

MODULAR VACUUM PURGE  
HEATLESS DESICCANT AIR DRYERS

**DRYTEC**

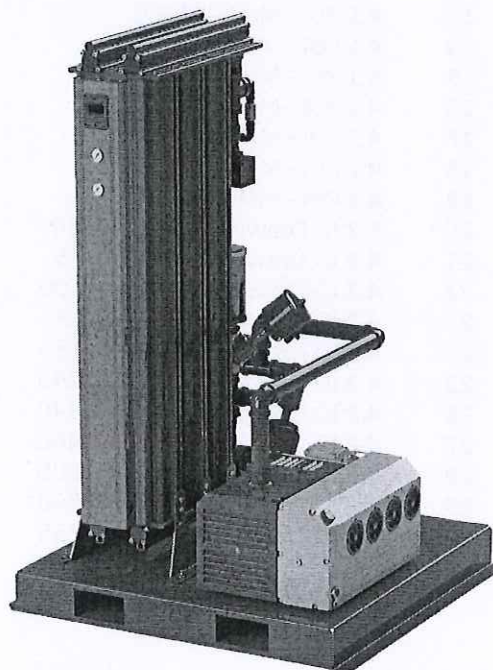
USER/SERVICE  
MANUAL

MMD-VP SERIES (MMD-60-VP to MMD-740-VP)

WARRANTY NOTICE



Failure to follow the instructions and  
procedures in this manual or misuse of this  
equipment will VOID its warranty !



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# SECTION 1

# SAFETY

The dryer has been designed and constructed in accordance with the generally recognized rules pertaining to adsorption technology as well as industrial safety and accident prevention regulations. The equipment design, development, production, assembly and customer service fall under the Drytec quality control system. The dryer is state of the art. There are, however, hazards to the body, equipment and life accompanying this type of product if it is not operated for the purpose which it is intended by trained and specialized personnel.

The equipment supplied is intended exclusively for drying compressed air. Any other use or one exceeding this is considered unauthorized. Drytec can not be held liable for damages resulting from incorrect or unauthorized use of the equipment. Any such risk is carried solely by the end user.

Authorized use means complete compliance with all of the conditions of operation, servicing and maintenance prescribed by Drytec in this Instruction and Operation Manual.

The dryer is only to be operated, serviced and repaired by trained personnel who are familiar with this type of equipment and understand fully its operation and any potential dangers.

## 1.1 SAFETY INFORMATION











The end user and operator must observe all National, State, and Local industrial and safety regulations dealing with the operation of pressure vessels under compressed air service. Also all "end user" safety rules for the same type of service must be adhered to. The following points list some of the important factors dealing with this type of equipment.

- Never make any structural changes to the equipment
- Use only original spare parts and accessories
- Never weld on any pressure vessel or modify it in any way
- All maintenance on "pressure parts" must be carried out with the equipment shutdown, depressurized and locked out. Any in plant procedures or work permits regarding pressure vessels are to be adhered to.
- Do not operate the equipment with the control panel door open, the electrical system energized and live parts exposed.
- Disconnect the dryer from the electrical supply when any electrical work is performed. Lock out the safety disconnect and obtain any required work permits.

The desiccants used in this equipment are not considered hazardous. However all contact with or disposal of the desiccant should be in accordance with the relevant MSDS. The following lists the more common safety measures normally observed during filling operations.

- In the case of accidental contact of the desiccant with the eyes, rinse immediately with an abundance of clean water. Refer to the MSDS.
- Accidental spillage of desiccant on the floor should be cleaned up avoiding the creation of excess dust during this procedure.
- Use a contoured face mask during any filling or draining operations. Refer to the MSDS.











## 1.2 DEFINITION OF THE SAFETY SYMBOLS USED

	Before attempting any intervention on the dryer, read carefully the instructions reported in this use and maintenance manual.
	General warning sign. Risk of danger or possibility of damage to the machine. Read carefully the text related to this sign.
	Electrical hazard. The relevant text outlines conditions which could result fatal. The related instructions must be strictly respected.
	Danger hazard. Part or system under pressure.
	Danger hazard. Component or system which during the operation can reach high temperature.
	Danger hazard. It's absolutely forbidden to breathe the air treatment with this apparatus.
	Danger hazard. It's absolutely forbidden to use water to extinguish fire on the dryer or in the surrounding area.
	Danger hazard; It's absolutely forbidden to operate the machine when the parts (under pressure or electric panels) are not in place or have been tampered with and changed.
	Danger hazard: Machine level noise could be higher than 85 dBA. It is mandatory to install the machine in dedicated area where people are not normally present. The installer and/or the user is responsible for correct installation of the dryer, in order to prevent noise propagation to the near work environment. The installer and/or the user is also responsible for the safety signs affixing into installation site.
	Attention : the User or Operator must wear hearing protection before performing any procedure on the dryer. All personnel must select the proper PPD (Personal Protection Device) hearing protector ( earmuffs, ear canal caps or ear plugs) in order to prevent damage to the person's hearing.



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## 1.3 WARNINGS

	Maintenance and/or control operation to be very carefully performed by qualified personnel 1.
	Compressed air inlet connection point.
	Compressed air outlet connection point.
	Condensate drain connection point.
	Operations which can be worked out by the operator of the machine, if qualified 1.
	<p>In designing this unit a lot of care has been devoted to the protection of the environment:</p> <ul style="list-style-type: none"> <li>• Dryer and relevant packaging composed of recyclable materials.</li> <li>• Energy saving design.</li> </ul> <p>Not to spoil our commitment, the user should follow the few ecological suggestions marked with this sign.</p>
	<p>Compressed air is a highly hazardous energy source. Never work on the dryer with parts under pressure. Never point the compressed air or the condensate drain jet towards anybody.</p> <p>This user is responsible for the installation of the dryer, which has to be executed on the basis of the instructions given in the "Installation" chapter. Otherwise, the warranty will be voided and dangerous situations for the personnel and/or damages to the machine could occur.</p>
	<p>Only qualified personnel can use and service electrically powered devices. Before attempting any maintenance action, the following conditions must be satisfied :</p> <ul style="list-style-type: none"> <li>• Ensure that any part of the machine is under voltage and that it can not be connected to the mains.</li> <li>• Ensure that any part of the dryer is under pressure and that it cannot be connected to the compressed air system.</li> </ul>
	Any change to the machine or to the relevant operating parameters, if not previously verified and authorised by the Manufacturer, in addition to create the possibility of dangerous conditions it will void the warranty.
	Don't use water to extinguish fire on the dryer or in the surrounding area.

## 1.4 PROPER USE OF THE DRYER

This dryer has been designed, manufactured and tested only to be used to separate the humidity normally contained in compressed air. Any other use has to be considered improper. The Manufacturer will not be responsible for any problem arising from improper use; the user will be in any case responsible for any resulting damage.

Moreover, the correct use requires the compliance with the installation conditions, in particular:

- Voltage and frequency of the primary electrical supply.
- Pressure, temperature and flow rate of the incoming air.
- Ambient temperature.

This dryer is supplied tested and fully assembled. The only operation left to the user is the connection of the dryer to the plant in compliance with the instructions given in the following chapters.

The purpose of the machine is the separation of water present in compressed air. The dried air cannot be used for respiration purposes or for operations leading to direct contact with foodstuff, unless subject to further treatments.

### NOTE: PRE-FILTRATION REQUIRED

## 1.5 INSTRUCTIONS FOR THE USE OF PRESSURE EQUIPMENT

To ensure the safe operation of pressure equipments, the user must conform strictly to the following:

1. The equipment must only be operated within the temperature and pressure limits stated on the manufacturers name/data plate.
2. No welding is allowed on the shell and end caps.
3. The equipment must not be stored in badly ventilated spaces, near a heat source or inflammable substances.
4. Vibration must be eliminated from the equipment to prevent fatigue failure.
5. An internal inspection must be carried out at 12 month intervals to check for pressure equipment corrosion. The actual wall thickness of the tower after corrosion should not be less than the data indicated on the chart located on the side on the tower.
6. Condensate drains should be checked for operation every day to prevent a build up of condensate in the pressure equipment.
7. The maximum working pressure stated on the manufacturers data plate must not be exceeded.
8. All documentation supplied with the equipment (manual, declaration of conformity etc.) must be kept for future reference.



# SECTION 2

## INTRODUCTION

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### 2.1 INTRODUCTION

In that MMD-VP system, two towers allow for continuous adsorption of water vapor from compressed air by using the hygroscopic desiccant with high crush strength and a high surface/ volume ratio. First- ly, pre-filtered compressed air flows into one of the towers. In that tower, water is held at high pressure. Af- ter the adsorbent has been saturated. Then, the adsorption of water vapor is switch over to the other tank and the second tank starts to adsorption. Meanwhile, the regeneration process started in the first tank by depressurizing the tower without the use of heat. The wet bed is dried by a small portion of dry air from the outlet at near atmospheric pressure and with help of a vacuum pump. The output of the dried air efficien- cy is increased by using the vacuum pump. Just only 2% of dried air need to be used for the regeneration process of dried air. After the regeneration process will be finished and the adsorption process will be taken over in the first tank again. With that cycle -40°C ( -70°C optional ) dew point can be achieved continuously.

### 2.3 PRESSURE SWING ADSORPTION (PSA)



A small percentage of dried air is taken from the dryer outlet flow and is used to regenerate the saturated chamber by expanding the dried air from line pressu- re to atmospheric pressure. During this process, the moisture is physically removed from the regenerating chamber and ven- ted to atmosphere through the exhaust.

### 2.2 GENERAL SPECIFICATION

Outlet Dewpoint: -40°C (-40°F)  
Optional: 70°C (-100°F)  
  
Noise Level <85 dB(A)

Dryer Model	Dryer Flow Rate (m3/h)	Vacuum Pump (kw)	Connection Size	Voltage	Max. Working Pressure (bar)	T Filter Model
MMD-VP-60	100	1,1	1 1/2"	400/3/50	16	G0N-35
MMD-DWG-VP-60	100	1,1	1 1/2"	400/3/50	16	G0N-35
MMD-VP-75	130	1,1	1 1/2"	400/3/50	16	G0N-35
MMD-VP-100	170	1,3	1 1/2"	400/3/50	16	G0N-35
MMD-VP-120	200	2,2	1 1/2"	400/3/50	16	G0N-35
MMD-VP-180	300	2,2	1 1/2"	400/3/50	16	G0N-35
MMD-VP-240	400	3	1 1/2"	400/3/50	16	G0N-35
MMD-VP-340	575	4	1 1/2"	400/3/50	16	G0N-35
MMD-VP-400	680	4	2"	400/3/50	16	G0N-35
MMD-VP-500	850	5,5	2"	400/3/50	16	G0N-35
MMD-VP-590	1000	5,5	2"	400/3/50	16	G0N-35

## SECTION 3 INTRODUCTION

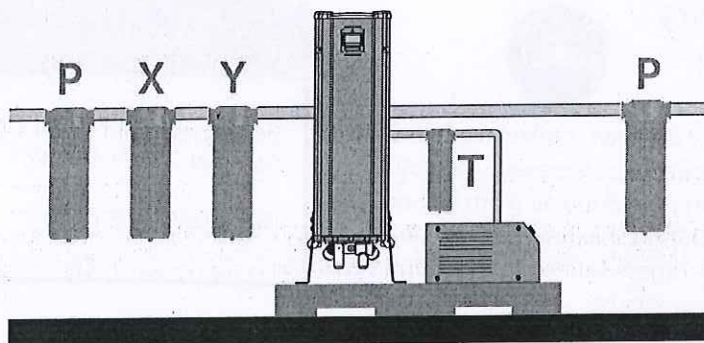
### 3.1 ESSENTIAL INFORMATION

Care must be taken to ensure that the dryer is not subject to flows (even peaks) in excess of the dryers rated capacity, e.g. dryers downstream of an air receiver have increased potential to be overflowed.

The dryer can be installed free standing, secured to the floor via the fastening points provided in the base or secured to a wall using optional brackets.

The dryer must be installed vertical and level. Suitable rated pipe and connections must be used for the installation. All pipework must be secure and safely positioned.

The purge flow is factory set for 7 bar (100 psig) inlet pressure operation. Should the minimum pressure requirement be different, the purge flow must be reset by a Drytec engineer or a Drytec approved agent. Ensure the dryer is electrically connected to a supply suitable for the unit. See wiring diagram printed in 2.3 Electrical Details.



Filtration: A 0.01 micron coalescer and a 1 micron particle after filter is INCLUDED between the vacuum pump and dryer.

