble and clean the pump.
	Hose is packed out with dry or cured material.	Clean or replace the material hose.
Material is too thick to push through the hose without packing out.	Hose is too restrictive.	Thin the mix material thoroughly to a lower viscosity if material supplier allows.
		Use a pump system priming fluid (dish soap or slicking agent) to wet out the system.
		Reduce length and/or increase diameter of hose.

Fault	Cause	Solution
Electric motor will not start or stops during operation.	Loose connections.	Check connections in electrical enclosure. Check for correct voltage supply at the disconnect voltage supply at the disconnect and VFD terminals L1, L2 and L3.
	Motor overload relay trips.	Turn power disconnect switch to OFF and wait one minute for the VSD to reset. Allow the motor to cool if conditions occur frequently.

NOTE

Should you experience any other problems contact your supplier.

A competent and trained person must be in charge of the machine at all times.

ROCKCRETER HSA GROUT PLANT – PRE USE CHECK LIST

Checked by:	
Date:	
Time:	
Section:	
Comments:	

**WARNING: REPORT DAMAGE, DEFECTS
OR FAULTY OPERATION IMMEDIATELY.
DO NOT OPERATE ROCKCRETE PUMP UNTIL
CORRECTED**

	Checked and in order
	Checked and found defective

SAFETY PRECAUTIONS

1. Isolate all electrical connections during inspection and maintenance.
2. Keep hands away from moving parts.
3. Wear all necessary safety gear.

BEFORE STARTING THE ROCKCRETER HSA GROUT PLANT

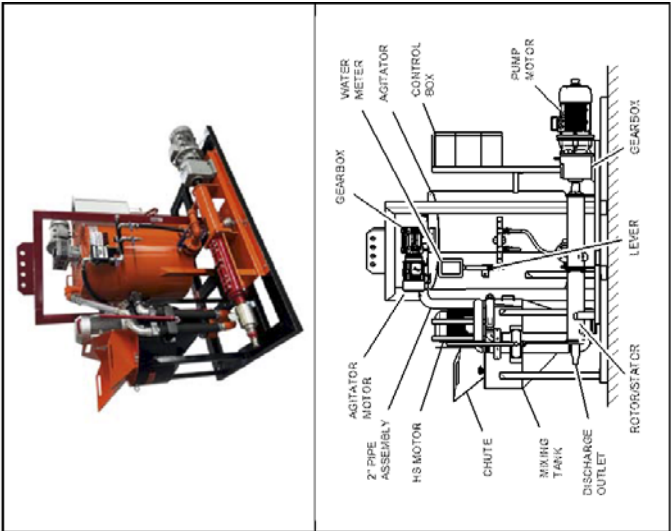
1. Check that water pressure is sufficient.
2. Check all electrical & water connections are in safe working order.
3. Check the rotor/stator, if worn, replace. Apply silicon spray before reassembling.
4. Check discharge, clean & replace if worn
5. Check hoses for any material or blockages before turning on the machine.
6. Check and make sure the sieve is in place and secure.
7. Check shaft for wear
8. Check clamps & gaskets are in place and secure to all fittings
9. Check all grease points are in place, greased and secure

