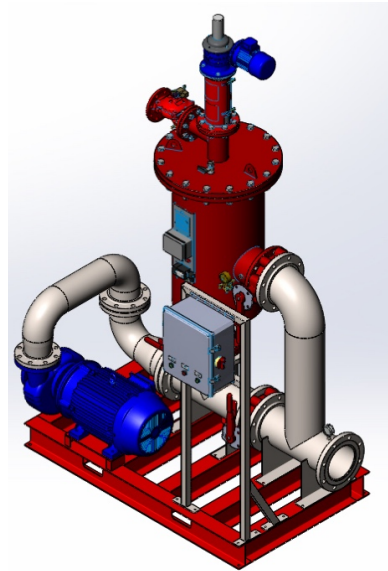


EBS Pre-Engineered HVAC Filter Skids

Installation, Operation and Maintenance Instructions



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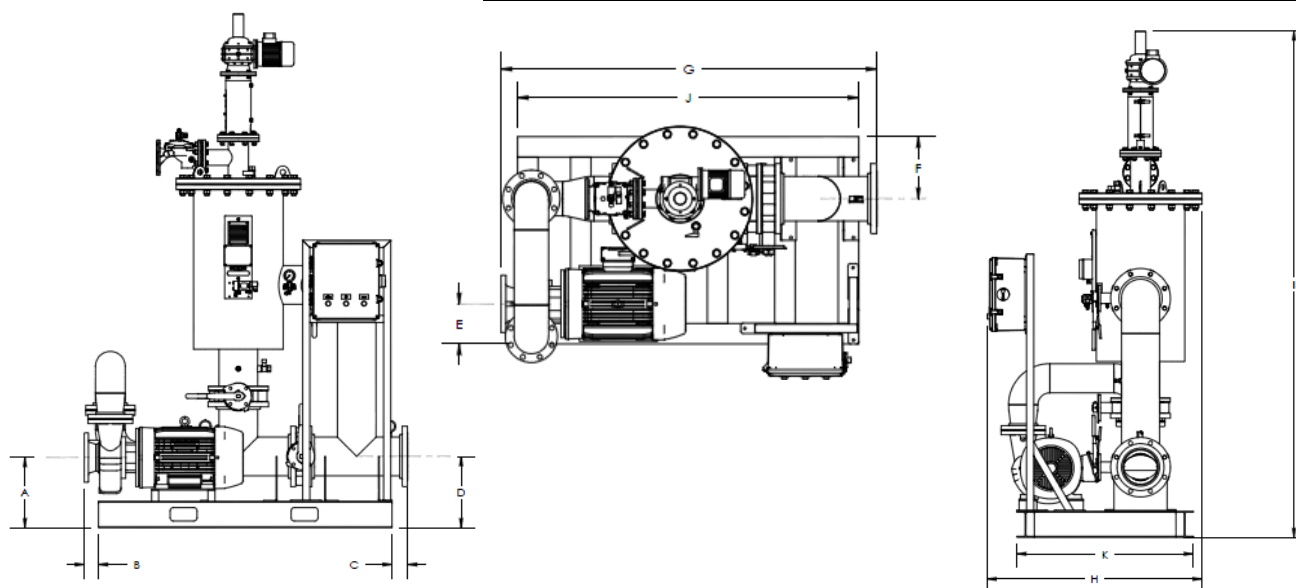
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GENERAL SYSTEM TECHNICAL DATA

General System Specifications

MODEL	Flow Rate (gpm)	EBS Filter	Surface Area (in ²)	Pump HP	Screen micron	Voltage	FLA	PUMP Inlet	Face Pipe	Flush Line	GPM/Gallons		Weight lbs.		
											Flush Flow	Reject per Flush	Filter	Shipping	Operation
EBS 769	769	10000	1500	25	50	230/460	28.4	4" FLG	8"	3" FLG	220	111	1456	1606	2072
EBS 883	883	10000	1500	30	50	230/460	33.7	6" FLG	8"	3" FLG	220	111	1519	1669	2135
EBS 1006	1006	10000	1500	30	50	230/460	33.7	6" FLG	8"	3" FLG	220	111	1519	1669	2135



Dimensions (inches)

MODEL	A	B	C	D	E	F	G	H	I	J	K
EBS 769	14.875	1.812	3.5	15.875	8.875	11.937	71.312	48.5	114.687	65.5	39.875
EBS 883	15.625	3.125	3.5	15.875	7.687	11.937	72.125	48.5	114.687	65.5	39.875
EBS 1006	15.625	3.125	3.5	15.875	7.687	11.937	72.125	48.5	114.687	65.5	39.875

INTRODUCTION

Amiad filtration equipment has been designed to give long, trouble-free service when properly installed, operated and maintained. This manual contains important installation procedures and should be read prior to installing. This manual is also a guide for proper filter operation, maintenance and winterizing. It is important that maintenance personnel review this manual carefully, including the Safety Precautions and Warnings before performing any maintenance on this filter.

Note that the recommendations on the frequency of service are minimums, and where operating conditions are severe, the service should be performed more often. For each required service, follow the procedures outlined under the Maintenance Procedures section in this manual. If additional information beyond the scope of this manual is required, contact your local Amiad Representative or the factory.

SAFETY INSTRUCTIONS

General

1. Prior to installation or work on the filter, please read the installation and operation instructions, carefully.
2. While working on the filter, please observe all conventional safety instructions in order to avoid danger to the workers, the public or nearby property.
3. Please note: the filters may enter a self-cleaning cycle automatically, without prior warning.
4. No changes or modification to the equipment are permitted without express authorization from the manufacturer or its representative. Changes will void warranty with no exception.

Installation

1. Install the filter according to the instructions in this manual.
2. Leave enough clearance for easy access to all components and safe maintenance operations.
3. Electric wiring should be performed by an authorized electrician only, using standardized and approved components.
4. Install a main power cut-off switch close to the control panel.
5. If the control panel cannot be seen from the filter(s), a power cut-off switch should be installed near each filter unit.
6. The filter should be installed in a manner that avoids splashing water on the electrical components or the control panel.
7. Extra safety devices should be installed on hot water applications to avoid scalding.

Operation, control and maintenance

1. Disconnect the filter from power supply before maintenance or working on the unit(s).
2. Release pressure from the unit(s) before loosening or unscrewing bolts.
3. Try to keep the work area as dry as possible to prevent mishaps, possible electrocution or damage to the equipment caused by moisture.
4. Always open and close valves slowly and gradually.
5. Remove grease and fat material residues in order to avoid slipping.
6. Always re-assemble the safety covers of the drive mechanism.
7. When using a high pressure water or steam cleaner to clean a screen manually, follow the device's operation and safety instructions carefully.
8. When using acid or other chemical agents to clean a screen manually, follow the appropriate safety instructions provided by the chemical manufacturer.

Use of lifting equipment

1. While using lifting equipment, make sure that the filter or the lifted part is chained securely and in a safe manner.
2. Avoid working below lifted equipment.
3. Wear a safety helmet while working around lifted equipment.

DESCRIPTION OF FILTER OPERATION

Filtering process:

The EBS series HVAC filter system is a sophisticated yet easy-to-operate automatic filter, with a self-cleaning mechanism driven by an electric motor. The filter system is also equipped with pump, control panel, isolation valves, and check valve all installed on a skid. The EBS filter system is designed to work with various types of screens in filtration degrees from 10 to 500 micron (HVAC STD is 50 micron).

The water enters through the pump inlet into the filters coarse screen from outside in, and through the fine screen from inside out. The "filtration cake" accumulates on the fine screen surface and causes pressure differential to develop.

The coarse screen is designed to protect the cleaning mechanism from large dirt particles and is not cleaned automatically. Usually, it does not accumulate large quantities of suspended solids that will inhibit system flow.

Self-cleaning process:

The EBS will start the self-cleaning process when the pressure differential across the screen reaches a pre-set value or a predetermined lapse of time.

Cleaning of the filter element is carried out by the suction scanner, which rotates in a spiral movement while removing the filtration cake from the screen and expels it out through the exhaust valve.

The scanner rotation is operated by a 2-way (fwd/rev) drive unit which is attached to the scanner by a threaded shaft, providing the linear movement.

The exhaust valve is activated for the duration of the cleaning cycle by a 3-way solenoid. During the self-cleaning process, which takes approximately 35 seconds, filtered water continues to flow out of the filter.

System Operation modes:

The filtration system may be found in one of the following modes:

1. **Filtering mode:** This is the normal operating status. The flush mode is idle and the power light on the control board is lit.
2. **Self-cleaning mode:** The motor and exhaust valve are activated according to the previously described self-cleaning process.
3. **Malfunction mode:** If the filter malfunctions, the self-cleaning operation stops and the malfunction light on the control board is turned on.

The filtration system enters a malfunction mode under any of the following conditions:

- 1st. A continuous signal from the pressure differential switch longer than the PD fault time-out (default value=15 minutes) indicates that the filter is unable to clean itself.
- 2nd. The pump or drive motor Over Load Protector was activated, either manually or due to actual over load.
- 3rd. Limit Switch malfunction – usually, simultaneous activation of both limit switches.

Initiation of self-cleaning:

The filter initiates the self-cleaning process under any one of the following conditions:

1. Pressure differential (PD) – The Pressure Differential Switch (PDS) closes a free potential contact signal when the pressure differential across the screen reaches the pre-set value (usually 0.5 bar = 7 psi). The control board registers the signal and activates the self-cleaning cycle.
2. Test - Manually pressing the "TEST" push button on the control board door activates a single self-cleaning cycle.
3. Timed – The timer in the control panel activates the self-cleaning cycle at time intervals, regardless of the pressure differential. The timer resets after every cycle. The PD mode is active in this mode as well.

Stages of cleaning cycle:

Under normal operating condition the electrical control panel operates the "EBS" filter in the following manner;

1. The exhaust valve opens to atmosphere.
2. Five seconds delay.
3. The motor starts rotating the suction scanner shaft upward until it reaches the upper limit switch.
4. The exhaust valve closes.
5. Two seconds delay.
6. The motor starts rotating the suction shaft downward until it reaches the lower limit switch.

INSTALLATION

Design recommendations

1. If flow increases and pressure drops dramatically for a long period of time during network filling-up, it is recommended that a pressure sustaining valve is installed downstream of the filter. The pressure sustaining valve will ensure a controlled filling-up of the line.
2. If continual water flow is essential even during maintenance period, it is recommended that a manual or automatic by-pass is installed, and the isolating valves will be used to isolate each filter.
3. In places where there is an expected temporary worsening of water quality, it is possible to operate an emergency flushing program. In order to do so, a hydraulic controlled valve has to be installed downstream of the filter. For details, please consult the manufacturer.

Installation instructions

1. Before beginning the installation process, carefully read the safety instructions in chapter 2 of this document and make sure that all the workers at the installation site are fully aware of and comply with, these and any other local safety instructions.
2. Select a convenient location for the installation of the filter where operation and maintenance will be optimal. It is recommended that a standard and safe lifting auxiliary is available for maintenance.
3. Install the filter vertically. Please note that a minimum clearance of 300 mm (12 In.) (Not including a crane) is required in order to allow disassembly of the unit.
4. Ensure that the direction of flow is aligned with the arrows marked on the filter housing. (Flow outlet will always be from the side; flow inlet is from the bottom).
5. Installation of a mechanical non-return valve downstream of the filter is required.
6. If possible, prior to installing the filter, thoroughly flush the main line at the connection point in order to remove large objects that may damage the filter's internal mechanism.
7. Install a drainage pipe to the exhaust valve. Minimum 3" diameter for a maximum pipe length of 20 meters (60 feet), for longer drainage, 4" pipe diameter must be used for a maximum length of 40 meters (120 feet). Please note that no restriction is allowed on the drainage pipe. For special applications, please consult the manufacturer.
8. The user should arrange suitable lighting in the vicinity of the filter to enable good visibility and safe maintenance.
9. The user should arrange suitable platforms and safety barriers to enable easy access to the filter without climbing on pipes and other equipment. All such equipment should comply with the safety clauses of the relevant local standards.

IMPORTANT!!

- ♦ Prevent static backpressure or reverse flow through the filter.
- ♦ Install a non-return valve at the outlet of the filter.
- ♦ Install a manual or a hydraulic valve downstream of the filter.