### 3.2 TECHNICAL SPECIFICATIONS

Operating Specifications			
Parameters	Min.	Max.	Nominal
Inlet Pressure	4 barg (60psig)	16barg (246,5psig)	7barg (100psig)
Ambient Air Temperature	1,6°C (34°F)	50°C (122°F)	35°C (95°F)
Inlet Temperature	5°C (41°F)	50°C (122°F)	35°C (95°F)
Electrical Specifications			
Dryer Model	Voltage Supply	Supply Need	Model
MMD VP Series	400 V	3 Phase	50 Hz



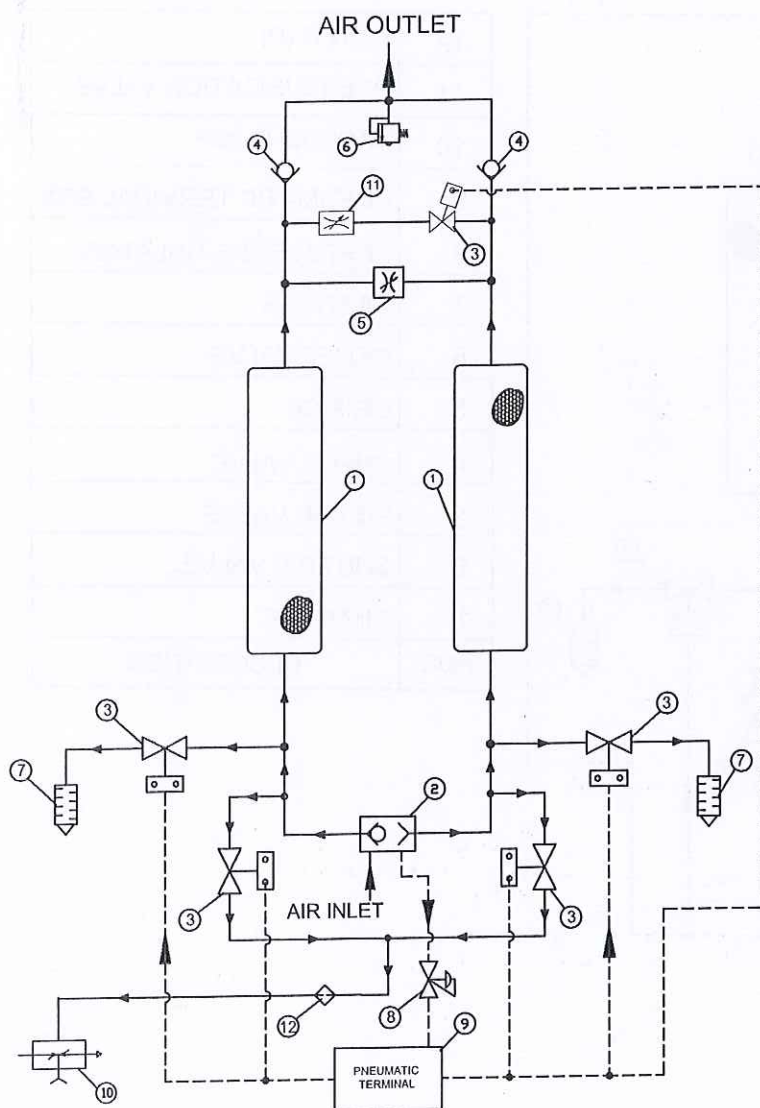
## SECTION 4

# DRAWINGS

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### 4.1. P&I Drawing - MMD VP 60 / MMD VP 60 DWG

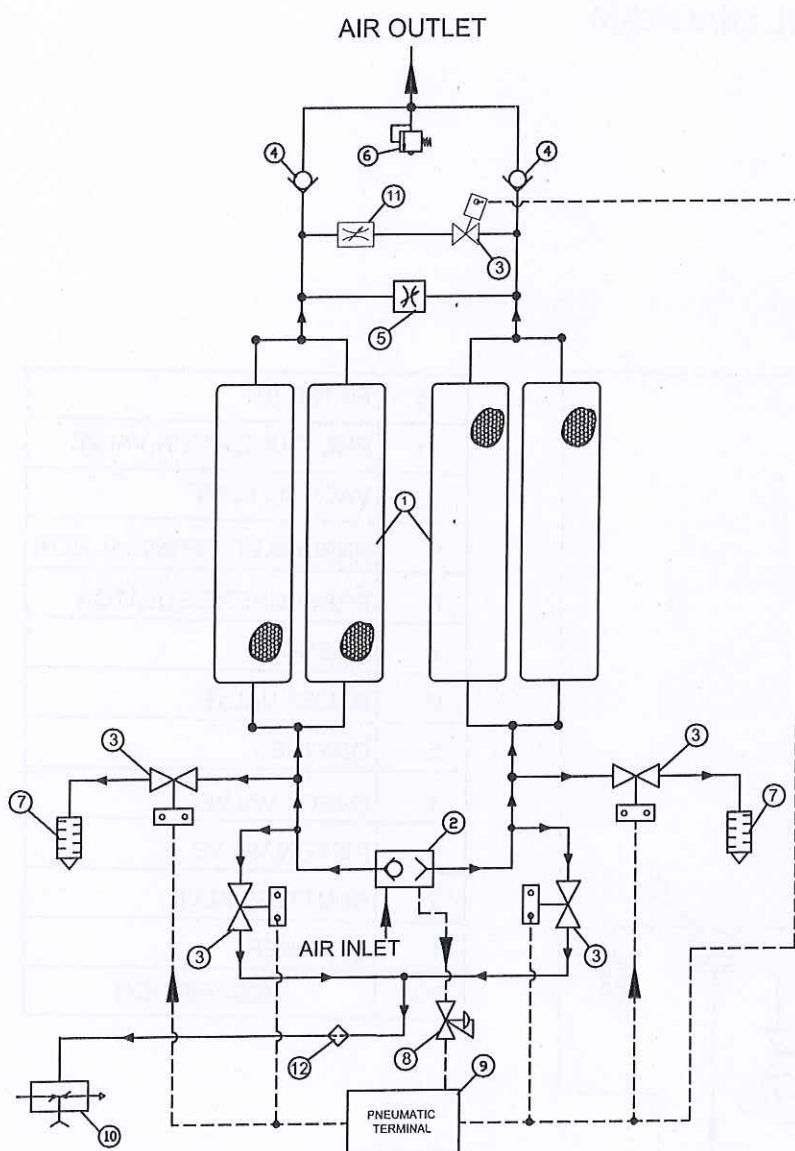
#### SYSTEM PRESSURE CONTROL DIAGRAM



12	FILTER (P)
11	PRESSURIZATION VALVE
10	VACUUM PUMP
9	PNEUMATIC TERMINAL BOX
8	PRESSURERE GULATOR
7	SILENCER
6	RELIEF VALVE
5	ORIFICE
4	CHECK VALVE
3	PISTON VALVE
2	SHUTTLE VALVE
1	CHAMBER
POS.	DESCRIPTION

## 4.1. P&I Drawing - MMD VP 75

### SYSTEM PRESSURE CONTROL DIAGRAM

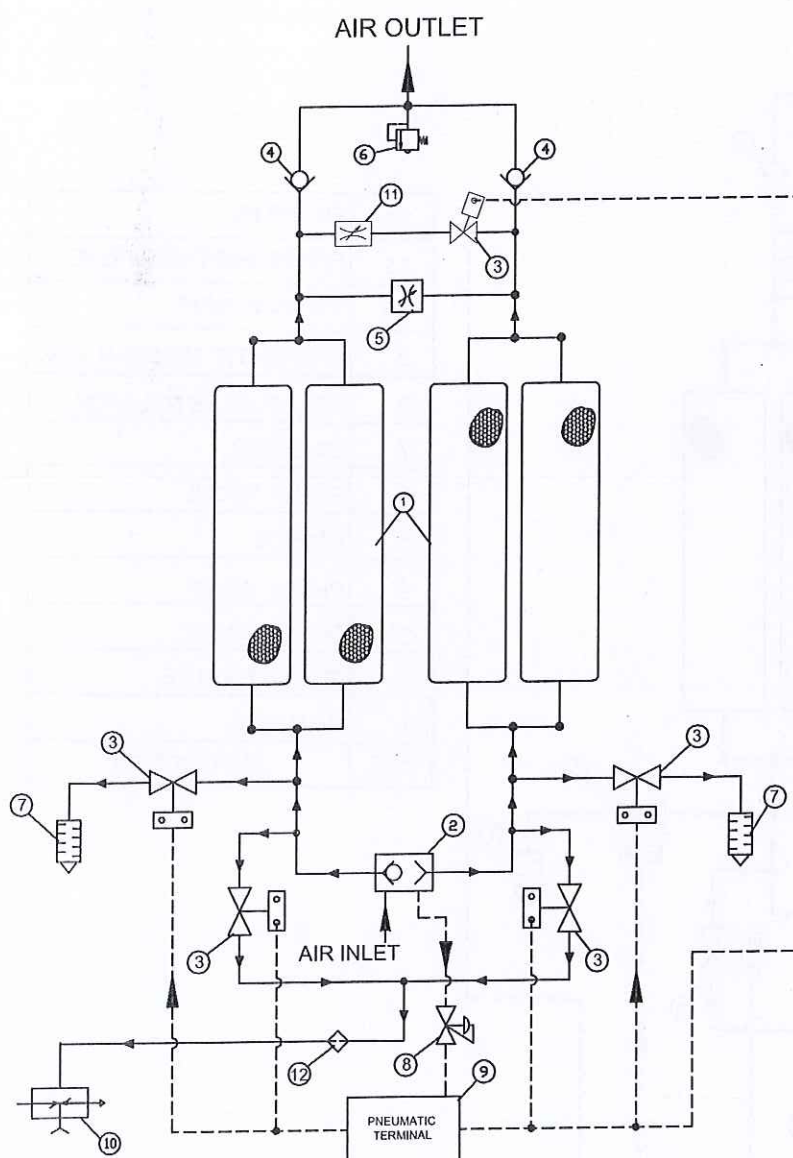


12	FILTER (P)
11	PRESSURIZATION VALVE
10	VACUUM PUMP
9	PNEUMATIC TERMINAL BOX
8	PRESSURERE GULATOR
7	SILENCER
6	RELIEF VALVE
5	ORIFICE
4	CHECK VALVE
3	PISTON VALVE
2	SHUTTLE VALVE
1	CHAMBER
POS.	DESCRIPTION



## 4.1. P&I Drawing - MMD VP 100

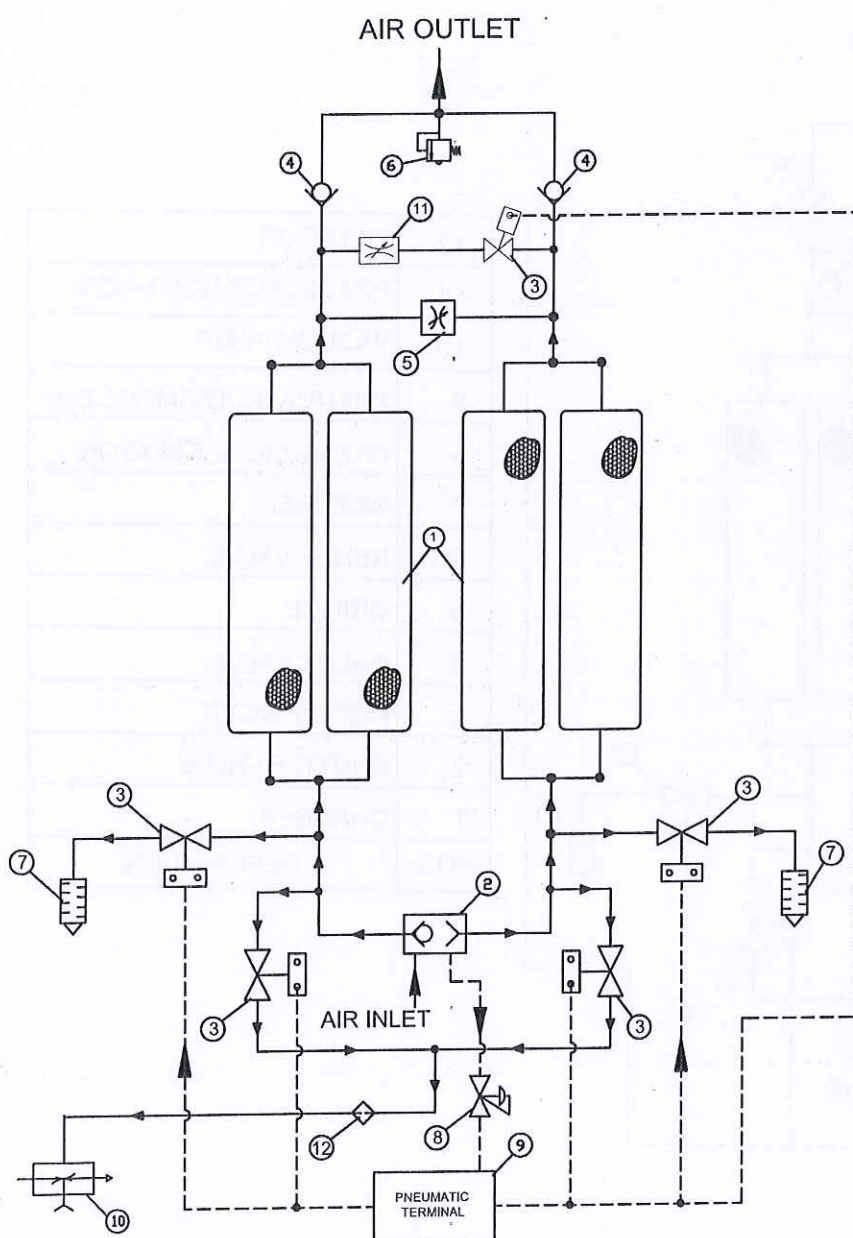
### SYSTEM PRESSURE CONTROL DIAGRAM



12	FILTER (P)
11	PRESSURIZATION VALVE
10	VACUUM PUMP
9	PNEUMATIC TERMINAL BOX
8	PRESSURERE GULATOR
7	SILENCER
6	RELIEF VALVE
5	ORIFICE
4	CHECK VALVE
3	PISTON VALVE
2	SHUTTLE VALVE
1	CHAMBER
POS.	DESCRIPTION