AFTER STARTING THE ROCKCRETER HSA GROUT PLANT

10. Check rotation of H/S, Agitator and pump – anti clockwise
11. Check smooth operation of ROCKCRETER HSA GROUT PLANT

NOTE: ALWAYS KEEP ENOUGH WATER ON SITE FOR CLEANING

ROCKCRETER HSA GROUT PLANT



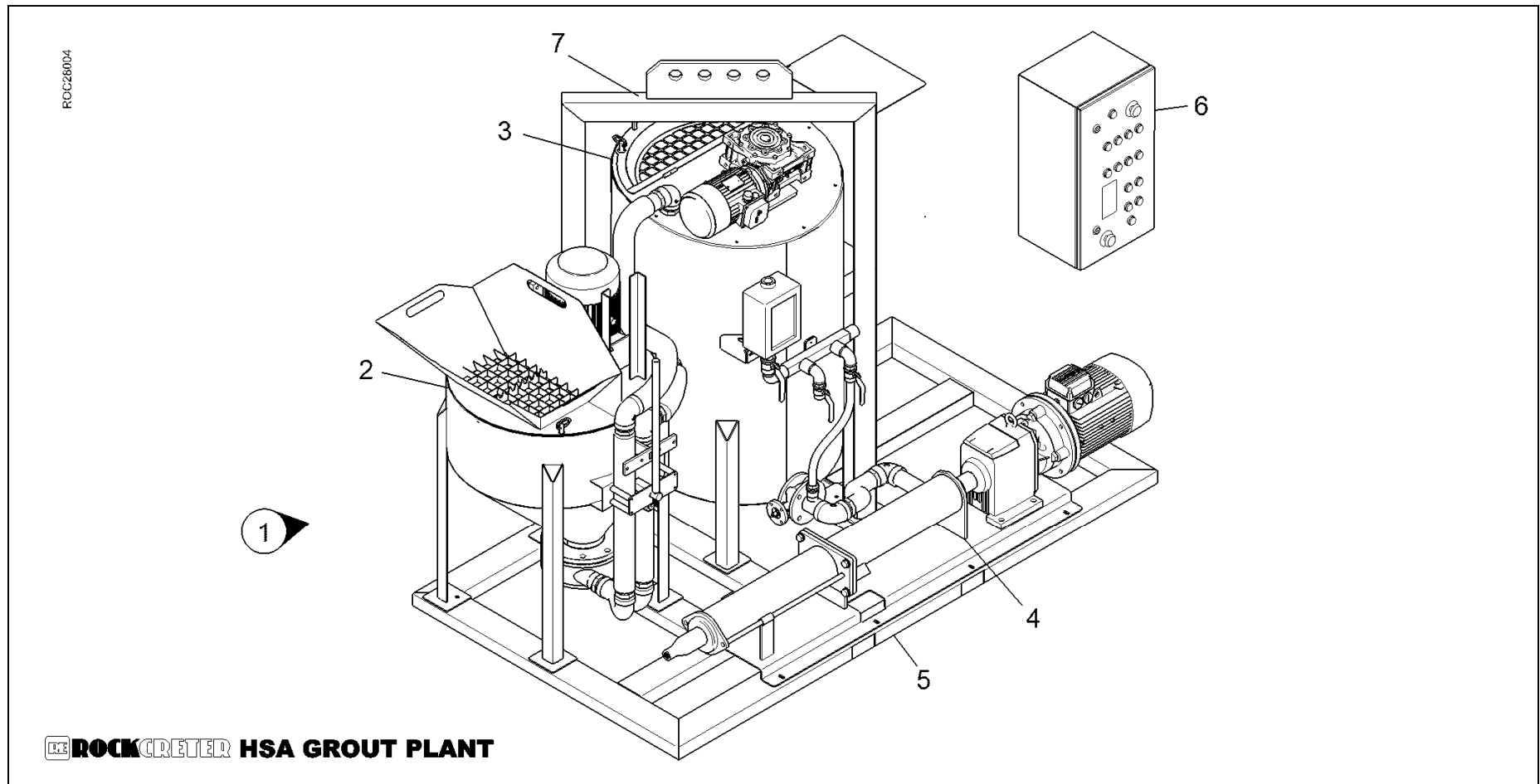
CHECK	GO	NO GO
1		
2		
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11		