Electric wiring

1. All electrical works at the installation site must be done by a qualified and authorized electrician only. Make sure that this electrician is fully aware of all the relevant safety instructions.
2. Install the control board in a dry and protected place (In out-door installation sites make sure to use a special control board for out-door installation).
3. **Power connection to the control board:**
 - a. Connect a three-phase voltage source through a semi-automatic switch, or 16 Amp. fuse to the L1 L2 L3 inlet at the terminal strip in the control board.
 - b. Earth the control board.
4. **Power connection to the motor:**

Connect the drive unit to the control panel by means of a 4 x 2.5 mm (12 or 14 AWG) wire in flex-conduct. Use a long enough cable to allow the drive unit to be removed and placed near the filter for maintenance, without having to disconnect it from the cable. (It is recommended that this installation meets or exceeds local or national electrical codes, this is a "high" voltage connection).
5. **Control wiring:**

The connection between the control junction box and the control board should be by 6 x 1.5 mm² (16 AWG) wire in flex-conduct. The numbers on the terminals in the board and in the junction box are identical.

COMMISSIONING, START-UP AND FIRST OPERATION

1. Before starting-up the filter read the safety instruction as appear at chapter 2 of this document and pay special attention to the commissioning safety instructions.
2. Inspect the filter's installation and make sure that it is installed in accordance with the official installation drawings.
3. Verify (by authorized electrician only) that the electric wiring is correct and complies with the enclosed drawings. Make sure that the electrical start-up operation is done by an authorized electrician only.
4. Switch the control & 24V circuit breakers. Leave the motor OL protector OFF.
5. Toggle all limit switches to verify that they activate the correct inputs on the PLC according to the wiring schematic. Correct connections, if necessary, before proceeding to the next step.
6. Switch ON the motor protector O.L. The motor will start operating.

The suction scanner shaft should turn clockwise and move downward to the filter housing until it reaches the lower limit switch. If the motor rotates in the opposite direction, disconnect the electricity immediately and change the direction of the motor rotation by changing between two phases.

The motor must stop when the limit switch plate reaches the lower limit switch and causes it to operate.
7. Operate a "dry" flushing cycle by pressing on the "TEST" push button. Make sure all flushing stages occur as described in the filter description chapter of this manual.
8. Open the inlet valve to the filter, while the outlet valve remains closed or with an open by-pass valve (This will keep the flow in the filter at a minimum), and operate a flushing cycle.

Make sure the exhaust valve opens and all stages of the flushing cycle are carried out. Attend to leakage, if any.
9. Gradually open the outlet valve and/or close the by-pass valve. Operate the filter at the designed hydraulic conditions.
10. Set the timer for 6-8 hours.
11. Check and re-tighten all bolts after the first week of operation.

MAINTENANCE

Before beginning any maintenance procedure, carefully read the safety instructions chapter of this document and make sure that all the workers at the filtration site are fully aware of and comply with, these and any other local safety instructions.

General inspection of the filter operation

This is the visual basic general inspection procedure of the filter for proper operation. It should be done regularly and prior to any scheduled maintenance procedure.

Press the test button, this will initiate the self-cleaning cycle; Check that the exhaust valve opens, that the scanner moves upwards, and when it reaches the top limit switch - verify that the exhaust valve closes.

Weekly maintenance

Visual Check:

1. Check that the filter operates properly by following the General Inspection of the Filter Operation as described above.
2. Visually check that there is grease on the drive shaft, and drive bushing.
3. Visually check the suction scanner for any leakage.
4. Visually check the filter housing, the valves and the check-valves for leakage.
5. Check the filter for loosen bolts.

If Necessary:

1. Disconnect and lock the filter's power supply.
2. Disconnect and lock the filter's compressed air supply.
3. Disconnect the filter from the water supply and drain the filter housing.
4. If it is necessary, add grease to the filter's suction scanner shaft.
5. Take care of any leakage from the scanner shaft. If necessary, replace the Sealing Flange Internal O-Ring (5 on page 23) as described at the following list:
6. Reconnect the filter carefully and safely to its water, air and power supply.
7. Perform a General Inspection of the Filter Operation as described above.

Changing the sealing flange internal O-ring

1. Close the inlet valve to the filter and release any residual pressure.
2. Disconnect and lock the filter's power supply.
3. Disconnect and lock the filter's compressed air supply and release any residual pressure.
4. Verify that the Suction Scanner is in its lower position. If not remove the electrical motor rear fan-cover, turn the fan manually till the scanner's limit switch plate reaches the lower limit switch.
5. Remove the Split pin (19) and pull out the connecting pin (18).
6. Turn the motor-fan till the drive shaft reaches half way of its movement. The drive shaft is now separated from the Suction Scanner.
7. Unscrew nuts (20 on page 23) and pull the sealing flange (4 on page 23).
8. Remove the used internal O-ring and clean the O-ring seat.
9. Insert a new O-ring (5 on page 23)
10. Apply some grease to the external O-ring and to the shaft.
11. Tighten the sealing flange nuts (20 on page 23).
12. Re-connect the drive shaft to the suction scanner shaft.
13. Reassemble the motor fan cover.
14. Make sure that the filter is correctly reassembled; re-connect the power and the compressed air.
15. Operate the control board and open the filter inlet valve.

Maintenance prior to long term cessation of filter operation

The following must be done if the filter will not be operated for more than a month.

1. Operate flushing cycle (If possible, with a closed downstream valve).
2. Disconnect the control board from the power and lock the main switch before the limit switch disc reaches the switch.
3. Release pressure from the filter.
4. Disconnect the compressed air supply and lock the main switch.
5. Grease the drive shaft and the drive bushing.

Maintenance prior to re-operation

1. Make sure that the filter is disconnected from power, compressed air and water supply.
2. Grease the drive shaft and the drive bushing.
3. Connect the control board to the mains.
4. Connect the compressed air supply.
5. Connect the filter to its water supply.
6. Perform a General Inspection of the Filter Operation as described above.
7. If necessary, change the Sealing Flange Internal O-Ring as described above.

Every Six Months

Before beginning this maintenance procedure, carefully read the safety instructions chapter of this document and make sure that all the workers at the filtration site are fully aware of and comply with, these and any other local safety instructions.

1. Perform a General Inspection of the filter Operation as described above and carefully inspect the filter visually for:
 - a. Proper operation
 - b. Any leakage from the filter housing or accessories
 - c. Abnormal or unusual noises
 - d. Loosen bolts
 - e. Non smooth turning of the suction scanner
 - f. Unusual load on the filter electrical motor
 - g. Any sign of corrosion on the filter housing or accessories
 - h. Unusual vibrations
 - i. Non smooth operation of the filter valves, air release valves and check-valves
2. Close the inlet and the outlet valves of the filter. Drain the filter housing and release any residual pressure.
3. Disconnect and lock the filter's power supply.
4. Disconnect and lock the filter's compressed air supply and release any residual pressure.
5. Disassemble the filter as described in the next chapter of this document.
6. Inspect the filter screen and components for any wear and tear.
7. Check the suction scanner and its nozzles.
8. Check the filter bearings.
9. Check the filter housing and lid for any sign of corrosion.
10. Check the filter internal and external coating and pain for damage
11. Replace any damaged component
12. Make sure that your maintenance engineers are aware of even the slightest sign of corrosion in the filter housing, lid or accessories. In such case consider performing a standard pressure vessel tests as required by your local applicable standards.
13. Re-assemble the filter as described in the next section of this document.
14. Perform a complete COMMISSIONING, START-UP AND FIRST OPERATION as described earlier in this document.

IMPORTANT!

THE DRIVE SHAFT MUST BE LUBRICATED WITH HEAVY-DUTY, WATER RESISTANT GREASE THAT WILL NOT OXIDIZE. (SHELL, DARINA EP-2 OR SIMILAR)

TROUBLESHOOTING

Before beginning any troubleshooting, carefully read the safety instructions chapter of this document and make sure that all the workers at the filtration site are fully aware of and comply with, these and any other local safety instructions.

The filtration system may enter a malfunction mode in the following cases:

Symptom	Remarks and Actions
<p>Fault due to continuous signal from the pressure differential switch for duration of more than 15 minutes.</p> <p>The fault indication lamp is lighted in red.</p>	<p>This fault means that the self-cleaning process is not successful.</p> <p>This fault may be caused by one of the following reasons:</p> <p>A. The filter is clogged due to heavy dirt load or too high water flow rate.</p> <ul style="list-style-type: none"> ○ Close the filter's downstream valve. ○ Press the reset button to reset the fault mode. The fault indication lamp is turned off. ○ Perform few consecutive manual self-cleaning cycles and monitor the PD signal. ○ Once the filter is clean gradually open the downstream valve and monitor the PD and the flow-rate. Make sure that the filter doesn't exceed its designated flow-rate. <p>B. The PD switch is faulty.</p> <ul style="list-style-type: none"> ○ Ask your qualified electrician to check the PD connections and operation. ○ Replace the switch if found faulty.
<p>The motor protector was activated.</p> <p>The fault indication lamp is blinking in red.</p>	<p>This fault means that the motor was operated under too high load.</p> <p><u>Note:</u> All the following checks and actions should be done by a qualified electrician only.</p> <p>A. Check the motor power consumption when not loaded.</p> <p>B. Check the limit switches for correct operation and verify that each one of them stop the motor at its designated point.</p> <p>C. Verify 3 phase power to the control board and the motor.</p> <p>D. Disconnect the drive unit from the suction scanner shaft and verify free turning of the suction scanner</p> <p><u>Note:</u> If during this fault a request for self-cleaning is received (Manual, Time or DP) the blinking lamp switches to constant red.</p>
<p>Malfunctioning limit switches</p> <p>The fault indication lamp is blinking in red</p>	<p>Faulty limit switch may not stop the motor at the right point and therefore the motor protection may be activated.</p> <p>Receiving signal from both limit switches at the same time causes fault.</p> <p>A. Check that the limit switches are not mechanically stuck.</p> <p>B. Ask your qualified electrician to check the wiring and the functionality of the limit switched.</p> <p><u>Note:</u> If during this fault a request for self-cleaning is received (Manual, Time or DP) the blinking lamp switches to constant red.</p>
<p>The fault indication lamp is blinking in red after the reset button is pressed</p>	<p>This means that the mechanical/electrical fault still exists.</p> <p>(Overload or Limit Switches fault)</p>

DISMANTLING AND ASSEMBLING THE FILTER COMPONENTS

Opening the filter and disassembling its inner components is necessary for changing screens, periodic maintenance and repairs.

Prior to opening the filter, it is recommended to initiate a flushing cycle by pressing the "TEST" push button.

Before beginning any maintenance procedure, carefully read the safety instructions in chapter 2 of this document and make sure that all the workers at the filtration site are fully aware of and comply with, these and any other local safety instructions.

Dismantling:

1. Disconnect the electrical power and lock the main switch.
2. Close off the water and drain the filter housing.
3. Disconnect the compressed air supply, lock the main switch and release the residual pressure.
4. Unscrew the bolts of the exhaust valve, disconnect the air pressure tubes and remove the valve.
5. Unscrew bolts (26) and remove the drive unit (25). Put the drive unit on a dry and protected surface near the filter. If the electric cable is not long enough, disconnect it from the motor.
6. Pull out the split pin (19) from the connecting pin (18) then pull out the connecting pin. If the connecting pin is not facing one of the shaft housing windows, turn the drive shaft (3 on page 23) a little. Use 17mm or 11/16 spanners.
7. Turn the drive shaft (3 on page 23) counter clockwise so that it will be separated from the suction scanner shaft (2 on page 24).
8. Unscrew bolts (10 on page 23) and remove the limit switches sling (9 on page 23) without disconnecting and changing the limit switches position.
9. Unscrew bolts (20) connecting the shaft housing (17) to the filter lid (12).
10. Pull up the shaft housing. Put it near the filter, make sure not to damage the limit switches electric wires. If necessary, disconnect the wires from the connecting box (48). (Do not forget to mark all wires for proper reconnections).
11. Unscrew the housing bolts (13) and pull the lid using a crane or other lifting device, make sure that it is located exactly above the lid center. Make sure that the lifting device is a standard device, operated by an authorized operator in accordance to all relevant safety standards. Never lift any filter component above people or equipment.
Note: the lid must be lifted vertically while maintaining its horizontal position; this prevents damage to the suction scanner and the upper bearing seals.
12. Pull the scanner (8) and the screen (7) (including screen seals 6); make sure that extracting the screen is done according to the following description.