# 4.1. P&I Drawing - MMD VP 120

## SYSTEM PRESSURE CONTROL DIAGRAM

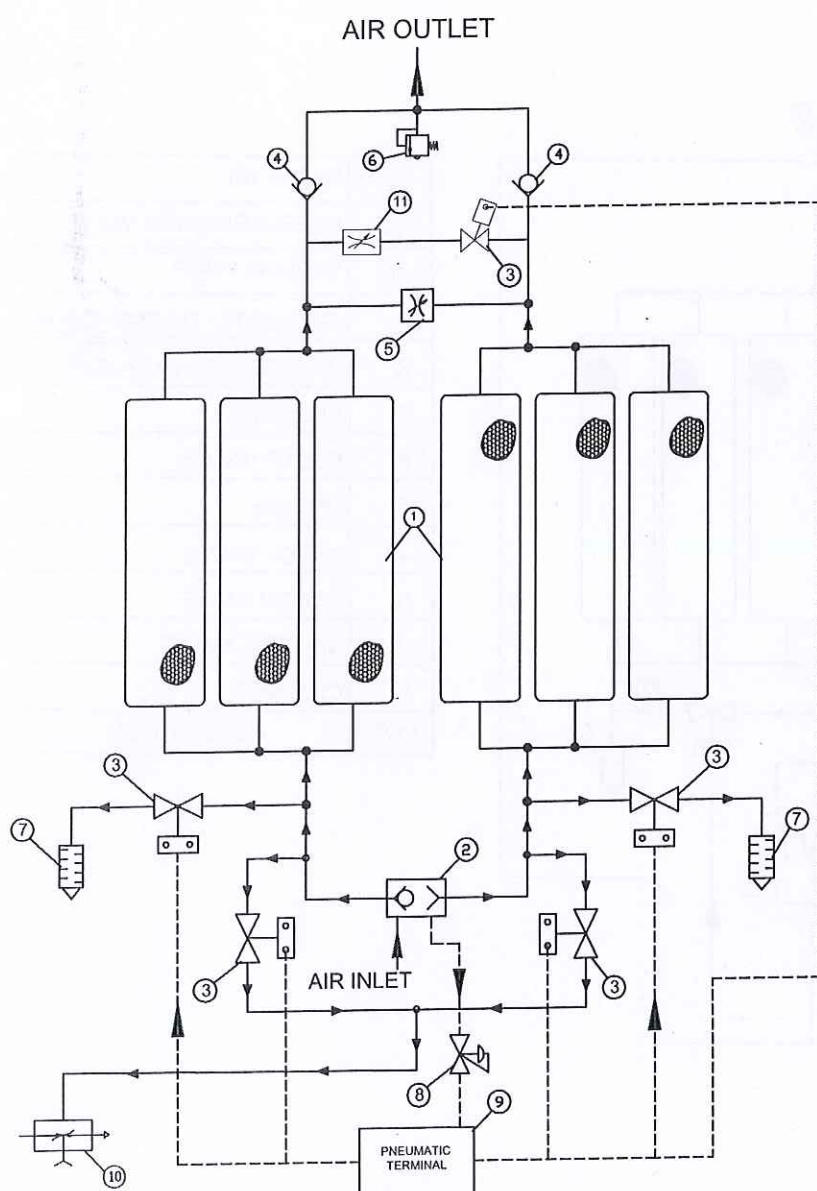


12	FILTER (P)
11	PRESSURIZATION VALVE
10	VACUUM PUMP
9	PNEUMATIC TERMINAL BOX
8	PRESSURERE GULATOR
7	SILENCER
6	RELIEF VALVE
5	ORIFICE
4	CHECK VALVE
3	PISTON VALVE
2	SHUTTLE VALVE
1	CHAMBER
POS.	DESCRIPTION



## 4.1. P&I Drawing - MMD VP 180

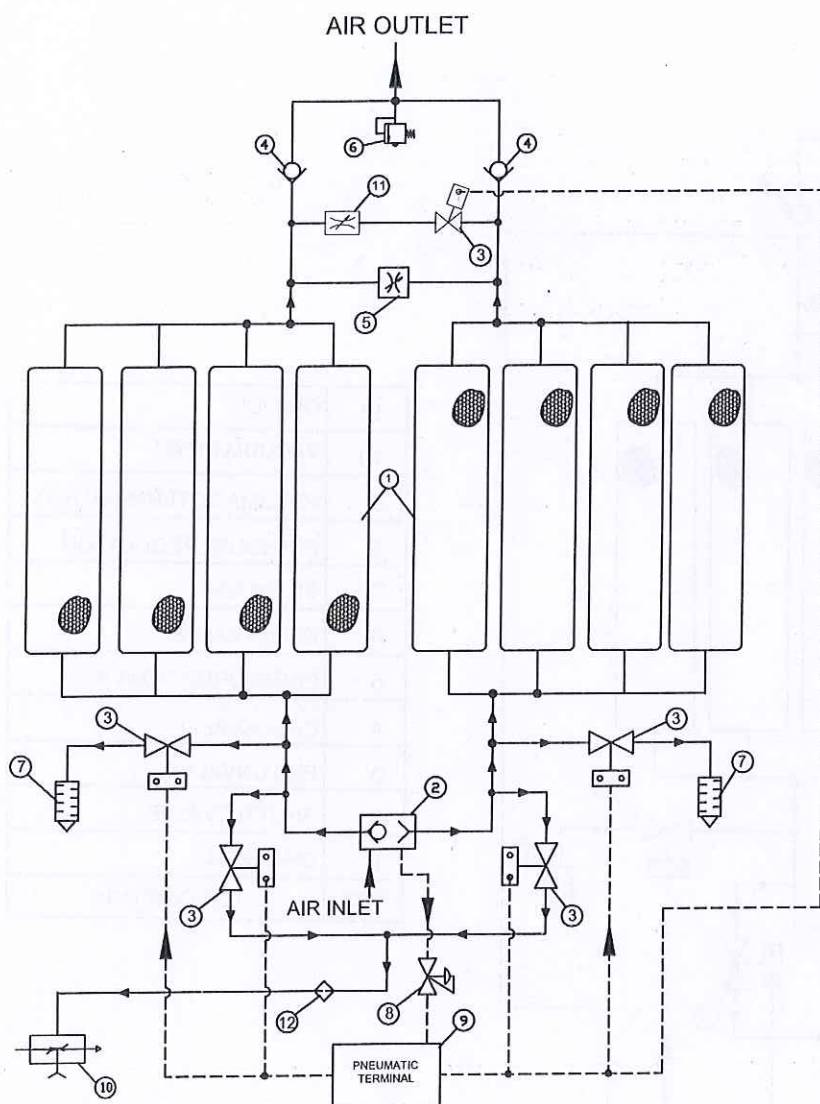
### SYSTEM PRESSURE CONTROL DIAGRAM



11	ORIFICE
10	VACUUM PUMP
9	PNEUMATIC TERMINAL BOX
8	PRESSURE REGULATOR
7	SILENCER
6	RELIEF VALVE
5	PRESSURIZATION VALVE
4	CHECK VALVE
3	PISTON VALVE
2	SHUTTLE VALVE
1	CHAMBER
POS.	DESCRIPTION

# 4.1. P&I Drawing - MMD VP 240

## SYSTEM PRESSURE CONTROL DIAGRAM

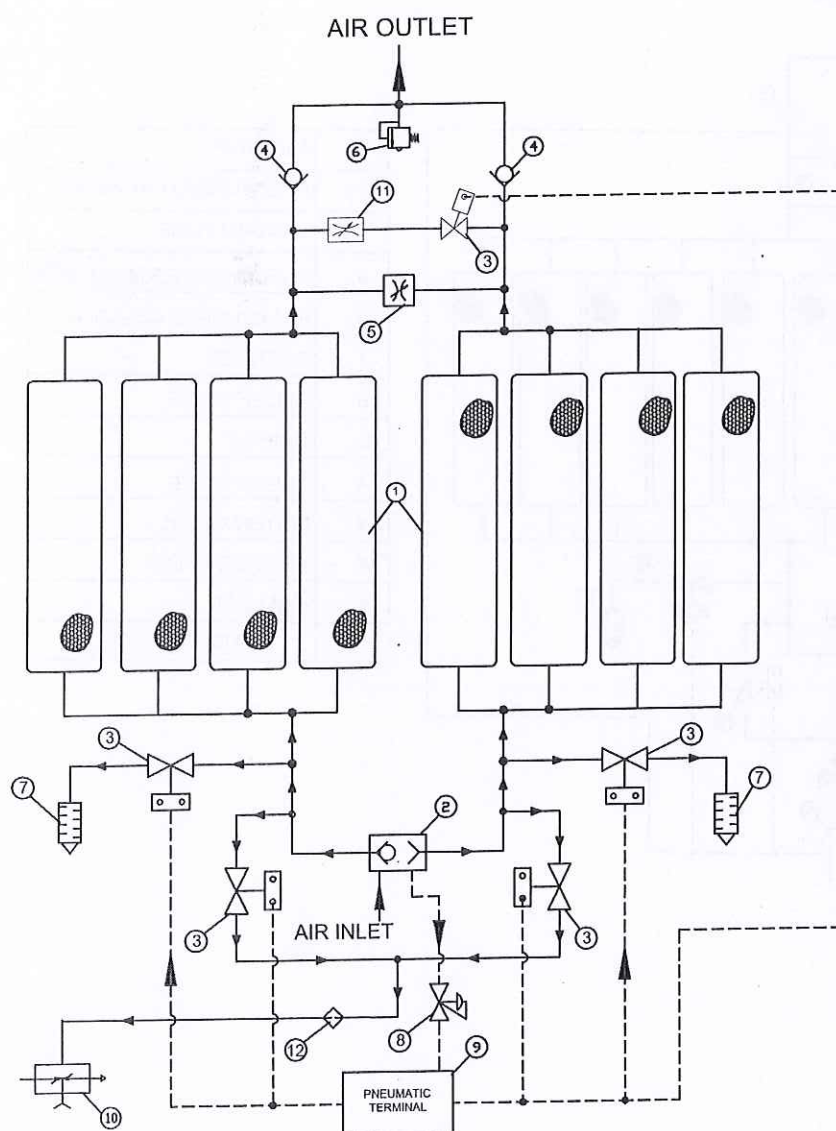


12	FILTER (P)
11	PRESSURIZATION VALVE
10	VACUUM PUMP
9	PNEUMATIC TERMINAL BOX
8	PRESSURERE GULATOR
7	SILENCER
6	RELIEF VALVE
5	ORIFICE
4	CHECK VALVE
3	PISTON VALVE
2	SHUTTLE VALVE
1	CHAMBER
POS.	DESCRIPTION



## 4.1. P&I Drawing - MMD VP 340

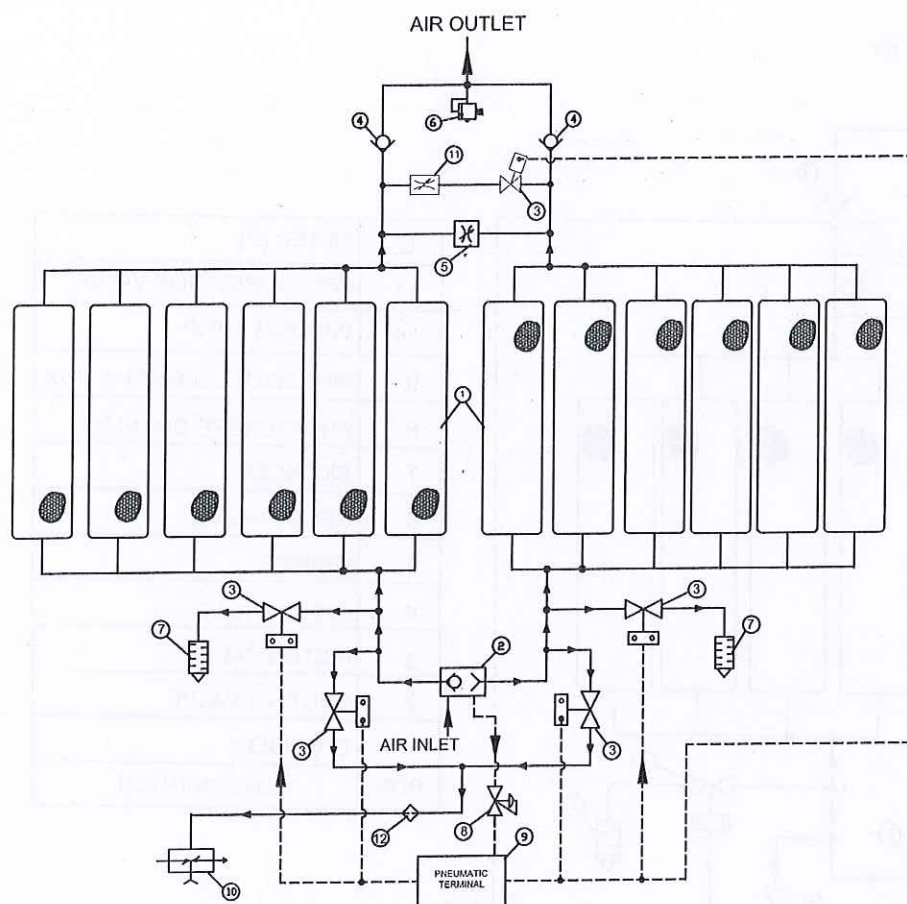
### SYSTEM PRESSURE CONTROL DIAGRAM



12	FILTER (P)
11	PRESSURIZATION VALVE
10	VACUUM PUMP
9	PNEUMATIC TERMINAL BOX
8	PRESSURERE GULATOR
7	SILENCER
6	RELIEF VALVE
5	ORIFICE
4	CHECK VALVE
3	PISTON VALVE
2	SHUTTLE VALVE
1	CHAMBER
POS.	DESCRIPTION