ILLUSTRATED PARTS CATALOGUE

CONTENTS LIST

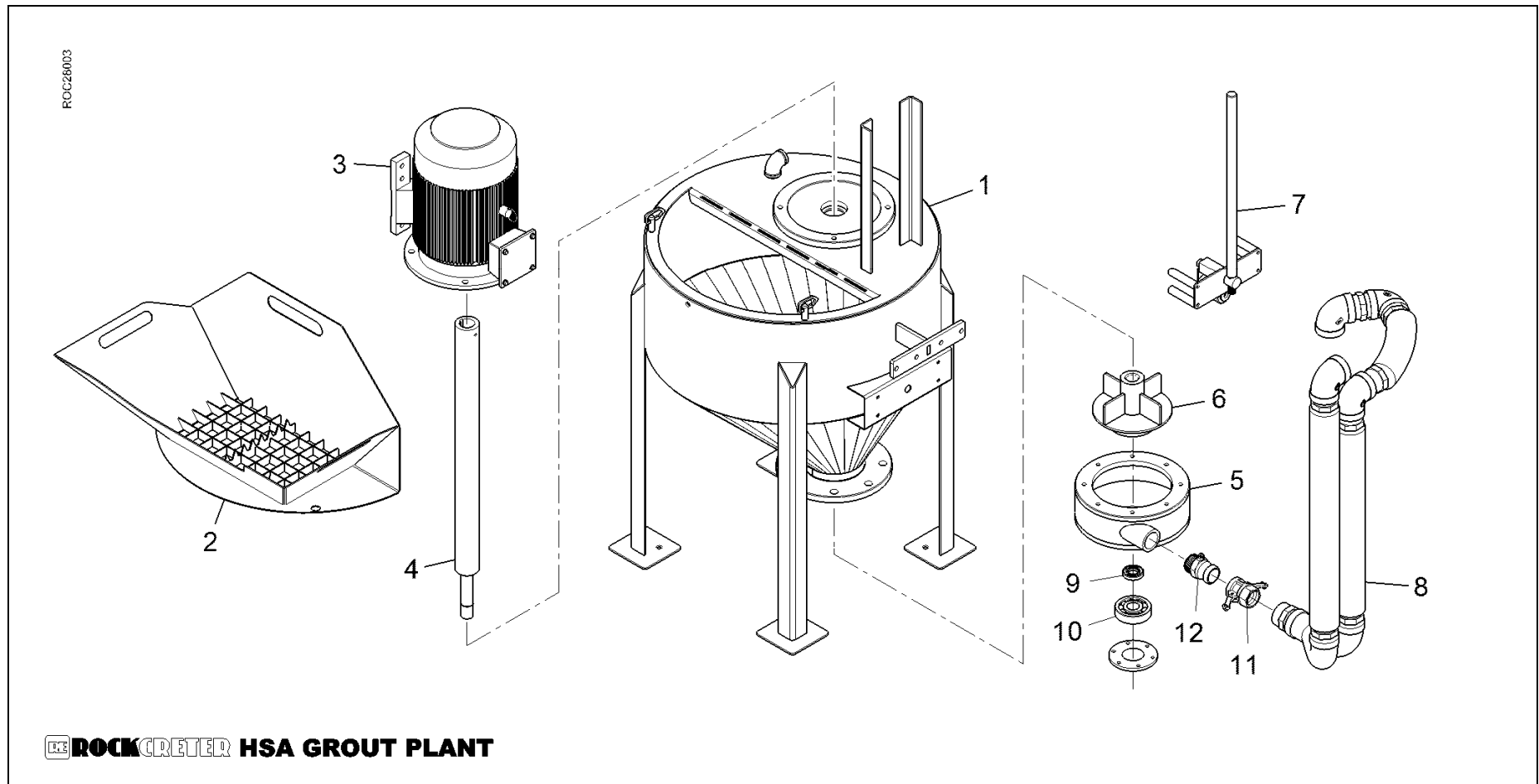
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1. HSA GROUT PLANT