Extracting the Screen

Before handling the screen, carefully read the safety instructions chapter of this document and make sure that all the workers at the filtration site are fully aware of and comply with, these and any other local safety instructions. Please note that the screen is heavy and in order to avoid damage and injury it should be lifted only with Amiad's standard Extractor and a standard lifting device operated by an authorized operator.

1. Clean and dry the rubber pads on the Extractor

2. Fold the Extractor upwards (Figure 1).



Figure 1

3. Insert the Extractor into the screen, about a quarter from top. Make sure that the extractor cushions do not touch the stitch found along the screen interior.
4. Pull the extractor up so that it is firmly set against the inside wall of the Screen (Figure 2)



Figure 2:

5. Attach a lifting device to the ring on the Extractor, and extract. Never lift the screen above people or equipment.

REASSEMBLING THE EBS FILTER

Before reassembling, visually check that all components are complete and in good mechanical condition.

Before reassembling, carefully read the safety instructions in chapter 2 of this document and make sure that all the workers at the filtration site are fully aware of and comply with, these and any other local safety instructions.

1. Install the seals (6) on the screen (7) and insert the screen into the filter housing (1). Make sure to handle the screen according to the description provided in the "Extracting the Screen" section above.
2. Position the scanner (8) in the filter housing. Make sure the lower shaft goes through the bearing (4).
3. Apply some grease to the suction scanner shaft (2 on page 24) and to the O-rings (3 and 5).
4. Lower the filter lid (12) carefully toward the filter housing (1) in a horizontal position. Make sure the lid is centered with the suction scanner.
5. For centering the lid properly use the two centering sleeves together with two bolts (13) in opposite positions.
6. Screw the rest of the housing bolts (13). Tightening opposite positioned bolts will achieve proper sealing.
7. Locate the O-ring (16) in its groove under the shaft housing (17). Place the bolts (20) but do not yet tighten them firmly.
8. Turn the drive shaft (3 on page 23) clockwise until it reaches the suction scanner shaft. Insert the connecting pin (18) into the hole in the drive shaft through the suction scanner shaft hole.
9. Insert the split pin (19) in its original position.
10. Make sure that the drive shaft key (23) is in its place. Apply grease to it and reassemble the drive unit (25).
11. Firmly tighten the shaft housing bolts (20) and the drive unit bolts (26) in a controlled and balanced method.
12. Reassemble the limit switches sling (9 on page 23); make sure the limit switches (14 on page 23) are tight in their place.
13. Reassemble the exhaust valve and air tubes.
14. Make sure that all bolts are tightened.
15. Switch on the compressed air supply and switch on the power. The motor will run until limit plate (2 on page 23) reaches the lower limit switch.
16. Press the "test" push button and make sure the filter works according to the stages of the cleaning cycle.
17. Slowly turn on the water, watch and eliminate any leaking.

PARTS SCHEDULE Section 1 (1)

No.	CAT. No.	DESCRIPTION	Qty.	Material
1	710105-XXXXXX	Housing EBS10K Improved PKPK-3002	1	ST.37-2
2	710105-001639	EBS-10 Mega Screen Support Cast-Iron Amerlock ID-7035	1	Cast Iron
3	770102-000126	O-Ring Seal (P2-237) Nat	1	NBR
4	710103-002924	Lower Bearing EBS-40000/EBS-15000	1	Delrin
5	770101-000059	O-Ring Seal 71x5 (Upper Bearing Disc EBS) NBR "S"	2	NBR
6	770104-000076	Shaped Seal Hydraulic AM-04 NR (EBS-10000 Screen) NBR	2	NBR
7	700101-XXXXXX	Weavewire St316 10000sq.cm screen for EBS- 10K	1	S/ST 316L
8	700190-002641	SLN Suction Scanner Assembly With Internal Filter EBS-10K	1	Various
9	770102-000188	O-Ring Seal P 2-471 NBR	1	NBR
10	710103-002611	Upper Bearing (EBS)	1	Delrin
11	770102-000077	O-Ring Seal P2-041, External Upper Bearing NBR	1	NBR
12	710105-XXXXXX	Lid EBS-10000 Filter Epoxy PKPK-3002	1	ST-37.2
13	760101-000375	Hex Bolt Partial Thread M22X100 Zinc Plated C/ST	16	Zinc Plated
14	760103-000079	Flat Washer M22 DIN125 Zinc Plated C/ST	32	Zinc Plated
15	760102-000069	Hex Nut M22 Zinc Plated C/ST DIN934	16	Zinc Plated
16	770102-000168	O-Ring Seal P2-433 (Drive Unit Adaptor EBS H- SAF) NBR N/F	1	NBR
17	700190-002571	EBS-10K Drive Shaft Assembly, Red	1	Various
18	710103-002542	Connecting Pin EBS	1	S/ST 316L
19	760105-000038	Split Pin 2X20 DIN 94 S/ST304	1	S/ST 304
20	760101-000328	Hex Bolt Partial Thread M16X60 Zinc Plated C/ST	8	Zinc Plated
21	760103-000069	Flat Washer M16 DIN125 Zinc Plated C/ST	32	Zinc Plated
22	760102-000067	Hex Nut M16 Zinc Plated C/ST DIN934	16	Zinc Plated

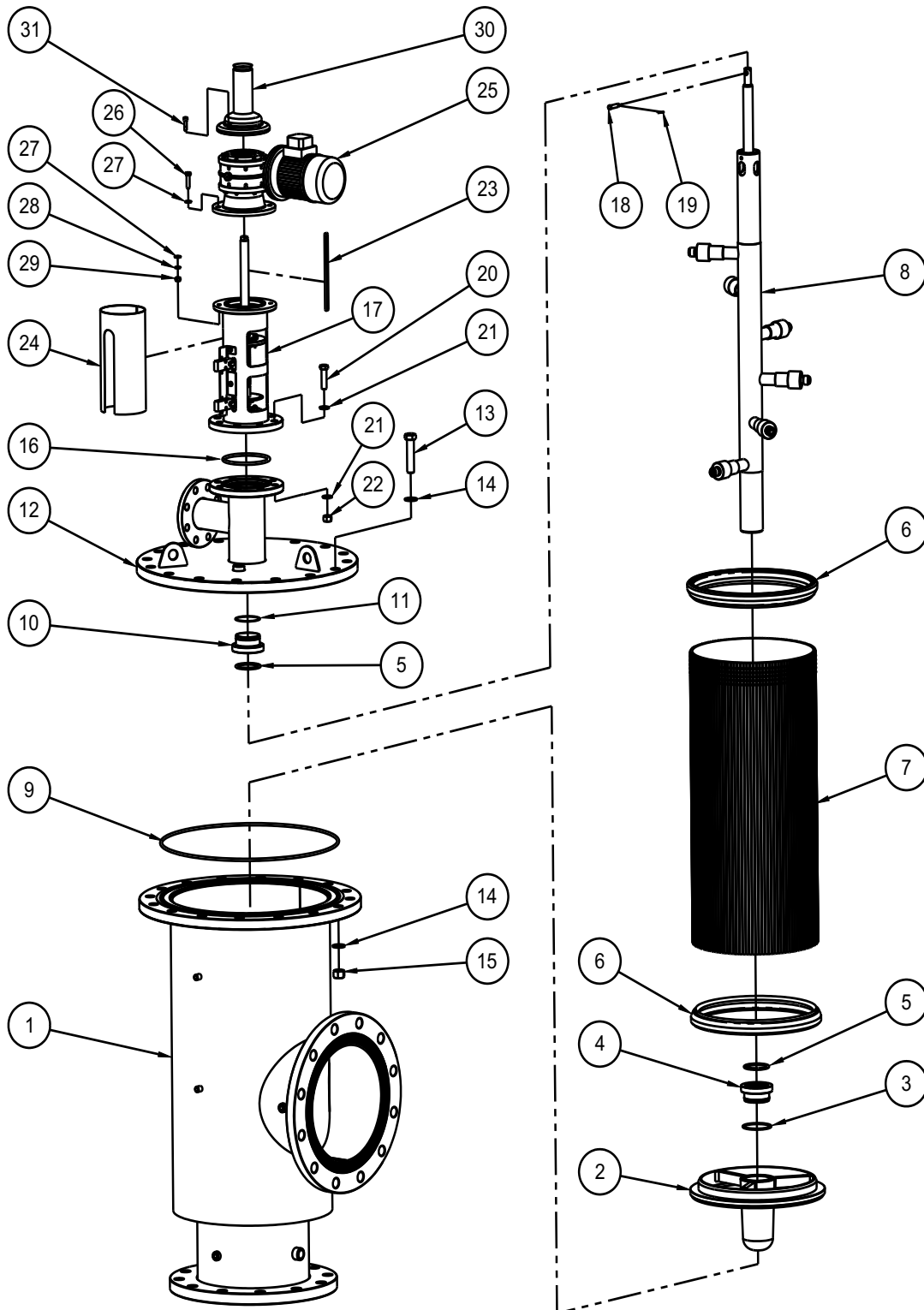
No.	CAT. No.	DESCRIPTION	Qty.	Material
23	710103-002541	Drive Shaft Key (EBS)	1	Brass
24	710105-001474	Drive Shaft Housing Cover Epoxy PKPK-3002	1	ST.37-2
25	720201-000022	Drive Unit EBS-10000 3-Ph 0.375Kw 1400RPM RMI70 1/70	1	Various
26	760101-000314	Hex Bolt Full Thread M10X40 Zinc Plated C/ST	4	Zinc Plated
27	760103-000067	Flat Washer M10 DIN125 Zinc Plated C/ST	8	Zinc Plated
28	760103-000086	Spring Washer M10 ZINC PL. C/ST	4	Z.PLATED C/ST
29	760102-000064	Hex Nut M10 Zinc Plated C/ST DIN934	4	Zinc Plated
30	710105-001582	EBS Drive Shaft Cover,Red,Gear EPOXY PKPK-3002	1	ST.37-2
31	760101-000524	Socket Head Cap Screw M8X30 S/ST316 DIN912	2	SST316L
32	700190-002336	Manometer Valve 1/4" W/Drain	1	Brass
33	720501-000214	T-Connector 1/4" FxFxM (Brass)	2	Brass
34	720501-000202	L-Connector 5/16"X1/4"	4	Brass
35	730104-000202	Valve 3-Way 1/4"	1	Brass
36	720501-000204	L-Connector 5/16"X1/8"	3	Brass
37	720301-000044	Pressure Gauge 1/4" (DI) w/PSI, Bottom Inlet	1	Brass
38	720501-000206	Connector 5/16"x1/4"	2	Brass
39	730104-000220	Ball Valve 3/4" M/F (BRASS)	2	Brass
40	710103-002659	Bracket Plate For Cast-Iron EBS	1	S/ST 304
41	760101-000602	Hex Bolt Full Thread M6X15 S/ST316 DIN933	2	SST316L
42	760103-000109	Spring Washer M6 DIN127 S/ST316	2	S/ST 316
43	760103-000094	Flat Washer M6 DIN125S/ST316	2	SST316
44	900103-000020	Aluminum Amiad Nameplate, CE, EN	1	Aluminum
45	760105-000036	Rivet Blind 3x6 DIN7337 S/ST316	4	S/ST 316
46	700190-002568	Electrical Junction Box EBS	1	PP
47	760101-000531	Phillips Pan Machine Screw M5X16 304	4	SST304
48	760103-000093	Flat Washer M5 DIN125 Zinc Plated C/ST	4	SST304

No.	CAT. No.	DESCRIPTION	Qty.	Material
49	760102-000084	Hex Nut M5 S/ST304 DIN934	4	SST304
50	700190-002618	PD Sub-Assembly Midwest w/o Fitting & Electric Cable	1	Various
51	720501-000213	Connector 5/16"x1/8"	2	Brass
52	770103-000046	Flange Gasket 3" 124X92 NBR	1	NBR