# 4.1. P&I Drawing - MMD VP 400

## SYSTEM PRESSURE CONTROL DIAGRAM



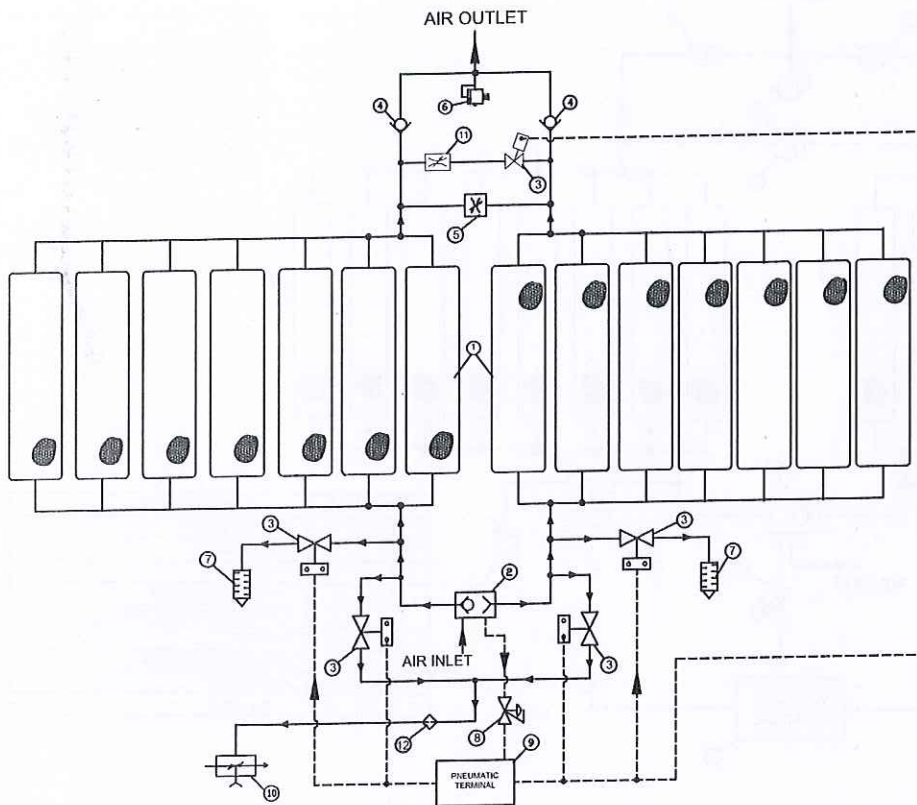
12	FILTER (P)
11	PRESSURIZATION VALVE
10	VACUUM PUMP
9	PNEUMATIC TERMINAL BOX
8	PRESSURERE GULATOR
7	SILENCER
6	RELIEF VALVE
5	ORIFICE
4	CHECK VALVE
3	PISTON VALVE
2	SHUTTLE VALVE
1	CHAMBER
POS.	DESCRIPTION



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# 4.1. P&I Drawing - MMD VP 500

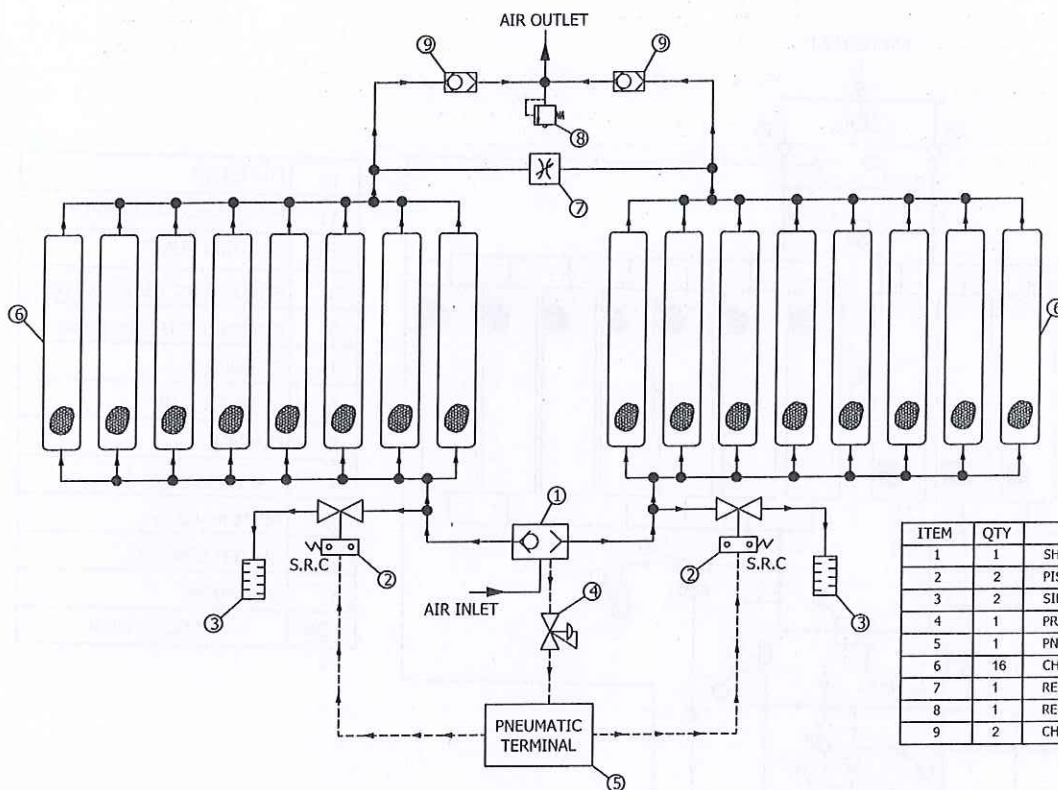
## SYSTEM PRESSURE CONTROL DIAGRAM



12	FILTER (P)
11	PRESSURIZATION VALVE
10	VACUUM PUMP
9	PNEUMATIC TERMINAL BOX
8	PRESSURERE GULATOR
7	SILENCER
6	RELIEF VALVE
5	ORIFICE
4	CHECK VALVE
3	PISTON VALVE
2	SHUTTLE VALVE
1	CHAMBER
POS.	DESCRIPTION

# 4.1. P&I Drawing - MMD VP 590

## SYSTEM PRESSURE CONTROL DIAGRAM

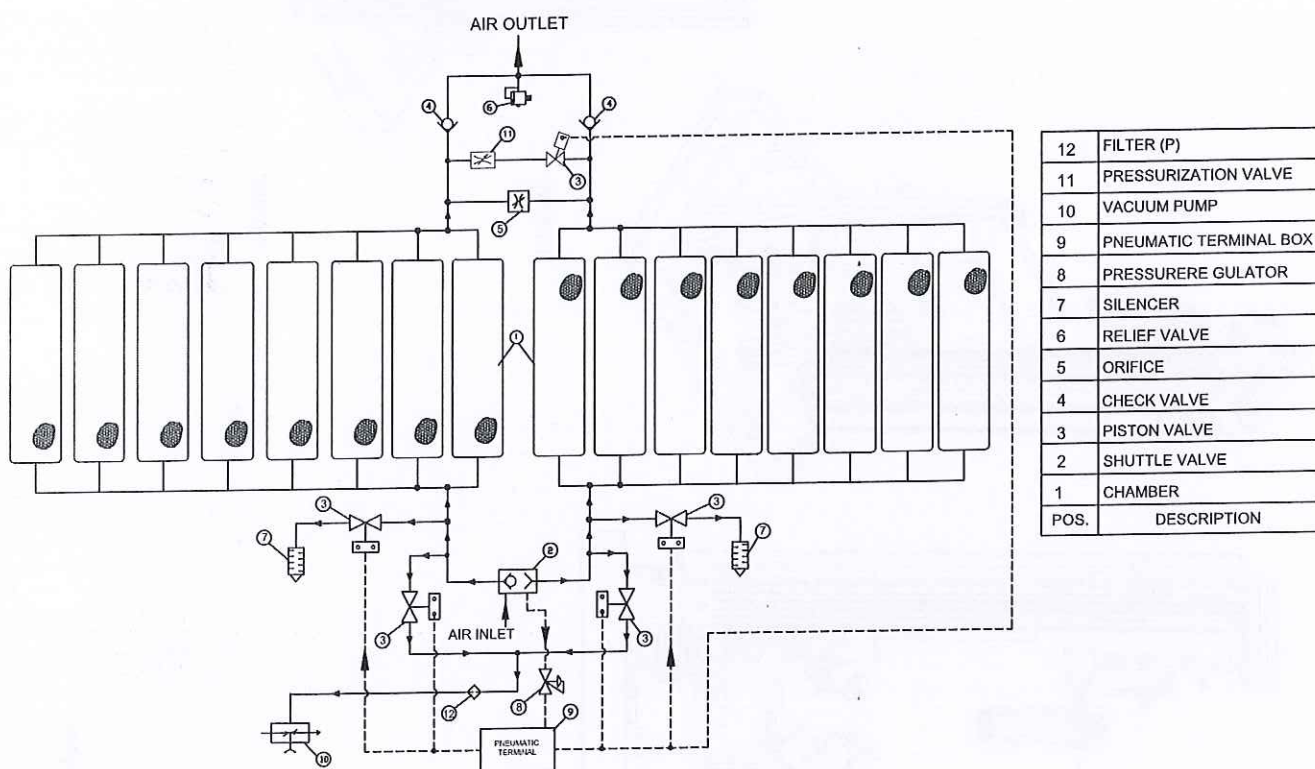


ITEM	QTY	DESCRIPTION
1	1	SHUTTLE VALVE
2	2	PISTON VALVE
3	2	SILENCER
4	1	PRESSURE REGULATOR
5	1	PNEUMATIC TERMINAL BOX
6	16	CHAMBER
7	1	REGENERATION ORIFICE
8	1	RELIEF VALVE
9	2	CHECK VALVE