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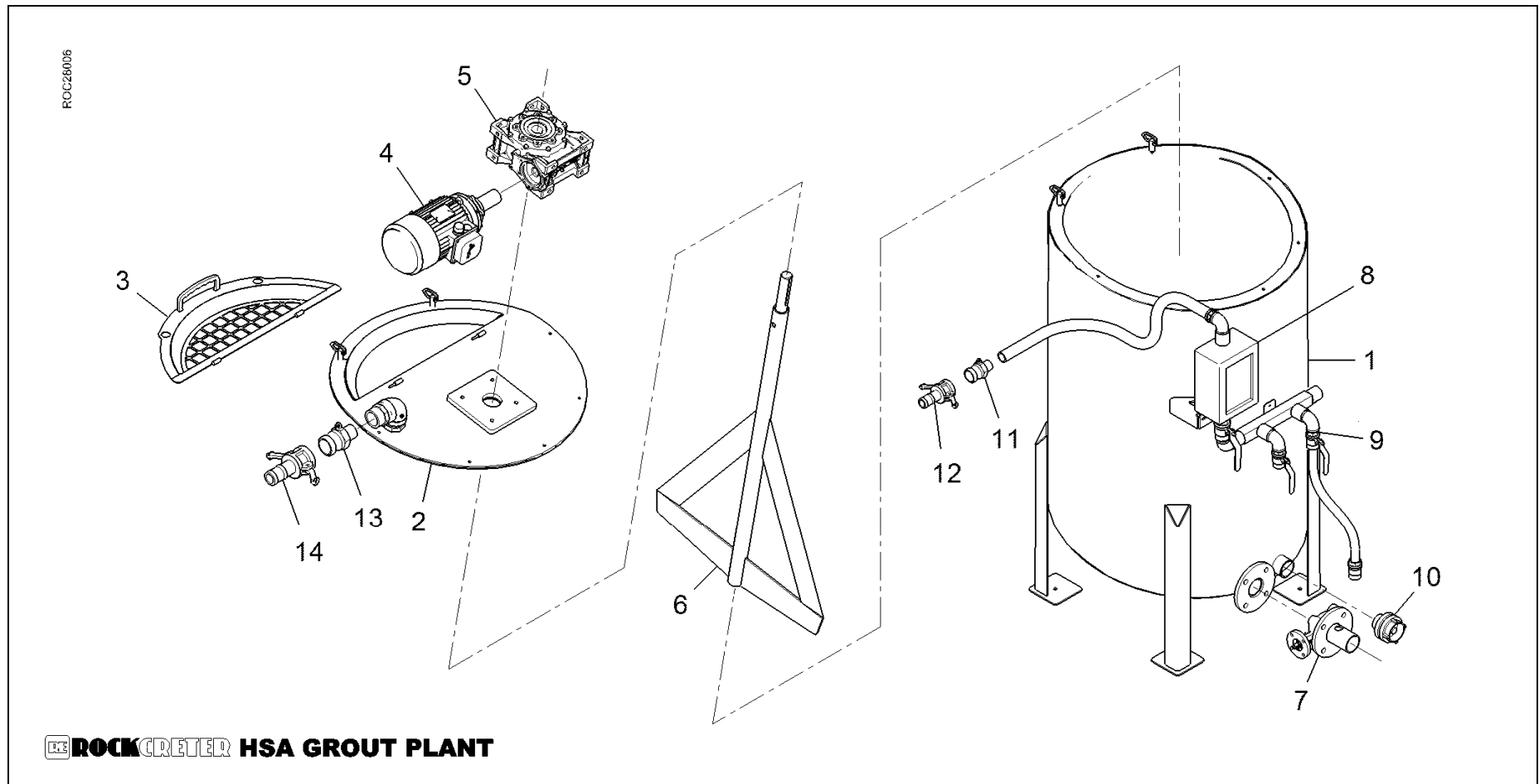
2. HS MIXER ASSEMBLY



2. HS MIXER ASSEMBLY

ITEM NO	DESCRIPTION	PART NO	QTY	COMMENTS
1	MIXING TANK ASSEMBLY	UARCHSM	1	
2	CHUTE ASSEMBLY	EA001HS	1	
3	7.5 KW MOTOR 380V/525V	EA027C/EA028C	1	
4	SHAFT	KGPF007HS	1	
5	PUMP HOUSING	HS001	1	
6	HIGH SHEAR IMPELLER	HSIMP	1	
7	CONTROL LEVER	HS002	1	
8	PIPE/HOSE	E001-1.5	1	
9	BEARING 6406	HS014	1	
10	SEAL 30577	HS011	1	
11	CAMLOCK B200	W006V	1	
12	CAMLOCK F200	W005	1	