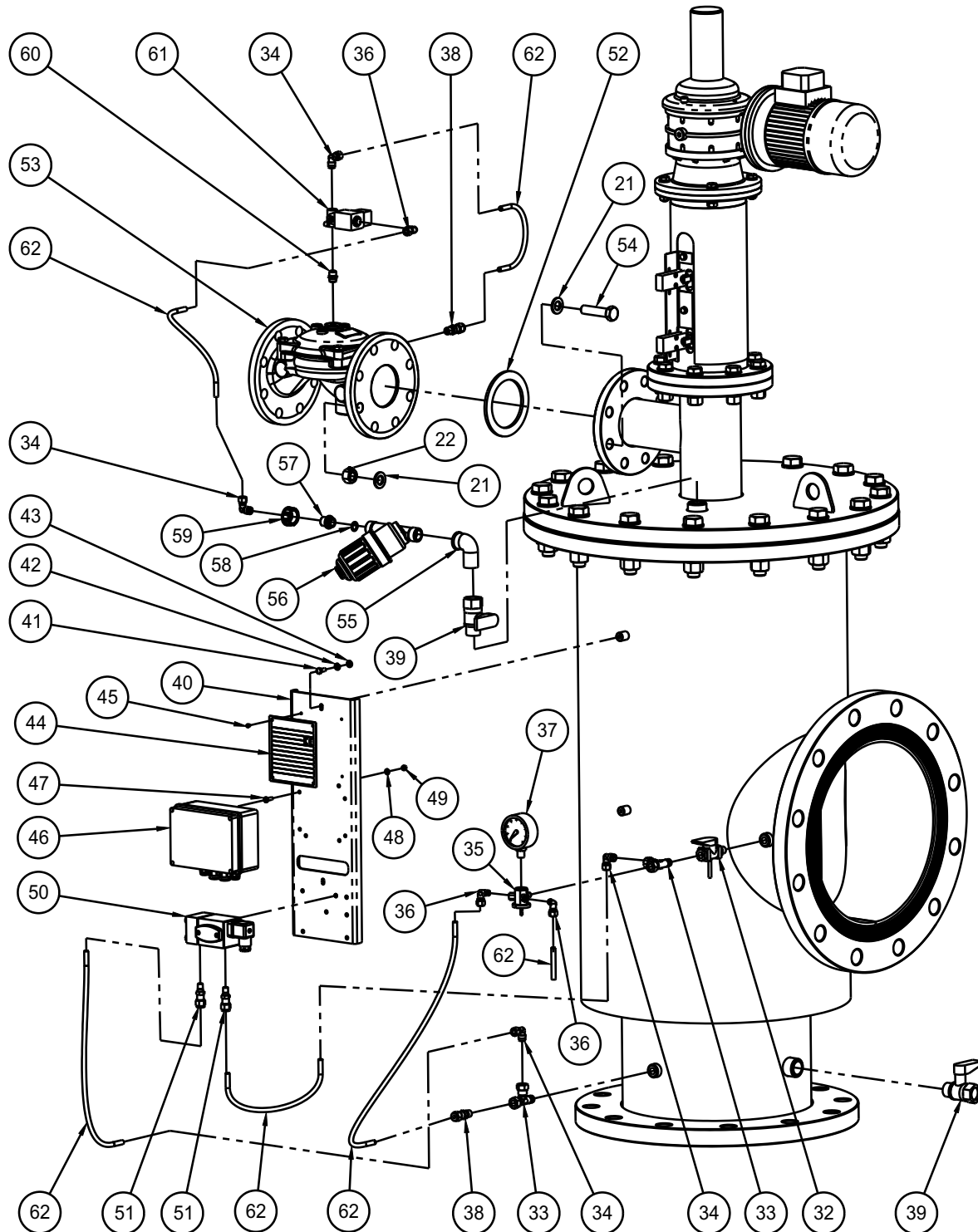
PARTS SCHEDULE Section 1 (2)

No.	CAT. No.	DESCRIPTION	Qty.	Material
53	730103-000522	3" Bermad (400) Hydraulic Valve Ir-405-G-I-Iso16-Pr	1	Cast Iron
54	760101-000329	Hex Bolt Partial Thread M16X65 Zinc Plated C/ST	8	Zinc Plated
55	780101-000789	L-Connector 3/4" F/M Galvanized	1	ST.37-2 Galvanized
56	010000-000042	3/4"Black Filter AC,W/O Valve Nylon Screen 200 Mic	1	Various
57	710103-002569	Raccord Nipple 1/4" for 3/4" Filter	1	ABS-medium impact
58	770102-000082	O-Ring Seal P2-112 NBR	1	NBR
59	710103-002570	Raccord Nut 3/4" for 3/4" Filter	1	ABS-medium impact
60	710103-000591	Pressure Check Point Connector 1/4"X1/4"	1	Brass
61	720103-000177	Solenoid Valve 24VAC,50HZ,No (Gem-Sol)	1	Various
62	720502-000036	Control Tube 5/16" Nylon Air Brake	1	Nylon

PARTS DRAWING Section 1 Page 1



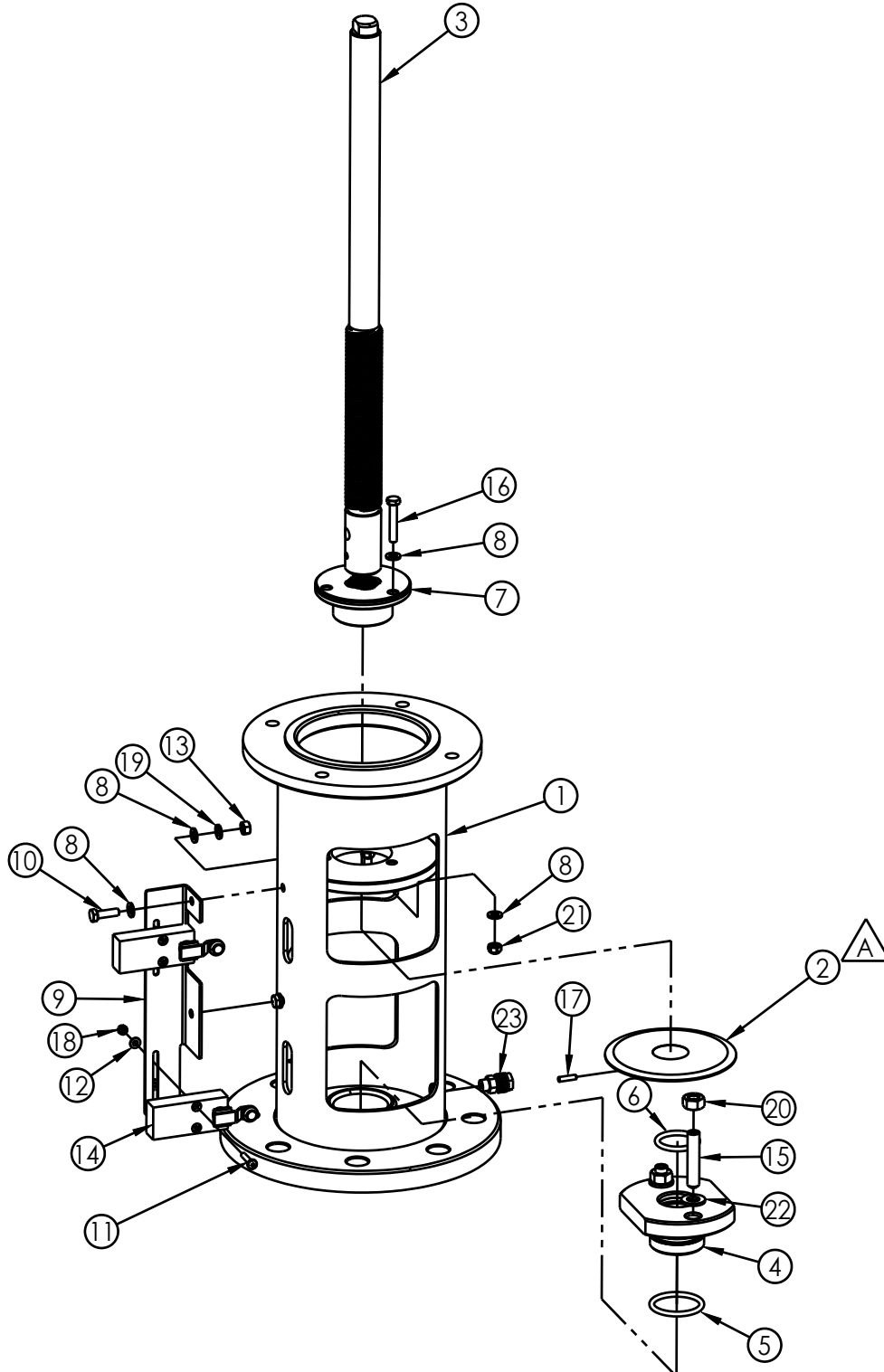
PARTS DRAWING Section 1 Page 2



PARTS DRAWING Section 2

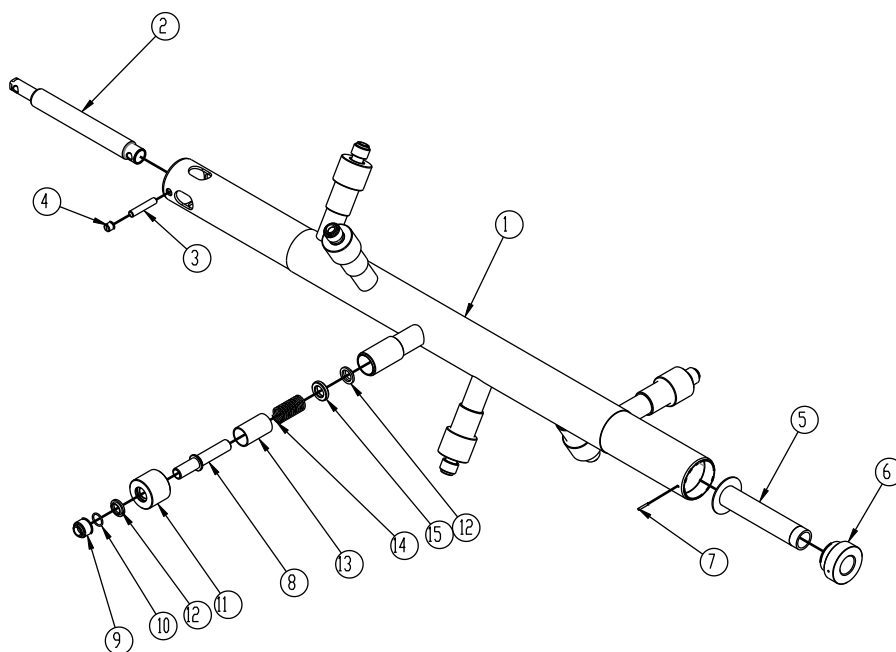
No.	CAT. No.	DESCRIPTION	Qty.	Material
1	710105-001473	Drive Shaft Housing EBS-10K EPOXY PKPK-3002	1	ST.37-2
2	710103-002537	Limit Switch Plate EBS	1	Brass
3	710103-002540	Drive Shaft (EBS) S/ST303	1	S/ST 303
4	710103-002612	Sealing Rope Flange EBS and HD	1	Delrin
5	770101-000055	O-Ring Seal 38x4 (Sealing Flange EBS) NBR "S"	1	NBR
6	770101-000053	O-Ring Seal 30x4 (Sealing Flange EBS) NBR "S"	1	NBR
7	710103-002539	Drive Bushing (EBS)	1	Brass
8	760103-000094	Flat Washer M6 DIN125 S/ST316	10	S/ST 316
9	710103-002558	Limit Switch Sling EBS Polished	1	S/ST 316
10	760101-000603	Hex Bolt Full Thread M6X20 S/ST316 DIN933	2	S/ST 316
11	760101-000683	Phillips Pan Machine Screw M4X20 S/ST316	4	S/ST 316
12	760103-000122	Flat Washer M4 DIN125 S/ST316	4	S/ST 316
13	760102-000085	Hex Nut M6 S/ST316 DIN934	2	S/ST 316
14	720302-000004	Flat Washer M10 DIN125 S/ST316	2	S/ST 316
15	760101-000527	Socket Set Screw M10X50 S/ST316 DIN916	2	S/ST 316
16	760101-000605	Hex Bolt Full Thread M6X35 S/ST316 DIN933	3	S/ST 316
17	760101-000695	Socket Set Screw M4X16 S/ST316 DIN916	2	S/ST 316
18	760102-000141	Nylon Insert Lock Nut M4 S/ST316 DIN985	4	S/ST 316
19	760103-000109	Spring Washer M6 DIN127 S/ST316	2	S/ST 316
20	760102-000087	Hex Nut M10 S/ST316 DIN934	2	S/ST 316
21	760102-000142	Nylon Insert Lock Nut M6 S/ST316 DIN985	3	S/ST 316
22	760103-000097	Flat Washer M10 DIN125 S/ST316	2	SST316
23	720501-000207	Straight Connector 1/4"X8mm Black-Red	1	PP