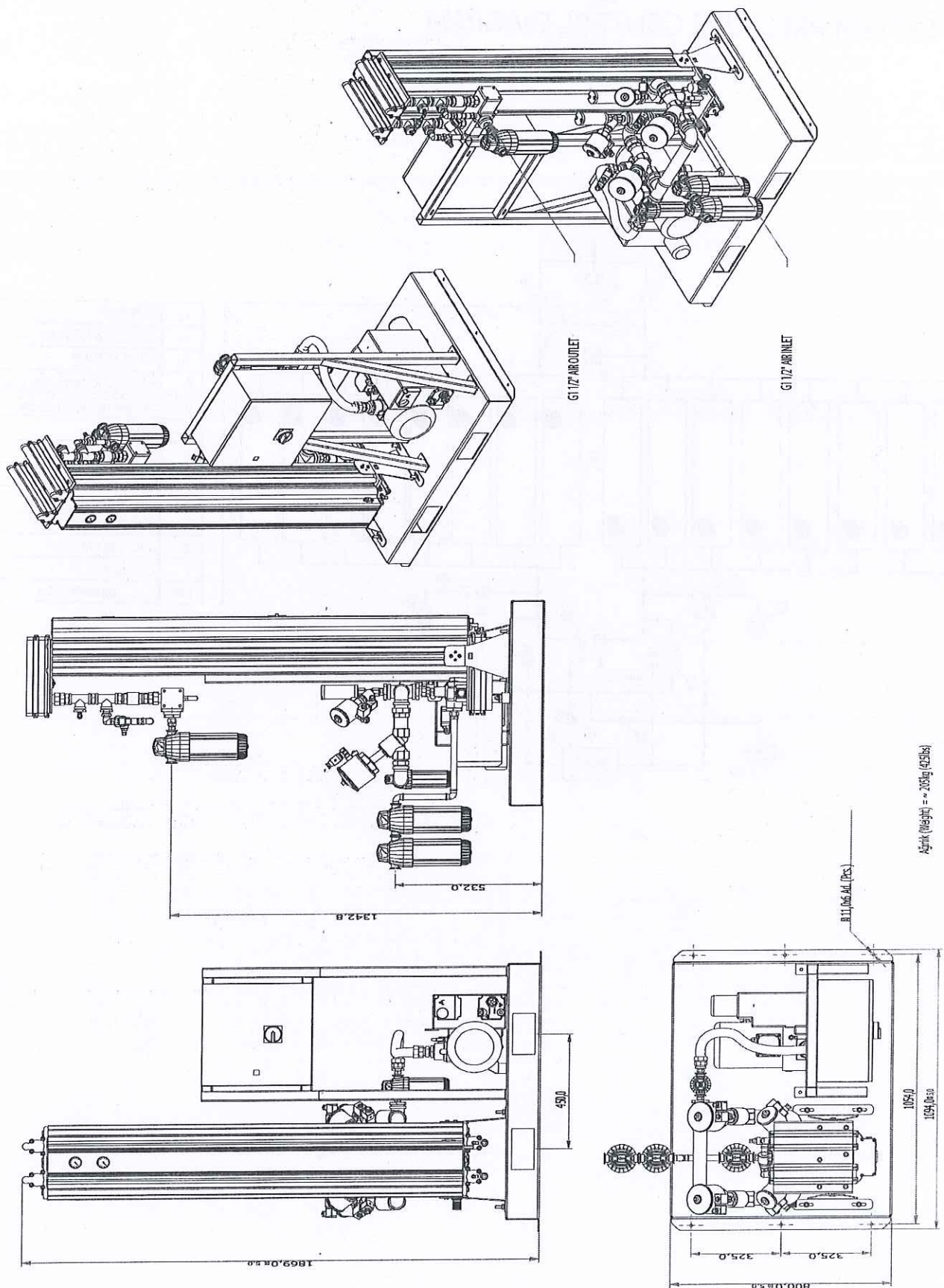


## 4.1. P&I Drawing - MMD VP 735

### SYSTEM PRESSURE CONTROL DIAGRAM

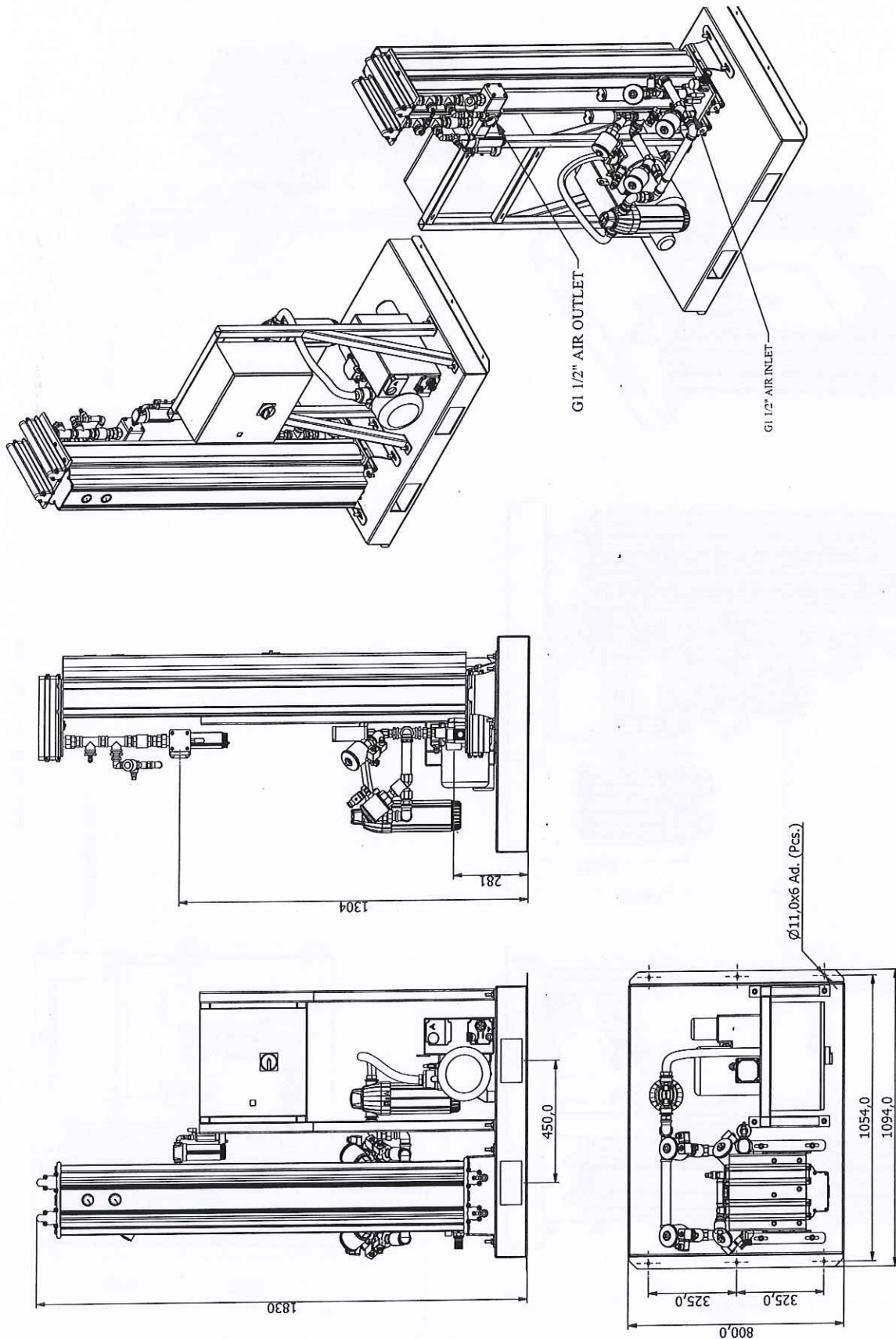


## 4.2. ID Drawing - MMD VP 60

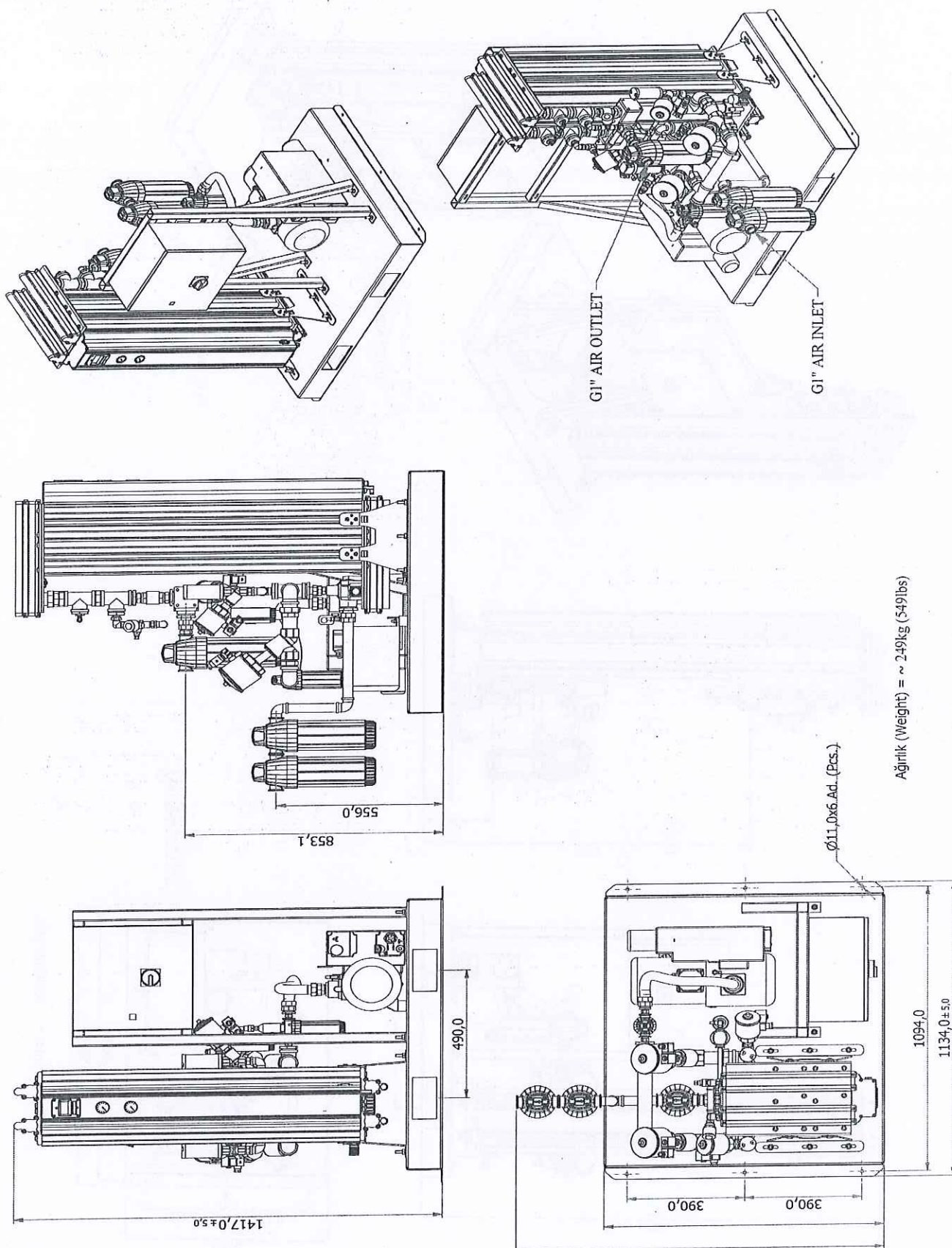




## 4.2. ID Drawing - MMD VP 60 DWG

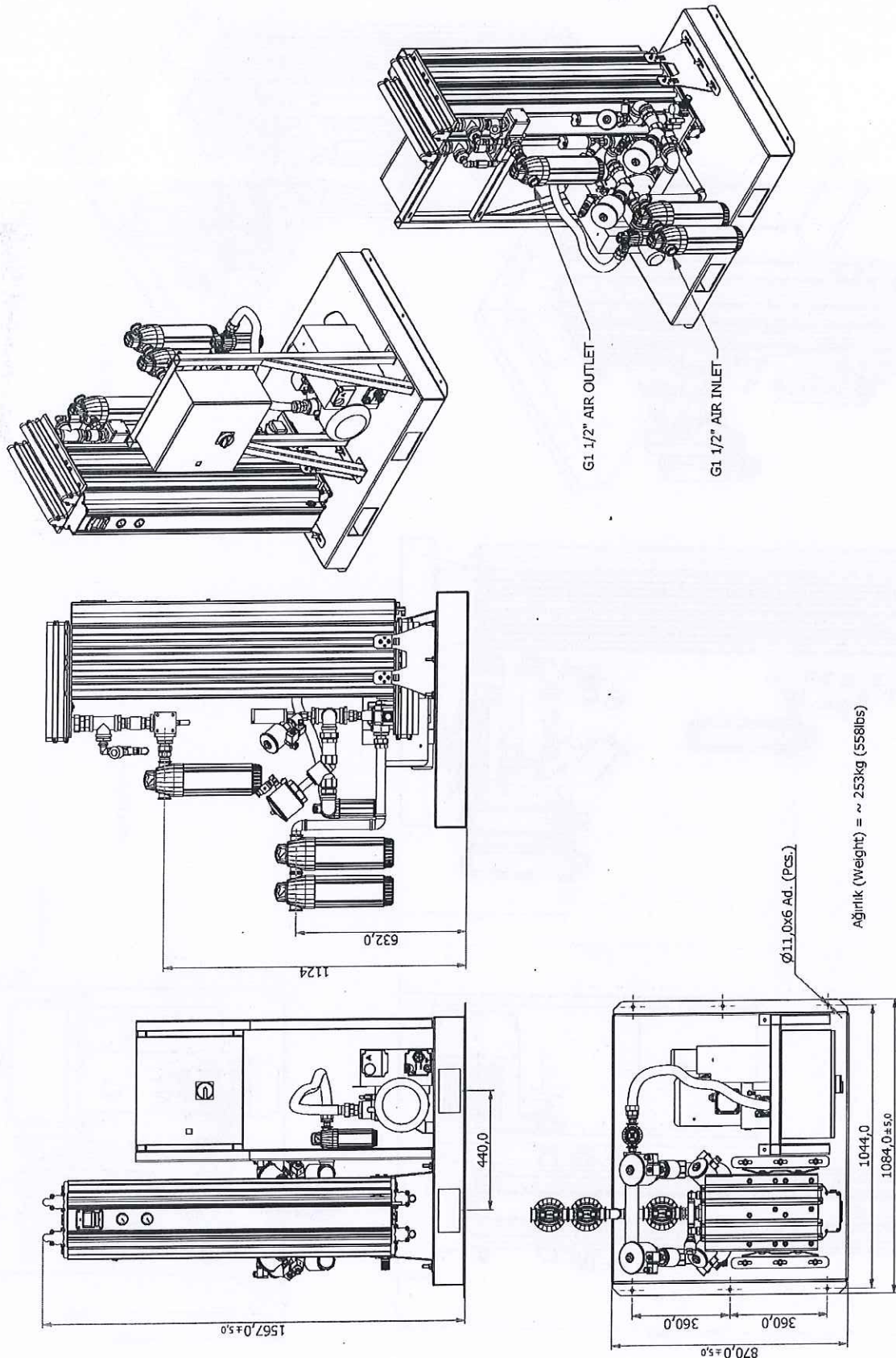


## 4.2. ID Drawing - MMD VP 75

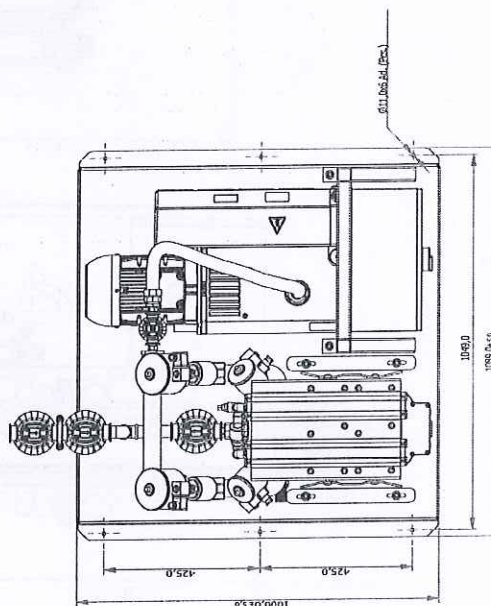
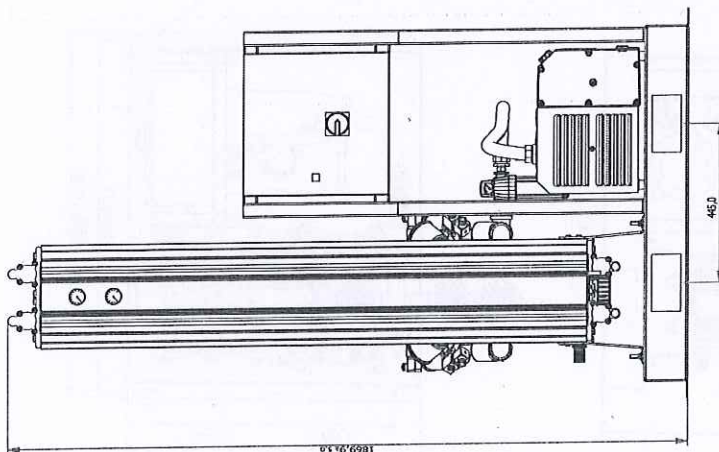
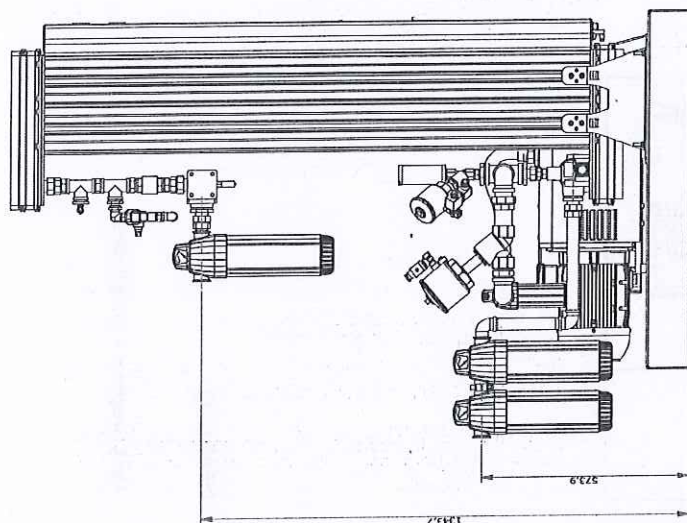
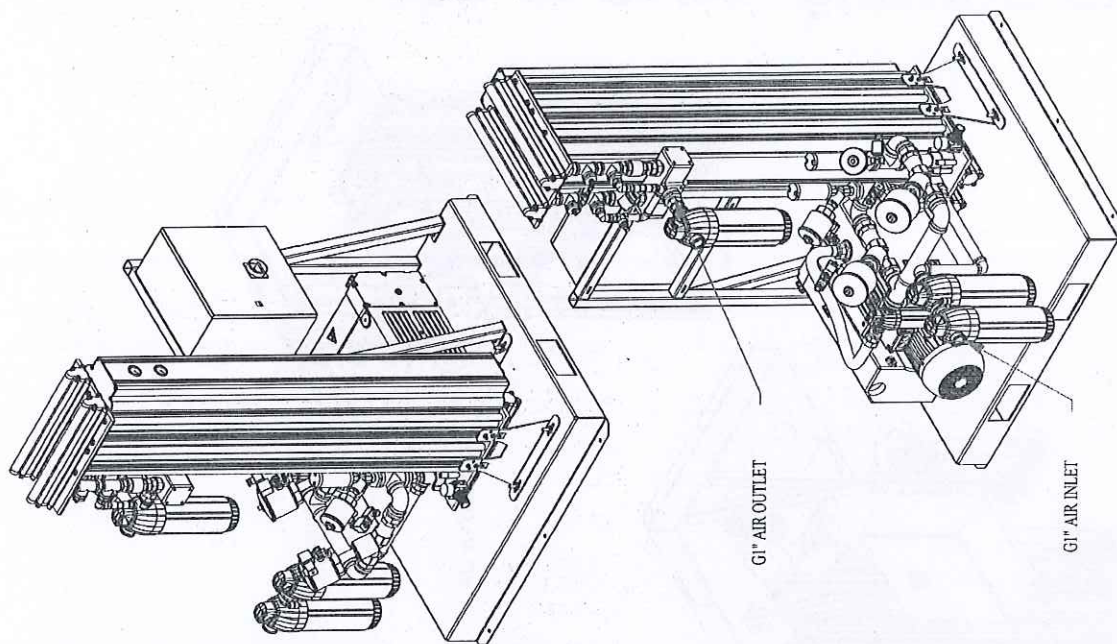