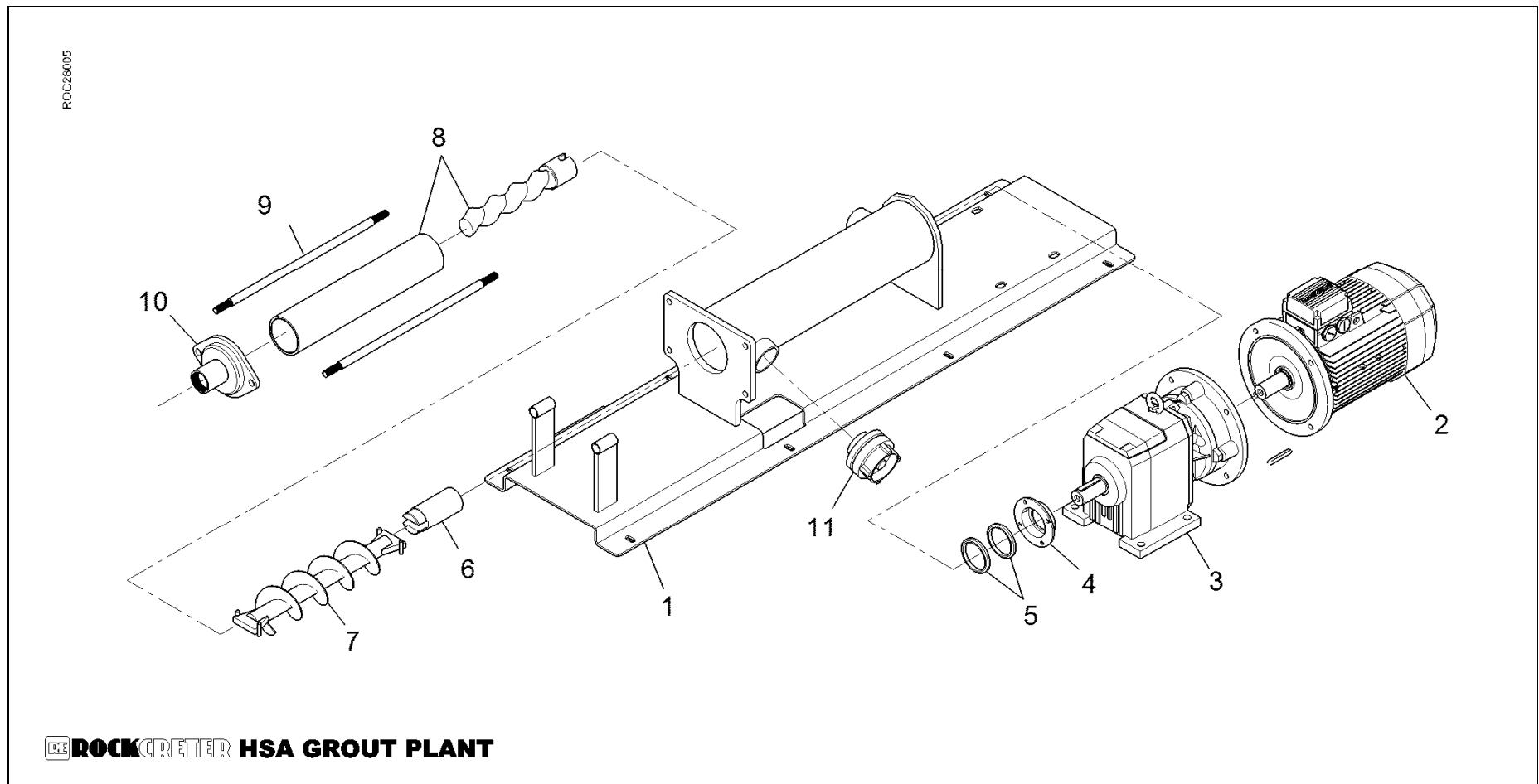
3. AGITATOR TANK ASSEMBLY



3. AGITATOR TANK ASSEMBLY

ITEM NO	DESCRIPTION	PART NO	QTY	COMMENTS
1	AGITATOR TANK ASSEMBLY	UARCA	1	
2	BIN COVER	HSA001A	1	
3	LID	HSA001	1	
4	2.2 KW MOTOR 380V/525V	EA023M-1	1	
5	GEARBOX DRIVE	KGPF202	1	
6	MIXING PADEL	HSA009A	1	
7	VALVE WATER	PV07	1	
8	FLOW METER	KGPF009	1	
9	VALVE	PV05	3	
10	BLIND COUPLING	EA060	1	
11	1" MALE CAMLOCK	W005A	1	
12	1" FEMALE CAMLOCK	W006A	1	
13	2" MALE CAMLOCK	W005	1	
14	2" FEMALE CAMLOCK	W006	1	

4. PUMP ASSEMBLY



4. PUMP ASSEMBLY

ITEM NO	DESCRIPTION	PART NO	QTY	COMMENTS
1	BASE PLATE		1	
2	ELECTRIC MOTOR 11KW 380V/525V	EA027E	1	
3	GEARBOX INLINE	KGPF203	1	
4	STUFFIN BOX	KGPF001-V	1	
5	SEAL	KGPF001D	2	
6	MAIN DRIVE SHAFT	KGPF007A	1	
7	AUGER	KGPF003A	1	
8	ROTOR / STATOR	KGPF005A-1	1	
9	STATOR BOLTS	KGPF017-580	2	
10	DISCHARGE OUTLET	KGPF006A	1	
11	BLIND COUPLING	EA060	1	