PARTS DRAWING Section 2



PARTS DRAWING Section 3

No.	CAT. No.	DESCRIPTION	Qty.	Material
1	710103-002976	Machined SLN Suction Scanner For Internal Filter - EBS 10K	1	S/ST.316L
2	710103-002547	Suction Scanner Shaft EBS 10K	1	S/ST.316L
3	760105-000043	Pin 10 X 53 S\ST316	1	S/ST 316
4	710103-002948	Plug M12 for Mega (19BAR)	1	Delrin
5	700190-002736	Internal Filter for Scanner EBS 10K/15K	1	S/ST.316L
6	710103-002827	Plug POM for Internal Filter	1	Delrin
7	760105-000042	PIN 3 X 20 S\ST316	1	S/ST 316
8	710103-002964	Housing for SLN EBS	6	S/ST 316L
9	710103-002962	Cap for Nozzle EBS Spring Loaded	6	NYLON 12
10	770101-000046	O-Ring Seal 18x2 NBR	6	NBR
11	710103-002963	Tightening Nut for Nozzle EBS Spring Loaded	6	Delrin
12	770104-000100	Spring Loaded Nozzle Seal-EBS (RED)	12	ECOPUR
13	710103-002960	Support Pipe for SLN EBS	6	S/ST 316L
14	760107-000052	Spring for Nozzle EBS	6	S/ST 302
15	710103-002961	Seat Spring for Nozzle EBS Spring Loaded	6	Delrin



PARTS SCHEDULE – SKID SYSTEM AND PARTS

Pumps and seal kits

Description	Filter Model	Part number
Pumps (60 Hz)		
25 HP SCOT #57, WEG 256JM SF, BN	EBS-10K 769 GPM	720401-000624
30 HP SCOT #59, WEG 286JM SF, BN	EBS-10K 883 GPM	720401-000625
30 HP SCOT #59, WEG 286JM SF, BN	EBS-10K 1006 GPM	720401-000625
Seal kits		
SEAL KIT - FOR SCOT PUMP # 57	EBS-10K 769 GPM	720401-000533
SEAL KIT - FOR SCOT PUMP # 59	EBS-10K 883 GPM	118.000.530
SEAL KIT - FOR SCOT PUMP # 59	EBS-10K 1006 GPM	118.000.530

PUMP CURVES

Pump Data Sheet - Scot Division of Ardox Corp.

Company: Amiad Water Systems
Name: EBS_10K_769
Date: 2/5/2016



Pump:

Size: 057-6.9-4.0x3.0
Type: Endsuct-Encl
Synch speed: 3600 rpm
Curve: 40.000.351
Specific Speeds:
Dimensions:
Speed: 3500 rpm
Dia: 5.75 in
Impeller:
Ns: ---
Nss: ---
Suction: 4 in
Discharge: 3 in

Search Criteria:

Flow: 769 US gpm
Head: 70 ft
Near miss: 5 % of Head

Fluid:

Water
SG: 1
Viscosity: 1.105 cP
NPSHa: ---
Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 14.7 psi a

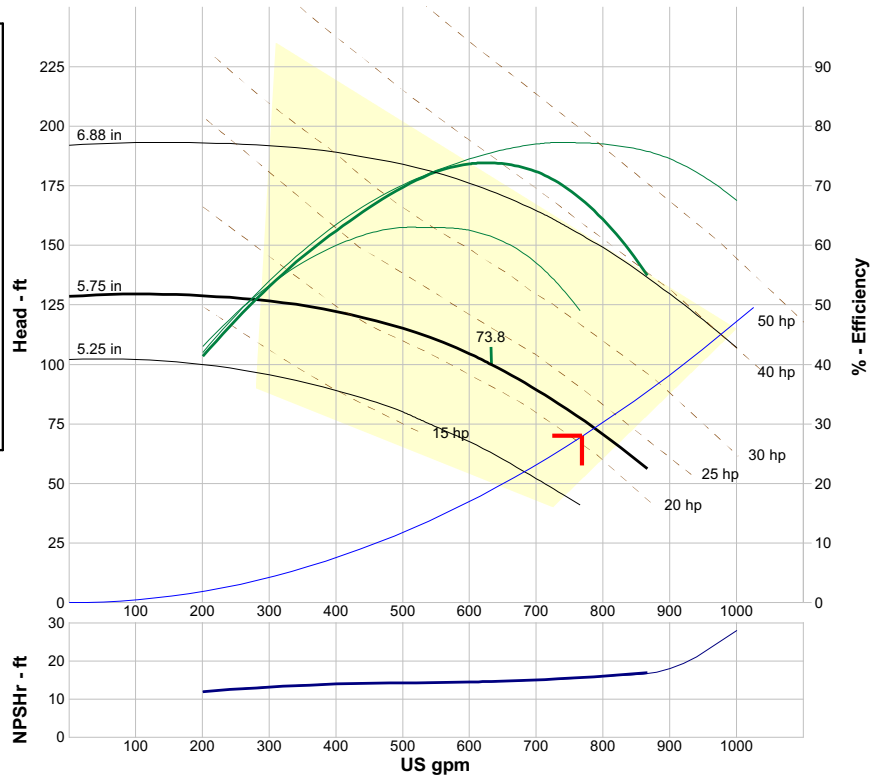
Pump Limits:

Temperature: 300 °F
Pressure: 175 psi g
Sphere size: ---
Power: ---
Eye area: ---

Motor:

Standard: NEMA
Enclosure: TEFC
Size: 25 hp
Speed: 3600
Frame: 284TS
Sizing criteria: Design Point

--- Data Point ---	
Flow:	769 US gpm
Head:	76.2 ft
Eff:	66%
Power:	22.1 hp
NPSHr:	15.8 ft
--- Design Curve ---	
Shutoff head:	129 ft
Shutoff dP:	55.7 psi
Min flow:	---
BEP:	74% @ 632 US gpm
NOL power:	22.4 hp @ 866 US gpm
--- Max Curve ---	
Max power:	40 hp @ 1000 US gpm



Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
923	3500	---	---	---	---
769	3500	76.2	66	22.1	15.8
615	3500	102	74	21.5	14.6
461	3500	117	66	20.3	14.2
308	3500	125	53	17.9	13.1

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Pump Data Sheet - Scot Division of Ardox Corp.

Company: Amiad Water Systems
Name: EBS_10K_883
Date: 2/5/2016



Pump:

Size: 059-7.0-6.0x5.0
Type: Endsuct-Encl
Synch speed: 3600 rpm
Curve: 40.000.502
Specific Speeds:
Ns: ---
Nss: ---
Dimensions:
Suction: 6 in
Discharge: 5 in

Search Criteria:

Flow: 883 US gpm
Head: 70 ft
Near miss: 5 % of Head

Fluid:

Water
SG: 1
Viscosity: 1.105 cP
NPSHa: ---
Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 14.7 psi a

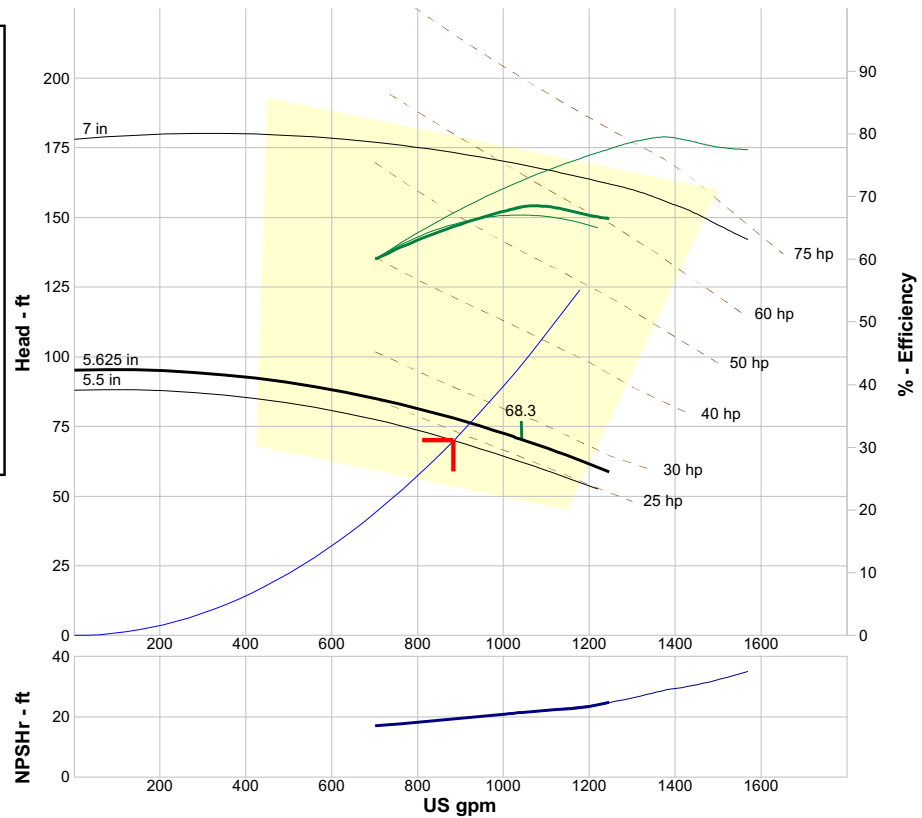
Pump Limits:

Temperature: 300 °F
Pressure: 175 psi g
Sphere size: ---
Power: ---
Eye area: ---

Motor:

Standard: NEMA
Enclosure: TEFC
Sizing criteria: Design Point
Size: 30 hp
Speed: 3600
Frame: 286TS

---- Data Point ----	
Flow:	883 US gpm
Head:	77.4 ft
Eff:	65%
Power:	26.3 hp
NPSHr:	19.4 ft
---- Design Curve ----	
Shutoff head:	95.2 ft
Shutoff dP:	41.2 psi
Min flow:	---
BEP:	68% @ 1042 US gpm
NOL power:	27.9 hp @ 1236 US gpm
-- Max Curve --	
Max power:	72.6 hp @ 1568 US gpm



Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
1060	3500	69.3	68	27.2	21.8
883	3500	77.4	65	26.3	19.4
706	3500	84.8	60	25.1	17.1
530	3500	87.5	56	24	14.8
353	3500	---	---	---	---

Selected from catalog: Scot.60 Vers: 10.1

Pump Data Sheet - Scot Division of Ardox Corp.