## 4.2. ID Drawing - MMD VP 100



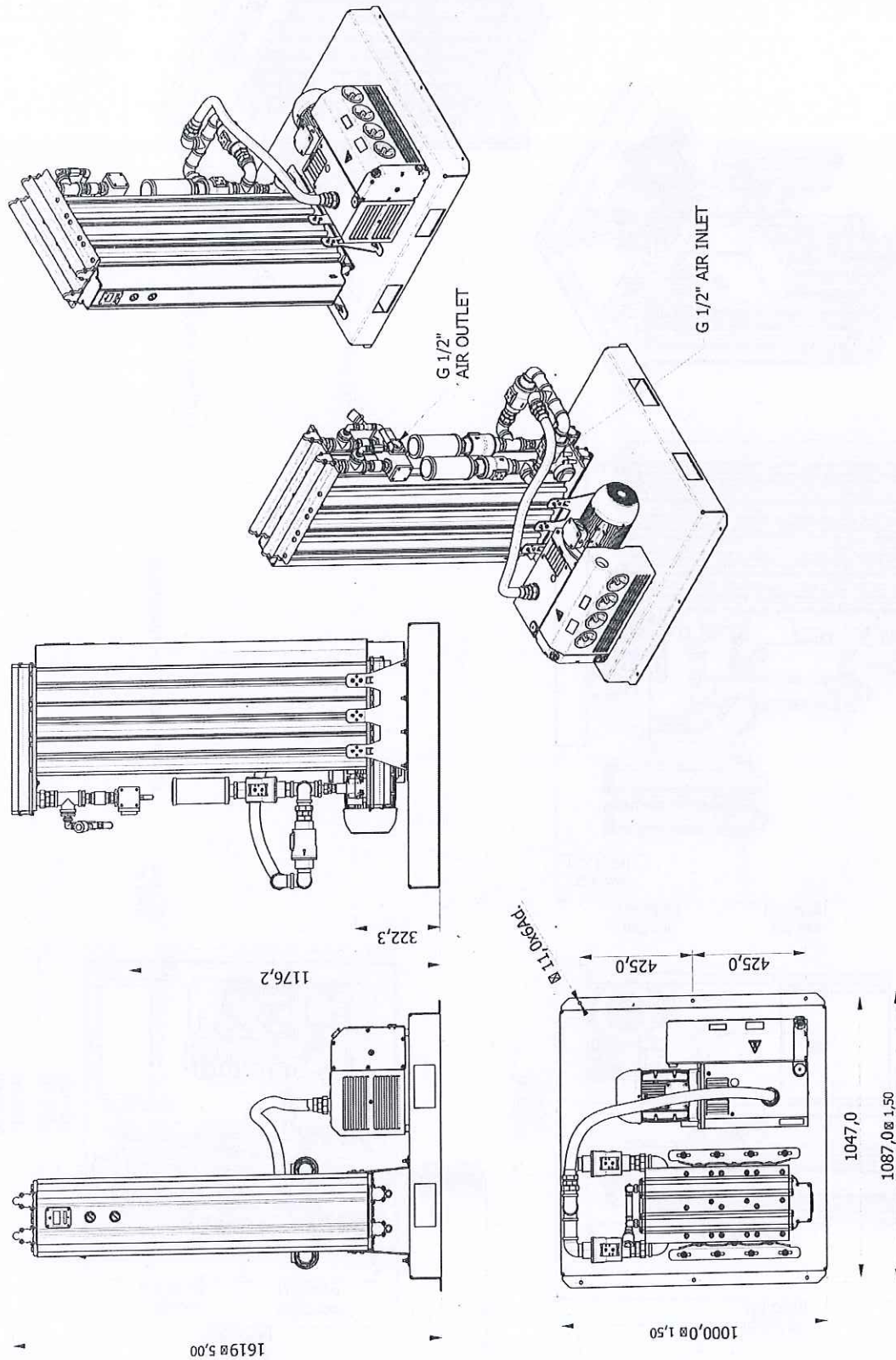
## 4.2. ID Drawing - MMD VP 120



Agrik (Weight) = ~ 333kg (734lbs)