Company: Amiad Water Systems
Name: EBS_10K_1006
Date: 2/5/2016



Pump:

Size: 059-7.0-6.0x5.0
Type: Endsuct-Endl
Synch speed: 3600 rpm
Curve: 40.000.502
Specific Speeds:
Ns: ---
Nss: ---
Dimensions:
Suction: 6 in
Discharge: 5 in

Search Criteria:

Flow: 1006 US gpm
Head: 70 ft
Near miss: 5 % of Head

Fluid:

Water
SG: 1
Viscosity: 1.105 cP
NPSHa: ---
Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 14.7 psi a

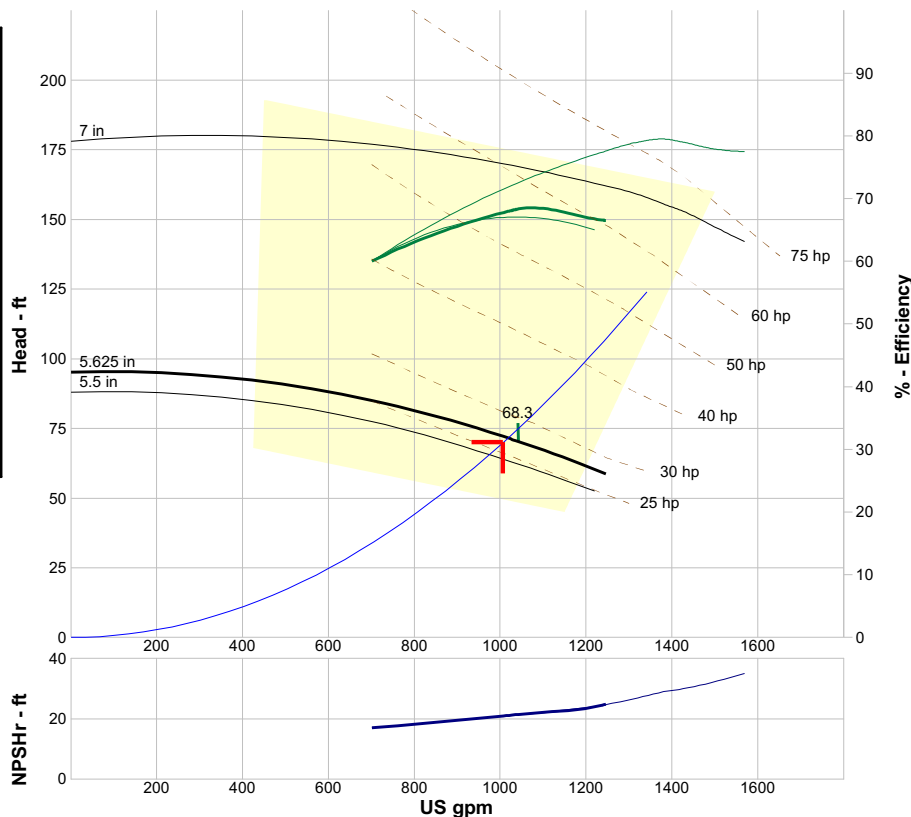
Pump Limits:

Temperature: 300 °F
Pressure: 175 psi g
Sphere size: ---
Power: ---
Eye area: ---

Motor:

Standard: NEMA
Enclosure: TEFC
Sizing criteria: Design Point
Size: 30 hp
Speed: 3600
Frame: 286TS

---- Data Point ----	
Flow:	1006 US gpm
Head:	72.2 ft
Eff:	68%
Power:	27.1 hp
NPSHr:	21 ft
---- Design Curve ----	
Shutoff head:	95.2 ft
Shutoff dP:	41.2 psi
Min flow:	---
BEP:	68% @ 1042 US gpm
NOL power:	27.9 hp @ 1236 US gpm
-- Max Curve --	
Max power:	72.6 hp @ 1568 US gpm



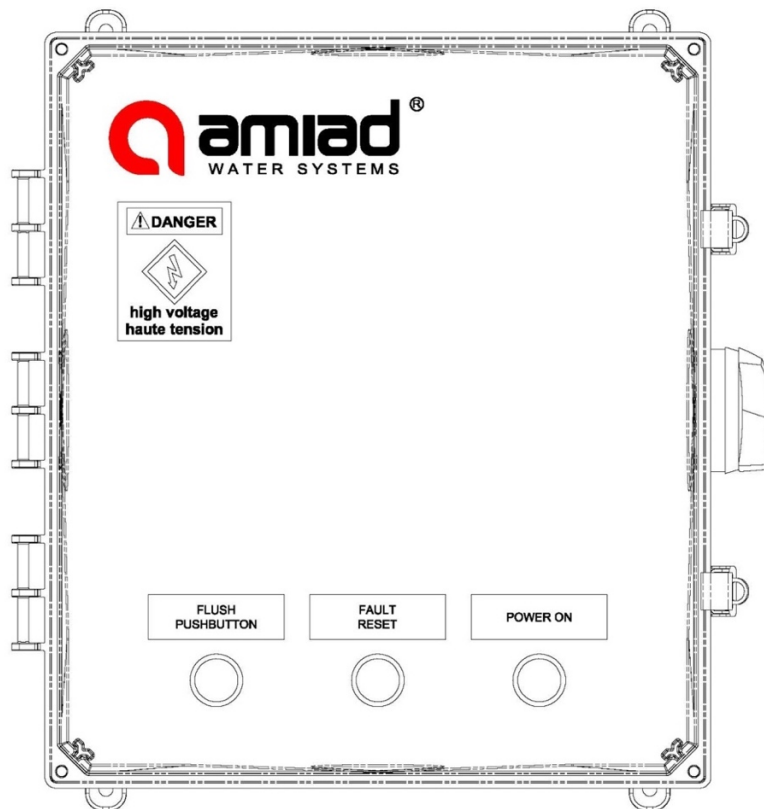
Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
1207	3500	61	67	27.8	24.1
1006	3500	72.2	68	27.1	21
805	3500	80.7	63	25.8	18.4
604	3500	86.5	58	24.4	15.7
402	3500	---	---	---	---

Selected from catalog: Scot.60 Vers: 10.1

Level I+ Filter Controller

Installation, Operation and Maintenance Instructions



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1. Introduction

To Our Customers,

Thank you for your purchase from the Amiad filter product line. Amiad products are designed and built to ensure successful operation as a part of your system. If operated and maintained properly, you can expect many years of service from this equipment.

Amiad wants to be sure that this equipment meets all of your needs. We depend upon your feedback to make necessary upgrades and improvements. Please contact our office with any comments or questions.

We look forward to assisting you with this product and any future filter system needs.

Amiad Water Systems
120-J Talbert Road
Mooresville, NC 28117
Toll Free 800 24 FILTER
Telephone 704.662.3133
Fax 704.662.3155
infousa@amiad.com

2. Safety

2.1 Intended Use

The Amiad Controller is only intended to be used with the appropriate Amiad products. Appropriate inspection and maintenance should be conducted to ensure safe operation.



Using the equipment in potentially explosive atmospheres is not permitted unless the equipment is designed for such service.

Any

- retrofitting or attachment of third party equipment
- use of spare parts that are not supplied or recommended by Amiad
- repairs implemented by companies or persons that are not authorized by the manufacturer

will result in the warranty becoming null and void.

2.2 Personnel Selection and Qualification

Persons operating or maintaining the Amiad Controller should be

- At least 18 years of age
- Properly trained for operation of this equipment
- Familiar with the relevant technical rules and safety regulations



The End-user should ensure that only personnel with the required qualifications and training shall operate and maintain the Amiad equipment.

Work on electronic components should only be performed by qualified personnel.

The term qualified personnel includes persons able to implement the required activities in each case on the basis of their vocational training and experience, as well as their knowledge of relevant and applicable standards and regulations on the prevention of accidents. These persons will be authorized by the equipment owner and by the person responsible for safety and should be trained to correctly operate and maintain this specific equipment.

2.3 Informal Safety Measures

The operating and maintenance instructions should be kept at the installation site of the Amiad Controller at all times. Applicable local regulations on the prevention of accidents and on the protection of the environment should be posted at the facility.

2.4 Hazards of Electric Power and Cables

All live components and cables are protected against accidental contact. Before opening any housing covers, connectors and cables, these items should be de-energized using safe electrical practices outlined in NFPA 79, NFPA 70 and other local standards.



2.5 Safety Devices

Trained operating personnel must ensure the following:

- Disconnect handle is damage free and able to lock out when work is required.
- Latches are secured and door is closed when equipment is in operation.



Identified deficiencies regarding these safety devices must be remedied immediately. The Amiad Controller must be disabled if any safety devices are missing or malfunctioning.

3. Product Description

This Amiad controller enables users to have powerful filter controls in a compact design. It is available in a wide array of power classes and voltages to meet the needs of the market. The initiation of the Amiad filters' self cleaning systems is by a signal from a differential pressure switch measuring the pressure of the filter inlet and outlet, a timer, control panel pushbutton for manual start or a remote start input.

The system is designed specifically for each customer's needs. Refer to the drawings/schematics or electrical data plate on the side of the enclosure to determine the largest motor which can be used and specific technical data.

3.1 Functional Description

Utilizing a start command (as described in the Product Description) for the self-cleaning cycle, the system is designed to be self-sufficient. There is no need to interfere with the filter as the equipment uses the highest level of technology to control the filter system. Typical start command is given by a differential pressure switch, however a variety of inputs are available for different applications. Consult with your local Regional Sales Manager or Application Engineer for more details on the best controller options for your application.

3.2 Standard Component Description

The following is for the standard controller configuration. Additional control options are available and may enhance the capabilities of your controller. All components are, UL approved, and conform to most international standards.

Disconnect Switch

This disconnect switch is for power isolation. It's capable of handling up to 600V AC.

Contactor and Overloads

The contactor and overload allow the end-user to have full control over the pump/drive motor. From the factory, the pump/drive motor is controlled to either turn on or off with the self-cleaning cycle as appropriate, but is easily modified to accept different logic schemes. The overloads use solid-state technology to

determine if the motor is being overdriven. At the factory, these settings are set and checked before shipment. Raising the overloads current value over the factory settings or removing the overloads from the controls will inhibit the ability of the controller to properly protect the motor. This setting should not be modified without contacting the manufacturer first.

Transformer

The transformer steps the high voltage down to a usable low voltage for the control components. It is protected with fuses on the primary side and circuit breakers on the secondary side. Exchanging the short-circuit protection of the controller should be exact one for one. Never increase the short circuit protection of the controller without consulting the manufacturer first.

Adjustable Flush Interval Timer

This timer allows the end-user to define the minimum self-cleaning/flush cycle interval time. This is very important to ensure efficiency of the filter system. Standard factory setting is to initiate one self-cleaning cycle every day at a minimum. This is a high performance timer with 8A contacts and the ability to set the interval from 0.05 seconds to 60 hours.

Programmable Logic Controller (PLC)

The Programmable Logic Controller (PLC) is designed to handle all of the controls. It is used to simplify the operation, thereby making the overall controller more robust. It has a special program designed by Amiad for this filter system. Although the software is available for download by the manufacturer, the program should not be altered without the consent of Amiad to avoid equipment malfunctions.

Power On Light

This panel face LED light is for local indication that the power is on and the system is running.

Flush Pushbutton

This panel face green pushbutton is used to initiate a system self-cleaning or flush cycle, providing the operator with a local means of self-cleaning/flushing the system.

Fault Reset Pushbutton and Light

This panel face red pushbutton and LED light is used to indicate when a fault has occurred (see Fault Conditions section for more detail) and the pushbutton function is used to clear a fault condition when the issue has been corrected and the system is ready to resume normal operation.

3.3 Transportation

The system can only be transported with the Disconnect Switch turned to the off position, and the power isolated.

3.4 Communication

The Amiad Controller allows for basic communication using standard dry-contacts for connecting to the end-user's facility controller. Standard communication includes:

- Major Fault dry contact
- Motor On dry contact

If the end-user requires additional logic to incorporate the filter into their system, additional inputs are available. Refer to the schematic for the following:

- Remote Start of the self-cleaning cycle – Allows the control panel to run in the Automatic mode, self-cleaning/flush cycle will be initiated by differential pressure or time.
- Remote Stop of the equipment - If the filter is in self-cleaning mode, it will terminate the operation, and return to filtering mode until the next self-cleaning cycle is initiated.)

4. Operation

4.1 Initial Operation

- Always use the appropriate Personal Protective Equipment (PPE) when working with electrical components.
- With the electrical source isolated, connect the appropriate electrical connections to the Amiad Controller. Check on the data plate to ensure the appropriate power supply is connected.
- Add necessary short circuit protection as required on schematic.
- Ensure pump is appropriately supplied with water.
- Ensure Stop connections are installed.
- Check the motor data plate and ensure that the motor overloads are set to the FLA on the data plate.
- Check to make sure that circuit breakers within panel are switched to the off position.
- Before switching power on to the panel, use a meter to ensure the correct voltage is being supplied to the panel.
- Close the disconnect switch to the on position to supply power to the panel.
- Before switching circuit breakers on, check voltages on the secondary of the transformer to ensure the correct voltage.
- Apply power to the control circuit by switching on the circuit breakers.
- Check configuration of Inputs and Outputs if applicable.
- Check timers to ensure appropriate self-cleaning/flush parameters.

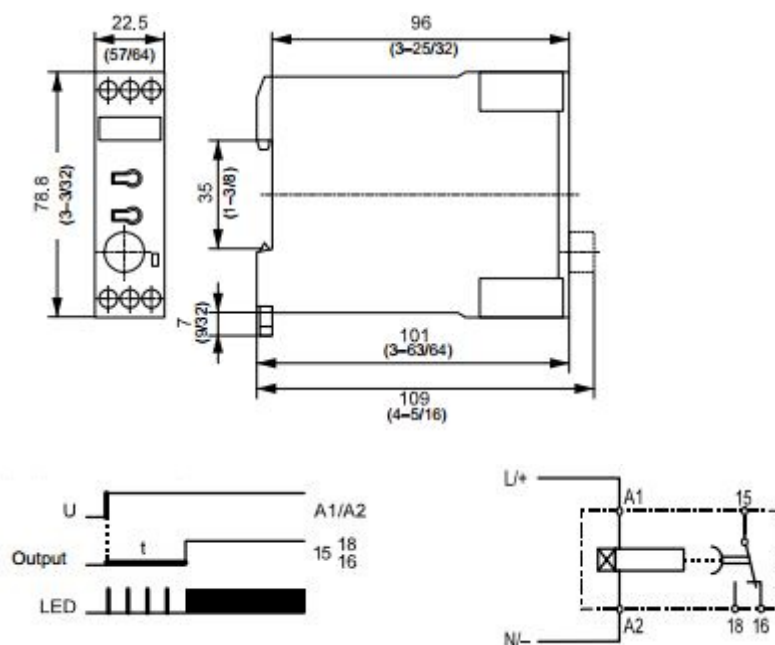
- Check for leaks within the filter pipes and valves and tighten if necessary as described in the filter O&M.

4.2 Deactivation

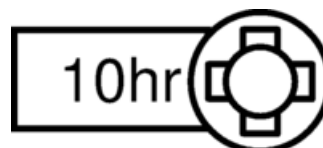
- Turn disconnect switch to the off position.
- Turn all circuit breakers to the off position.
- Apply appropriate lock-out/tag-out measures to ensure that power is not accidentally switched on.

5. Electro-mechanical Controls

Standard settings are set at the factory. These settings are specific to the customer's application. There is, however, a wide range of flexibility with this product.



The image above is the timing chart for the Flush Interval Timer.



The adjustable Interval Timer has a small dial for adjusting timing settings in 12 convenient larger ranges, and a larger dial for adjusting through the specific range for both timers.

Setting the controller

Configuración del controlador

Réglage du régulateur

Large Dial number Número de marcación grande Un grand nombre de numérotation	Actual Time Tiempo real Temps réel
0.17	30s
0.33	60s
0.67	120s
1.00	180s

Set the large dial on TR1 to get the appropriate flush time.

Ajuste el dial grande en TR1 para obtener el tiempo de lavado adecuado.

Réglez le grand cadran sur TR1 pour obtenir le temps de rinçage approprié.

Small Dial Number Pequeño número de marcación Petit numéro d'appel	Large Dial number Número de marcación grande Un grand nombre de numérotation	Actual Time Tiempo real Temps réel
1h	.5	30m
1h	1.0	1h
3h	1.0	3h
10h	.8	8h
60h	.4	24h

Set the dials on TR2 to get the flush interval time.

Ajuste los selectores de TR2 para obtener el tiempo de intervalo de vaciado.

Régler les cadrans sur TR2 pour obtenir l'intervalle de temps de chasse.

Set the overload(s) according the FLA on the motor data plate.

Establezca la sobrecarga (s) de acuerdo a la FLA en la placa de datos del motor.

Réglez la surcharge (s) selon la FLA sur la plaque signalétique du moteur.

6. Fault Conditions

There are two different types of faults conditions:

1. A Minor Fault is a condition in which the filter can still continue operating in the current condition, but has a fault that needs to be corrected. The red Reset Fault light will blink during this condition.
2. A Major Fault is a condition in which the filter cannot continue to operate and a self-cleaning/flush cycle cannot be operated properly. The system will be shut-down (filter and pump if included). The red Reset Fault light will glow continuously during this condition.

Minor Fault indication is caused by a mechanical fault which is the failure of the filter suction scanner (SAF, EBS and Omega filter systems) to complete its travel (monitored by limit or proximity switches). The Minor Fault condition will continue until a self-cleaning/flush cycle is initiated, at which time the Minor Fault will become a Major Fault as a self-cleaning/flush cycle cannot be started with this fault occurring.

There are two standard filter Major Faults and one Major Fault which can occur when a suction pump is used during the self-cleaning/flush cycle:

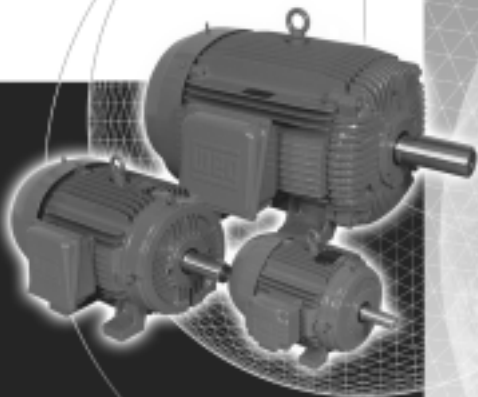
1. Differential Pressure Fault - the self-cleaning/flush cycle has not been able to clear the differential pressure for a programmed period of time (factory set at 240 seconds). The differential pressure must be cleared by power flushing the filter system or by manually cleaning the filter element(s). The fault can then be cleared by pushing the Fault Reset button.
2. Overload Fault - the motor current has exceeded the setting on the overload. Pushing the reset button alone will not affect this fault condition. The overload will have to be reset on the device and then the Fault Reset button can be pushed to clear the fault condition.
3. Suction Pump Fault - the flow switch placed after the suction pump did not engage after a period of time or flow dropped off during the self-cleaning/flush cycle. The suction pump must be inspected and repaired if necessary or flow restrictions to the pump feed must be removed. Once the flow conditions are corrected, the Fault Reset button can be pushed to clear the fault condition.

The Major Alarm dry contact will only be activated during a Major Alarm condition and not by Minor Fault conditions.

Appendix 1 – Pump IOM



MOTORS AND DRIVES



INSTALLATION AND
MAINTENANCE
INSTRUCTIONS FOR
ELECTRIC MOTORS
Frames 143/5T - 586/7T

QUALITY SYSTEM
ISO 9001
WEG MOTORES





*READ CAREFULLY THIS MANUAL BEFORE
INSTALLING THE MOTOR.*

RECEIVING CHECK

- ✓ Check if any damage has occurred during transportation.
- ✓ Check nameplate data.
- ✓ Remove shaft locking device (if any) before operating the motor.
- ✓ Turn the shaft with the hand to make sure if it is turning freely.

HANDLING AND TRANSPORTATION

1 - General



*MOTORS MUST NOT BE LIFTED BY THE SHAFT,
BUT BY THE EYE BOLTS WHICH ARE PROPERLY
DESIGNED TO SUPPORT THE MOTOR WEIGHT.*

Lifting devices, when supplied, are designed only to support the motor. If the motor has two lifting devices then a double chain must be used to lift it.

Lifting and lowering must be done gently without any shocks, otherwise the bearings can get damaged.



*DURING TRANSPORTATION, MOTORS FITTED
WITH ROLLER OR ANGULAR CONTACT
BEARINGS ARE PROTECTED AGAINST BEARING
DAMAGES WITH A SHAFT LOCKING DEVICE.*



*THIS LOCKING DEVICE MUST BE USED ON ANY
FURTHER TRANSPORT OF THE MOTOR, EVEN
WHEN THIS MEANS TO UNCOUPLE THE MOTOR
FROM THE DRIVEN MACHINE.*

STORAGE

If motors are not immediately installed, they must be stored in dry places, free of dust, vibrations, gases, corrosive smokes, under constant temperature and in normal position free from other objects.

In case the motors are stored for more than two years, the bearings must be changed or the lubrication grease must be totally replaced after cleaning.

Single phase motors when kept in stock for 2 years or more must have their capacitors replaced (if any).

We recommend to turn the shaft (by hands) at least once a month, and to measure the insulation resistance before installing it, in cases of motors stored for more than 6 months or when subject to high humidity areas.

If motor is fitted with space heaters, these should be switched on.

Insulation Resistance Check

Measure the insulation resistance before operating the motor and/or when there is any sign of humidity in the winding.

The resistance measured at 25°C (77°F) must be:

$R_i > (20 \times U) / (1000 + 2P)$ [Mohm] (measured with a MEGGER at 500 V d.c.); where U = voltage (V); P = power (kW).

If the insulation resistance is less than 2 megaohms, the winding must be dried according to the following:

✓ Warm it up inside an oven at a minimum temperature of 80°C (176°F) increasing 5°C (41°F) every hour until 105°C (221°F), remaining under this temperature for at least one hour. Check if the stator insulation resistance remains constant within the accepted values. If not, stator must be reimpregnated.

INSTALLATION

1 - Safety

All personnel involved with electrical installations, either handling, lifting, operation or maintenance must be well informed and up-to-dated concerning the safety standard and principles that govern the work and carefully follow them.

We strongly recommend that these jobs are carried out by qualified personnel.



MAKE SURE THAT THE ELECTRIC MOTORS ARE SWITCHED OFF BEFORE STARTING ANY MAINTENANCE SERVICE.

Motors must be protected against accidental starts.

When performing any maintenance service, disconnect the motor from the power supply. Make sure all accessories have been switched off and disconnected.

Do not change the regulation of the protecting devices to avoid damaging.



LEAD CONNECTION IN SULATION INSIDE THE TERMINAL BOX MUST BE DONE WITH AN INSULATING MATERIAL COMPATIBLE WITH MOTOR THERMAL CLASS WHICH IS SHOWN ON THE MOTOR NAMEPLATE.

2 - Operating Conditions

Electric motors, in general, are designed for operation at an altitude of 1000m above sea level for an ambient temperature between 25°C (77°F) and 40°C (104°F). Any variation is stated on the nameplate.



*COMPARE THE CURRENT, VOLTAGE,
FREQUENCY, SPEED, OUTPUT AND OTHER
VALUES DEMANDED BY THE APPLICATION WITH
THE DATA GIVEN ON THE NAMEPLATE.*

Motors supplied for hazardous locations must be installed in areas that comply with that specified on the motor nameplate.



*KEEP AIR INLET AND OUTLET FREE AND CLEAN.
THE AIR BLOWN OUT BY THE MOTOR SHALL
NOT ENTER AGAIN. THE DISTANCE BETWEEN
THE AIR INLET AND THE WALL MUST BE
AROUND $\frac{1}{4}$ OF THE INLET OPENING DIAMETER.*

3 - Foundation

Motors provided with feet must be installed on though foundations to avoid excessive vibrations.

The purchaser is fully responsible for the foundation.

Metal parts must be painted to avoid corrosion.

The foundation must be uniform and sufficiently tough to support any short circuit strengths. It must be designed in such a way to stop any vibration originated from resonance.

4 - Drain Holes

Make sure the drains are placed in the lower part of the motor when the mounting configuration differs from that specified on the motor purchase order.

5 - Balancing



WEG MOTORS ARE DYNAMICALLY BALANCED, WITH HALF KEY AT NO LOAD AND UNCOUPLED.

Transmission elements such as pulleys, couplings, etc must be dynamically balanced with half key before installation. Use always appropriate tools for installation and removal.

6 - Alignment

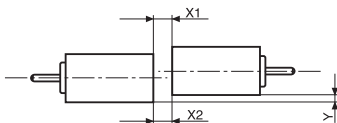


ALIGN THE SHAFT ENDS AND USE FLEXIBLE COUPLING, WHENEVER POSSIBLE.

Ensure that the motor mounting devices do not allow modifications on the alignment and further damages to the bearings.

When assembling a half-coupling, be sure to use suitable equipment and tools to protect the bearings.

Suitable assembly of half-coupling: check that clearance Y is less than 0.05mm and that the difference X1 to X2 is less than 0.05m as well.



Note: The "X" dimension must be at least 3mm.

7 - Belt Drive

When using pulley or belt coupling the following must be observed:

✓ Belts must be tighten just enough to avoid slippage when running, according to the specifications stated on the belt supplier recommendation.

WARNING:

Excessive tension on the pulleys will damage the bearings and lead to a probable shaft rupture.

8 - Connection

WARNING: Voltage may be connected at standstill inside the terminal box for heating elements or direct winding heating.

WARNING: The capacitor on single-phase motors can retain a charge which appears across the motor terminals, even when the motor has reached standstill.



A WRONG CONNECTION CAN BURN THE MOTOR.

Voltage and connection are indicated on the nameplate. The acceptable voltage variation is $\pm 10\%$, the acceptable frequency variation is $\pm 5\%$ and the total acceptable variation is $\pm 10\%$.