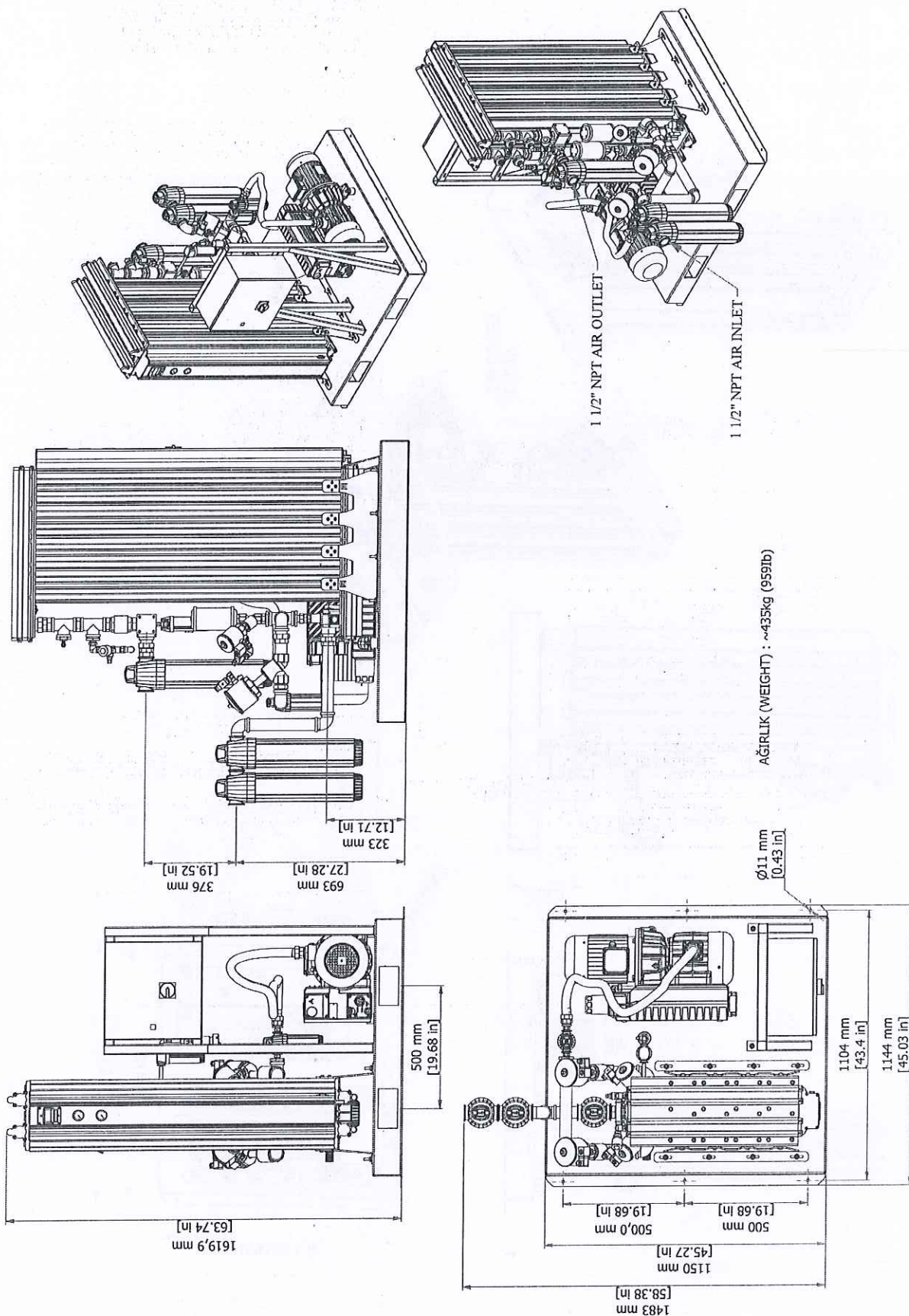


## 4.2. ID Drawing - MMD VP 180

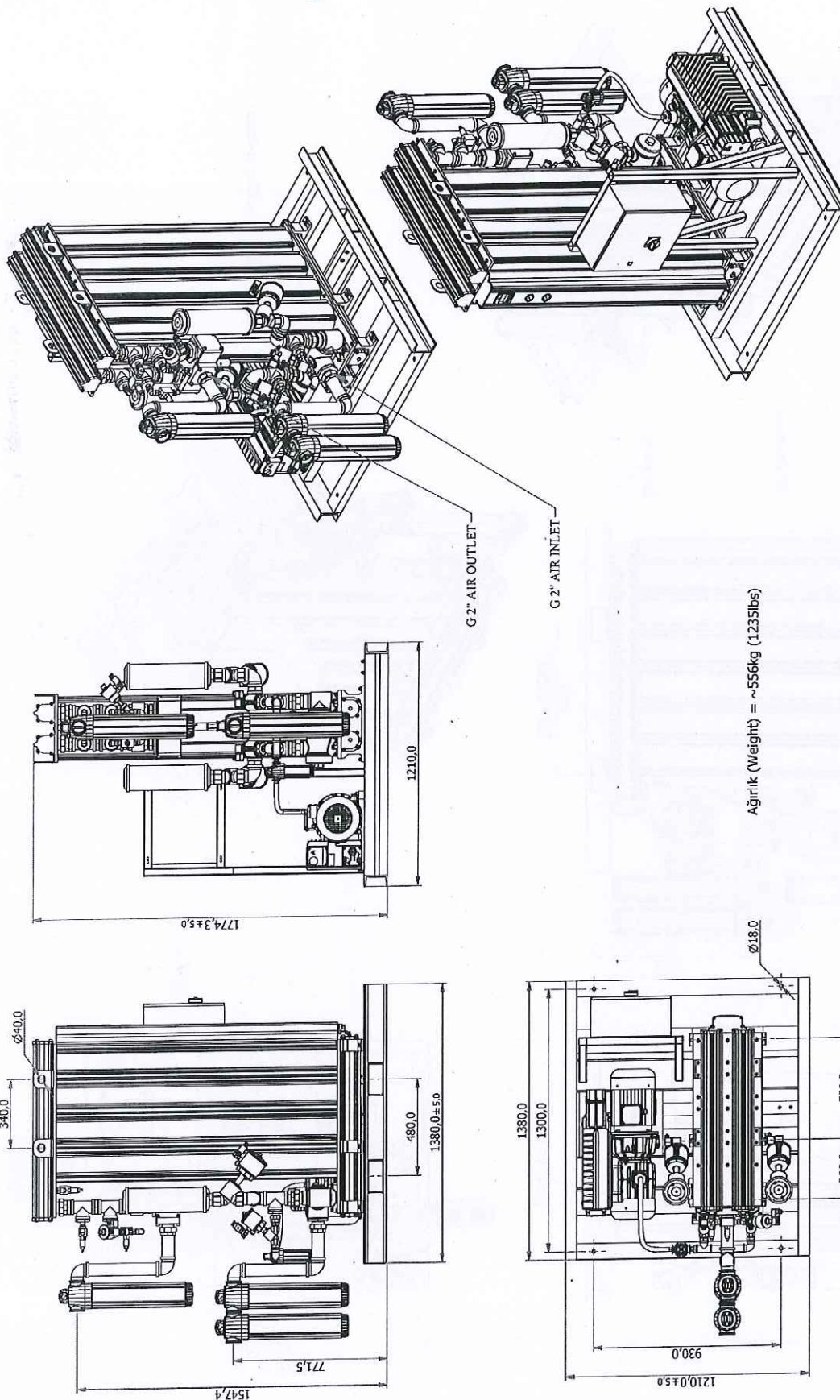




## 4.2. ID Drawing - MMD VP 240

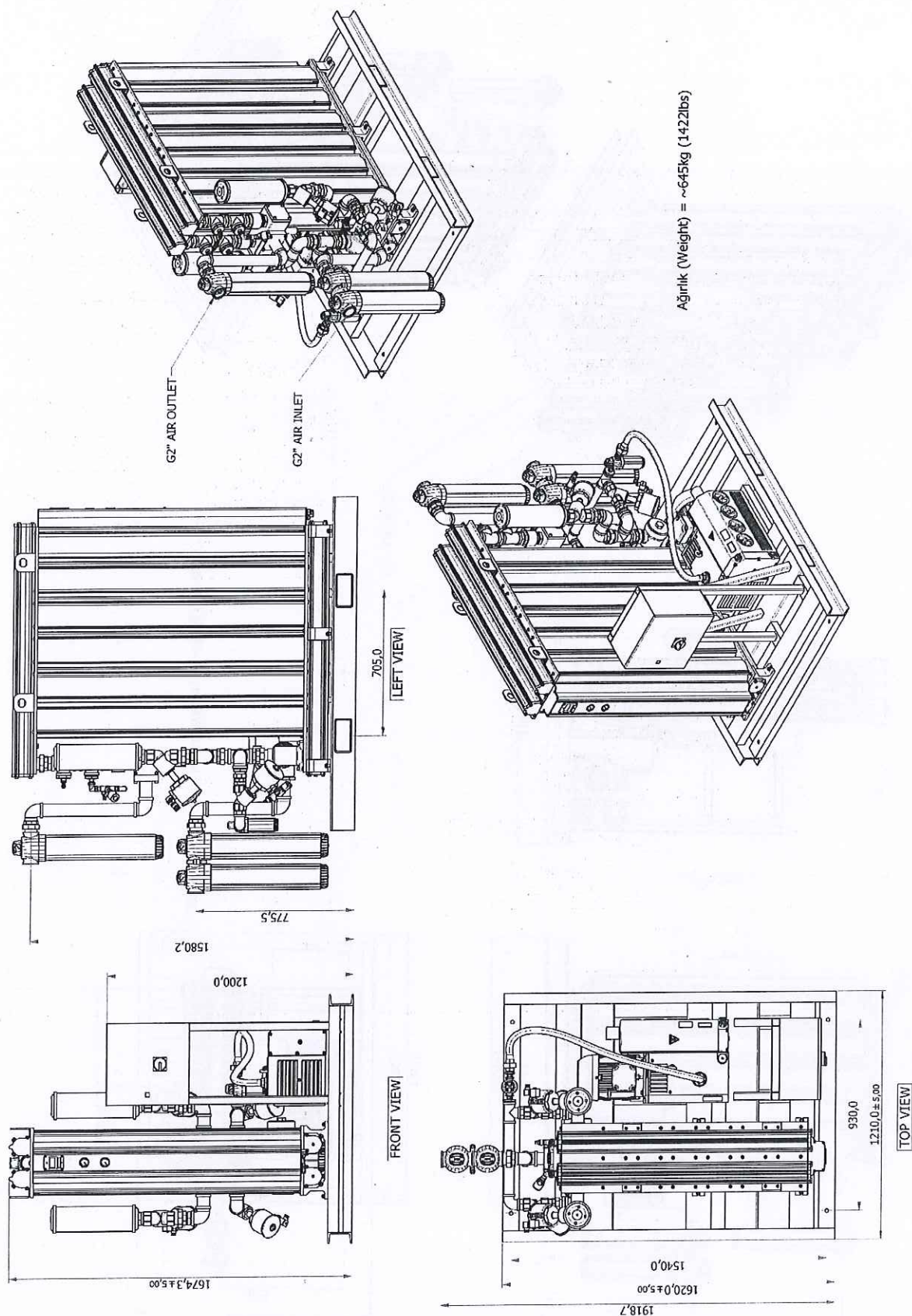


## 4.2. ID Drawing - MMD VP 340



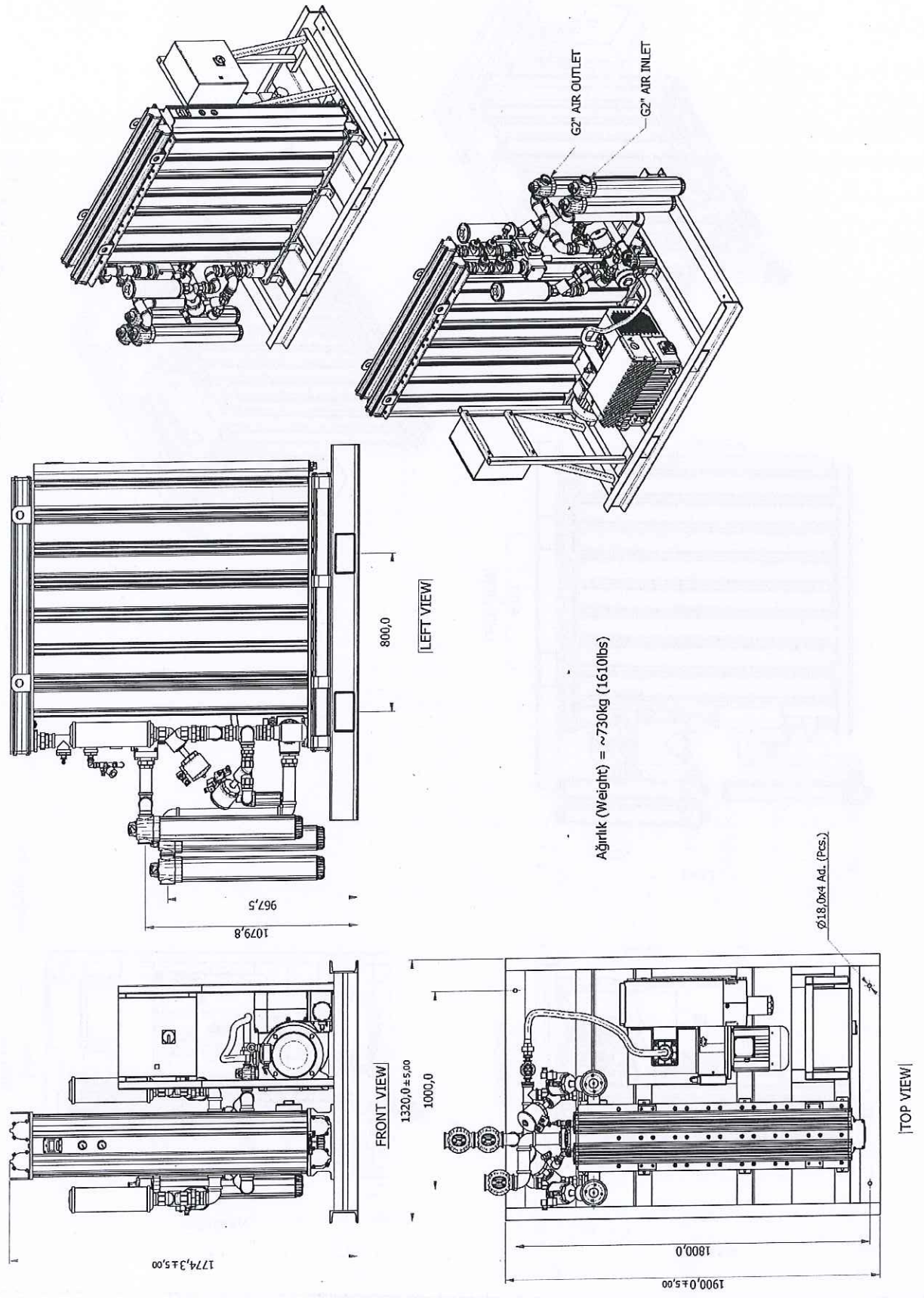


## 4.2. ID Drawing - MMD VP 400

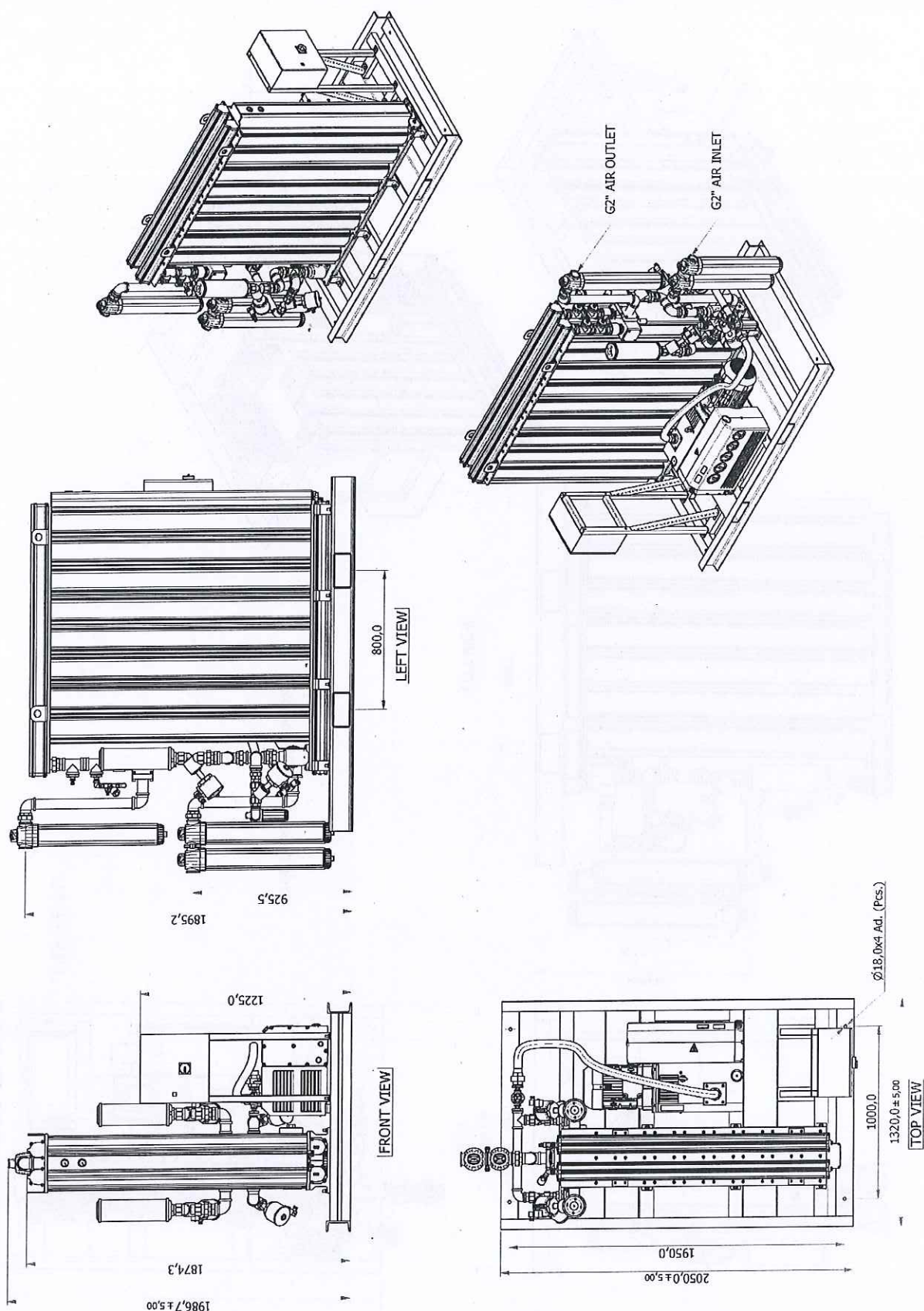




## 4.2. ID Drawing - MMD VP 500

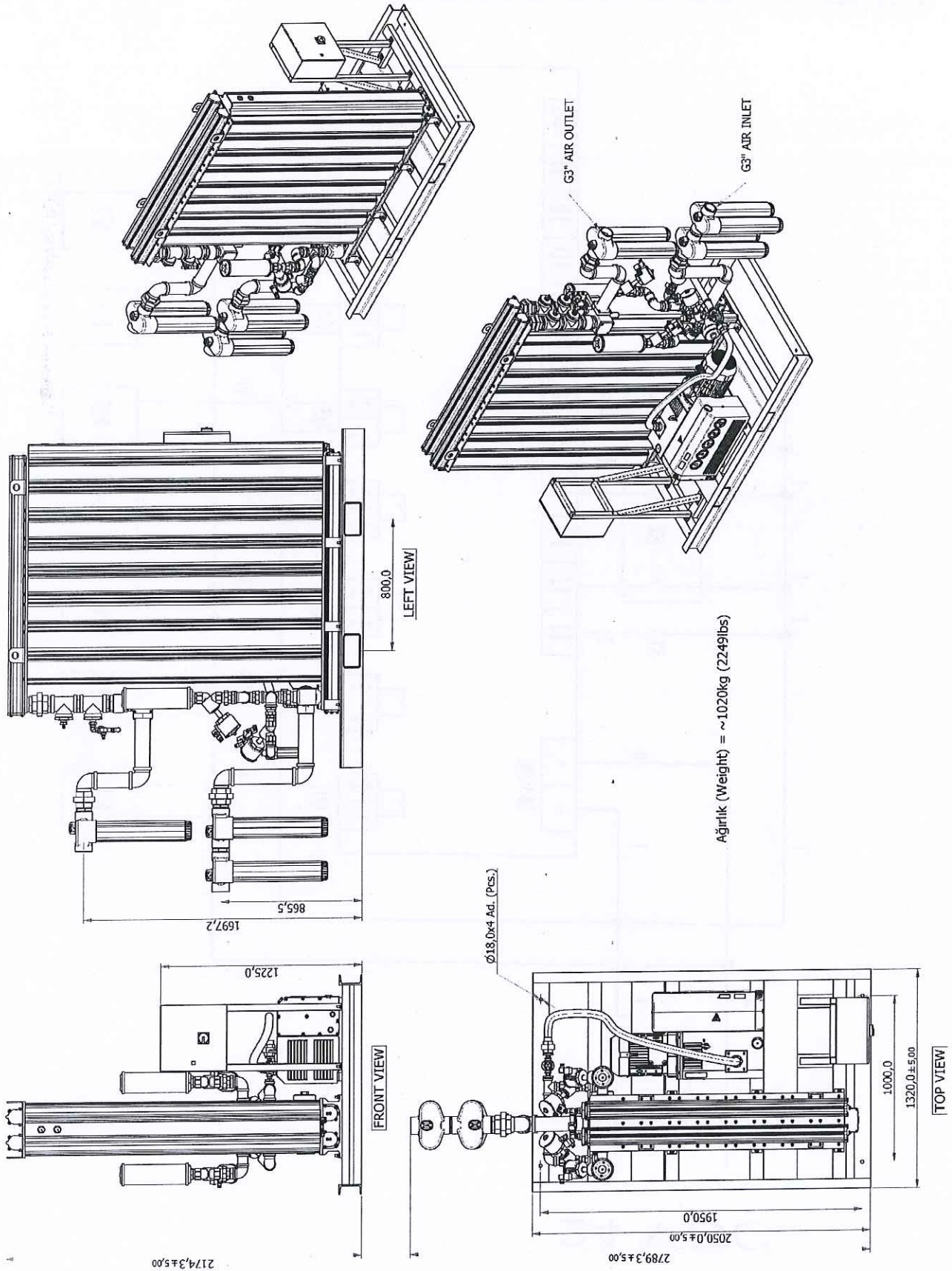