9 - Starting Methods

The motor is rather started through direct starting. All Weg motors must be connected as shown on the motor nameplate, failure to follow the motor nameplate could lead to motor failure.

In case this is not possible, use compatible methods to the motor load and voltage.

✓ 3 lead single voltage and 9 lead dual voltage motors can be started as follows:

Full Voltage Direct On Line.

Auto-Transformer Starting.

Electronic Soft-Starting.

VFD Starting - subject to verification and application analysis.

✓ 6 lead single voltage motors and 12 lead dual voltage motors can be connected as follows:

Full Voltage Direct On Line.

WYE/DELTA Starting.

Auto-Transformer Starting.

Electronic Soft-Starting.

VFD Starting - subject to verification and application analysis.

The rotation direction is clockwise if the motor is viewed from DE side and if the phases are connected according to the sequence L1, L2, L3.

To change the rotation direction, interchange two of the connecting leads.



THE CONNECTION TO THE POWER SUPPLY MUST BE DONE BY QUALIFIED PERSONNEL AND WITH FULL ATTENTION TO ASSURE A SAFE AND PERMANENT CONNECTION. AFTER CONNECTING THE MOTOR, CHECK FOR ANY STRANGE BODY INSIDE THE TERMINAL BOX. THE CABLE INLETS NOT IN USE MUST BE CLOSED.

Make sure to use the correct cable dimension, based on the rated current stamped on the motor nameplate.



BEFORE ENERGIZING THE TERMINALS, CHECK IF THE EARTHING IS MADE ACCORDING TO THE ACTUAL STANDARDS. THIS IS ESSENTIAL AGAINST ACCIDENT RISKS.

When the motor is supplied with protective or monitor temperature device such as thermostats, thermistors, thermal protector, etc, connect their terminals to the corresponding devices on the control panel.

10- Start-Up



*THE KEY MUST BE FASTENED OR REMOVED
BEFORE STARTING THE MOTOR.*

a) The motor must start and operate smoothly. In case this does not occur, turn it off and check the connections and the mounting before starting it again.

b) If there is excessive vibration, check if the fastening screws are correctly fastened. Check also if the vibration comes from a neighbour machine. Periodical vibration checks must be done.

c) Run the motor under rated load for a short period of time and compare if the running current is equal to that stamped on the nameplate.

MAINTENANCE



*WARNING:
SAFETY CHECK LIST.*

1 - General Inspection

- ✓ Check the motor periodically.
- ✓ Keep the motor clean and assure free air flow.
- ✓ Check the seals or V Ring and replace them, if required.
- ✓ Check the connections as well as supporting screws.
- ✓ Check the bearings and observe:
Any excessive noise, bearing temperature and grease condition.
- ✓ When a changing, under normal conditions, is detected, check the motor and replace the required parts.
The frequency of the inspections depends on the motor type and on the application conditions.

LUBRICATION



FOLLOW THE REGREASING INTERVALS. THIS IS FUNDAMENTAL FOR PROPER MOTOR OPERATION.

1 - Machines without Grease Nipples

Motors up to frame 324/6T are normally fitted without grease nipples. In these cases the regreasing shall be done at the preventive maintenance job observing the following aspects:

- ✓ Disassemble carefully the motors.
- ✓ Take all the grease out.
- ✓ Wash the bearing with querosene or diesel.
- ✓ Regrease the bearing immediately.

2 - Machines Fitted with Grease Nipples

It is strongly recommended to grease the machine while running. This allows the grease renewal in the bearing housing. When this is not possible due to turning parts by the grease device (pulleys, bushing, etc) that offer some risk to the physical integrity of the operator, proceed as follows:

- ✓ Clean the area near to the grease nipple.
- ✓ Put approximately half of the total grease and run the motor for 1 minute at full speed. Then turn off the motor and pump the rest of the grease.
- ✓ The injection of all the grease with the motor in standstill can make the grease penetrate into the motor, through the inner seal of the bearing housing.

When regreasing, use only special bearing grease with the following properties:

RELUBRICATION INTERVALS RECOMMENDED - POLYREX® EM GREASE (ESSO/EXXON)

Frame	Amount of grease (g)	3600 rpm	3000 rpm	1800 rpm	1500 rpm	1200 rpm	1000 rpm	900 rpm	750 rpm	720 rpm	600 rpm	500 rpm
Relubrication intervals in hours - ball bearings												
254/6T	13	15700	18100	20000	20000	20000	20000	20000	20000	20000	20000	20000
284/6T	18	11500	13700	20000	20000	20000	20000	20000	20000	20000	20000	20000
324/6T	21	9800	11900	20000	20000	20000	20000	20000	20000	20000	20000	20000
364/5T	27	3600	4500	9700	11600	14200	16400	17300	19700	20000	20000	20000
404/5TS	27	3600	4500	9700	11600	14200	16400	17300	19700	20000	20000	20000
444/5TS	27	3600	4500	9700	11600	14200	16400	17300	19700	20000	20000	20000
504/5TS	27	3600	4500	9700	11600	14200	16400	17300	19700	20000	20000	20000
586/7TS	27	3600	4500	9700	11600	14200	16400	17300	19700	20000	20000	20000
Relubrication intervals in hours - cylindrical roller bearings												
324/5T	21	9800	11900	20000	20000	20000	20000	20000	20000	20000	20000	20000
364/5T	27			9700	11600	14200	16400	17300	19700	20000	20000	20000
404/5T	34			6000	7600	9500	11600	13800	15500	15500	17800	20000
444/5T	45			4700	6000	7600	9800	12200	13700	13700	15700	20000
447/5T	45			4700	6000	7600	9800	12200	13700	13700	15700	20000
504/5T	45			4700	6000	7600	9800	12200	13700	13700	15700	20000
586/7T	60			3300	4400	5900	7800	10700	11500	11500	13400	17300

WARNING:

The table above is specifically intended for relubrication with Polyrex® EM grease and bearing absolute operating temperature of:

- ✓ 70°C (158°F) for 254/6T to 324/6T frame motors;
- ✓ 85°C (185°F) for 364/5T to 586/7T frame motors.

For every 15°C (59°F) above these limits, relubrication interval must be reduced by half.

Shielded bearing (ZZ) are lubricated for bearings life as long as they operate under normal ambient conditions and temperature of 70°C(158°F).



WE RECOMMEND TO USE BALL BEARINGS FOR MOTORS DIRECTLY COUPLED TO THE LOAD.



WARNING:
EXCESS OF GREASE CAN CAUSE BEARING OVERHEATING RESULTING IN COMPLETE DAMAGE.

Compatibility of Polyrex® EM grease with other types of grease:

Containing polyurea thickener and mineral oil, the Polyrex® EM grease is compatible with other types of grease that contain:

- ✓ Lithium base or complex of lithium or polyurea and highly refined mineral oil;
- ✓ Inhibitor additive against corrosion, rust and anti-oxidant additive.

Notes:

- ✓ Although Polyrex® EM is compatible with the types of grease given above, we do not recommend to mix it with any other greases.
- ✓ If you intend to use a type of grease different than those recommended above, first contact WEG.
- ✓ On applications (with high or low temperatures, speed variation, etc), the type of grease and relubrication interval are given on an additional nameplate attached to the motor.
- ✓ Vertical mounted motors must have the relubrication intervals reduced by half.



*THE USE OF STANDARD MOTORS IN SPECIFIC
AREAS OR SPECIAL APPLICATIONS MUST BE
DONE BY CONSULT TO THE GREASE
MANUFACTURER OR WEG.*

ASSEMBLY AND DISASSEMBLY

Disassembly and assembly must be done by qualified personnel using only suitable tools and appropriated methods. The stator grips must be applied over the side face of the inner ring to be disassembled or over and adjacent part.

It is essential that the bearings disassembly and assembly be done under cleaning conditions to ensure good operation

and to avoid damages. New bearings shall only be taken out from their cases when assembling them.

Before installing a new bearing it is required to check the shaft fitting for any sharp edge or strike signals.

For bearing assembly, warm their inner parts with suitable equipment - inductive process - or use suitable tools.

SPARE PARTS

When ordering spare parts, please specify the full type designation and product code as stated on the motor nameplate.

Please also inform the motor serial number stated on the nameplate.

MOTORS FOR HAZARDOUS LOCATIONS

Besides the recommendations given previously, these ones must be also followed:



*THE SPECIFICATION OF THE MOTOR
INSTALLATION PLACE IS FOR CUSTOMER'S
RESPONSIBILITY, WHO WILL ALSO DETERMINE
THE ENVIRONMENT CHARACTERISTICS.*

Motors for hazardous locations are manufactured according to specific standards for such environments and they are certified by worldwide certifying entities.

1 - Installation

The complete installation must follow procedures given by the local legislation in effect.



THE INSTALLATION OF HAZARDOUS LOCATION MOTORS MUST BE CARRIED OUT BY SKILLED PEOPLE, AND THE THERMAL PROTECTION MUST BE ALWAYS INSTALLED, EITHER INSIDE OR OUTSIDE THE MOTOR, OPERATING AT THE RATED CURRENT.

2 - Maintenance

Maintenance must be carried out by repair shops authorized by WEG.

Repair shops and people without WEG's authorization who will perform any service on hazardous location motors will be fully responsible for such service as well as for any consequential damage.



ANY ELECTRICAL OR MECHANICAL MODIFICATION MADE ON HAZARDOUS LOCATION MOTORS WILL VOID THE CERTIFICATION.

When performing maintenance, installation or relubrication, follow these instructions:

- ✓ Check if all components are free of edges, knocks or dirt.
- ✓ Make sure all parts are in perfect conditions.
- ✓ Lubricate the surfaces of the endshield fittings with protective oil to make the assembly easier.
- ✓ Use only rubber hammer to fit the parts.
- ✓ Check for correct bolts tightening.
- ✓ Use clearance calibrator for correct T-box fitting (smaller than 0.05mm).



DO NOT REUSE DAMAGED OR WORN PARTS. REPLACE THEM BY NEW ONES SUPPLIED BY THE FACTORY.

MOTORS DRIVEN BY VFD

Applications using VFD's without filter can affect motor performance as follows:

- ✓ Lower efficiency.
- ✓ Higher vibration.
- ✓ Higher noise level.
- ✓ Higher rated current.
- ✓ Higher temperature rise.
- ✓ Reduced motor insulation.
- ✓ Reduced bearing life.

1 - Standard Motors

- ✓ Voltages lower than 440V do not require filter.
- ✓ Voltages equal or higher than 440V or lower than 575V require filter for motor power supply cables longer than 20 meters.
- ✓ Voltages equal or higher than 575V require filter for any size of power supply cables.



*IF SUCH RECOMMENDATIONS ARE NOT
FOLLOWED ACCORDINGLY, MOTOR WARRANTY
WILL BE VOID.*

2 - Inverter Duty Motors

- ✓ Check power supply voltage of the forced cooling set.
- ✓ Filters are not required.

WARRANTY TERMS SERIES AND ENGINEERING PRODUCTS

WEG warrants its products against defects in workmanship and materials for 18 months from the invoice date issued by the factory, authorized distributor or agent limited to 24 months from manufacturing date independent of installation date as long as the following items are fulfilled accordingly:

- Proper transportation, handling and storage;*
- Correct installation based on the specified ambient conditions and free of corrosive gases;*
- Operation under motor capacity limits;*
- Observation of the periodical maintenance services;*
- Repair and/or replacement effected only by personnel duly authorized in writing by WEG;*
- The failed product be available to the supplier and/or repair shop for a required period to detect the cause of the failure and corresponding repair;*
- Immediate notice by the purchaser about failures occurred and that these are accepted by WEG as manufacturing defects.*

This warranty does not include disassembly services at the purchaser facilities, transportation costs with product, tickets, accommodation and meals for technical personnel when requested by the customer. The warranty service will be only carried out at WEG Authorized Repair Shops or at WEG's facilities.

Components whose useful life, under normal use, is shorter than the warranty period are not covered by these warranty terms.

The repair and/or replacement of parts or components, when effected by WEG and/or any WEG Authorized Repair Shop, will not give warranty extension.

This constitutes WEG's only warranty in connection with this sale and the company will have no obligation or liability whatsoever to people, third parties, other equipment or installations, including without limitation, any claims for consequential damages or labor costs.