## 4.2. ID Drawing - MMD VP 590



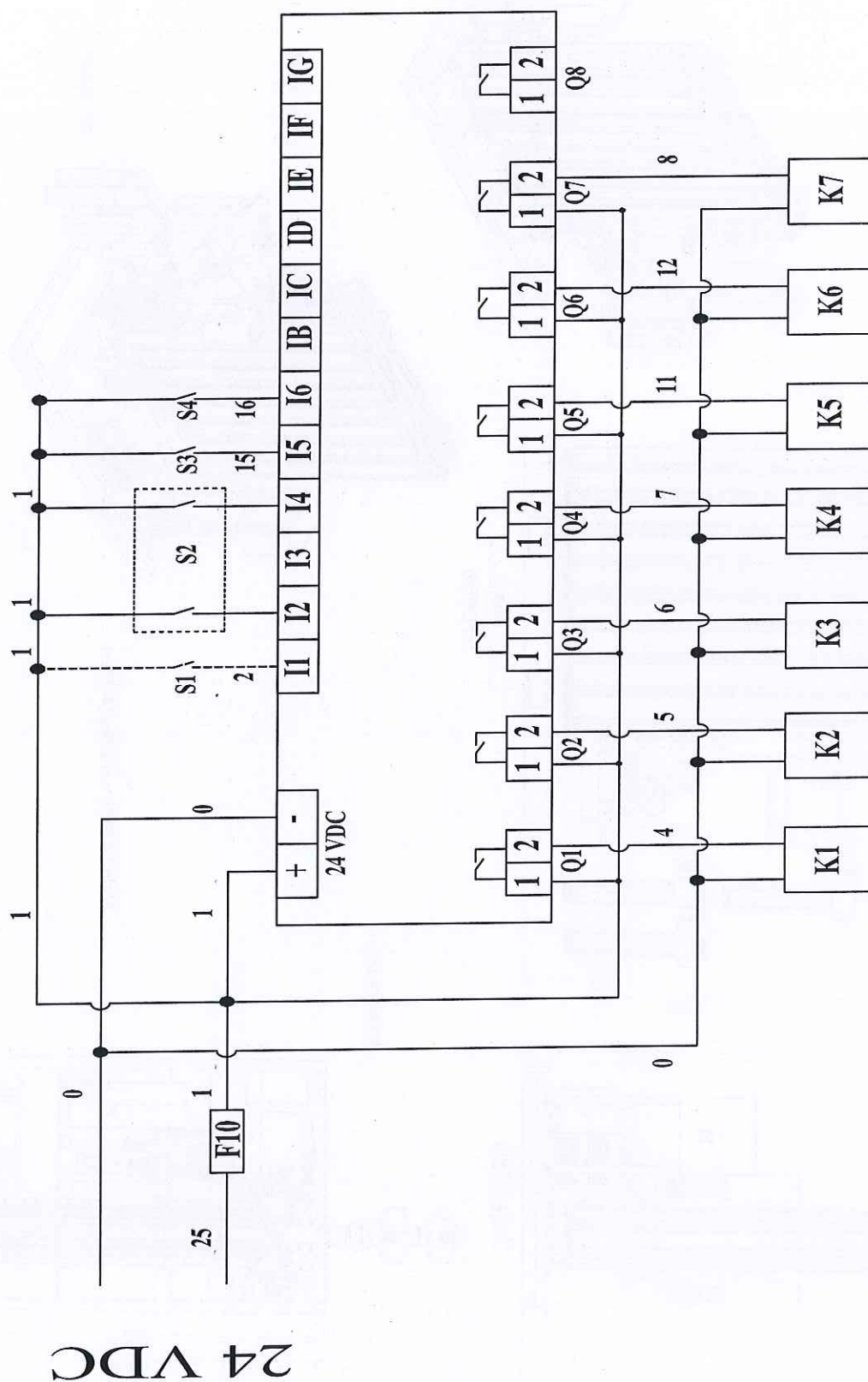


## 4.2. ID Drawing - MMD VP 735

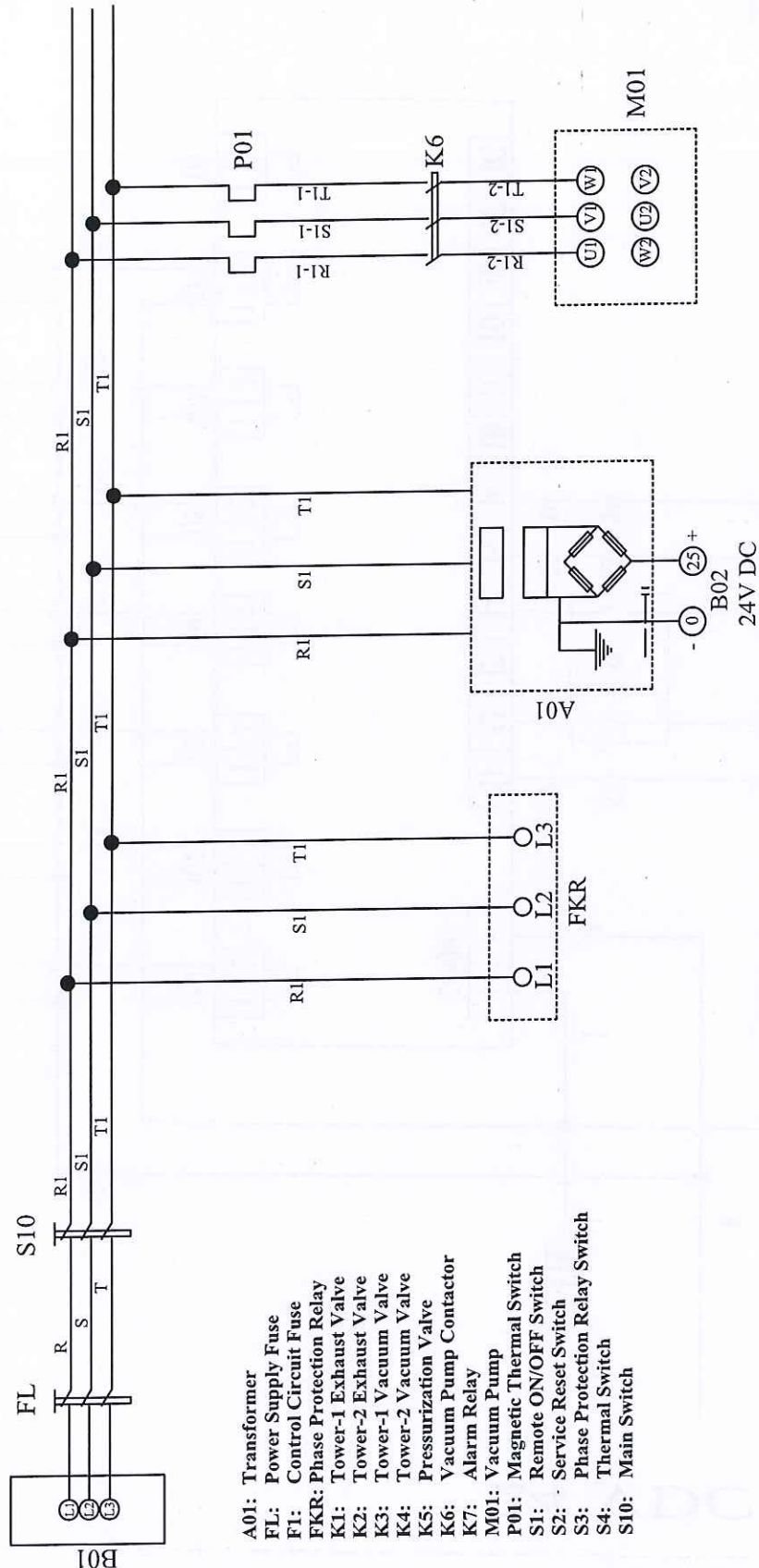




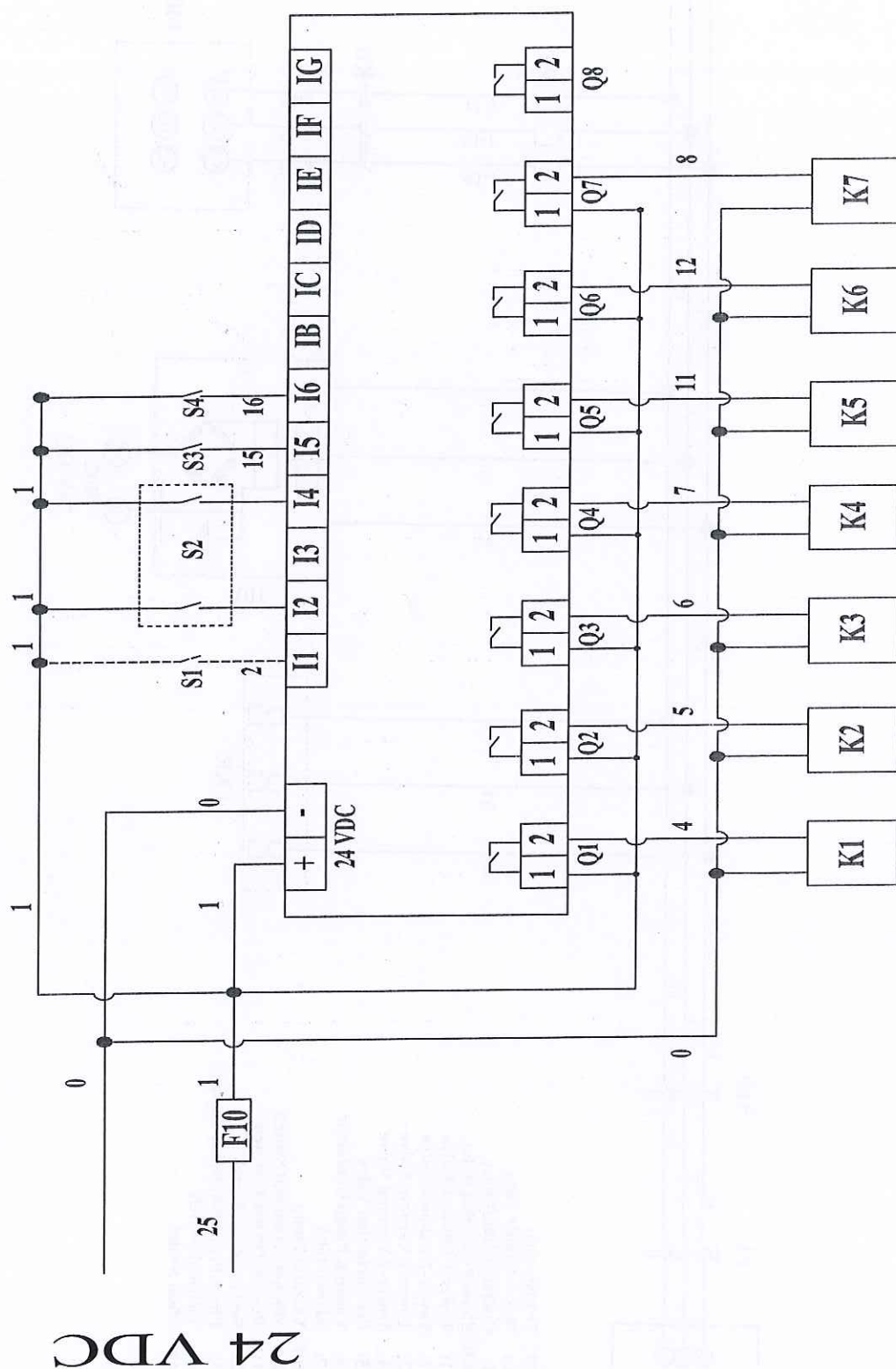
## 4.3. WD Drawing MMD VP 60 DWG Control



## 4.3. WD Drawing MMD VP 60 DWG Power



# 4.3. WD Drawing MMD VP 180 - MMD VP 735 Control

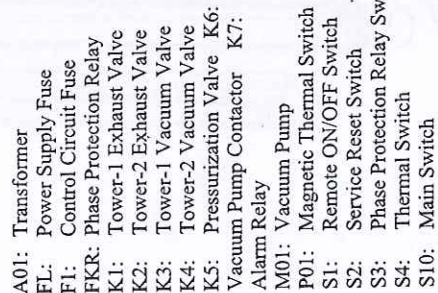




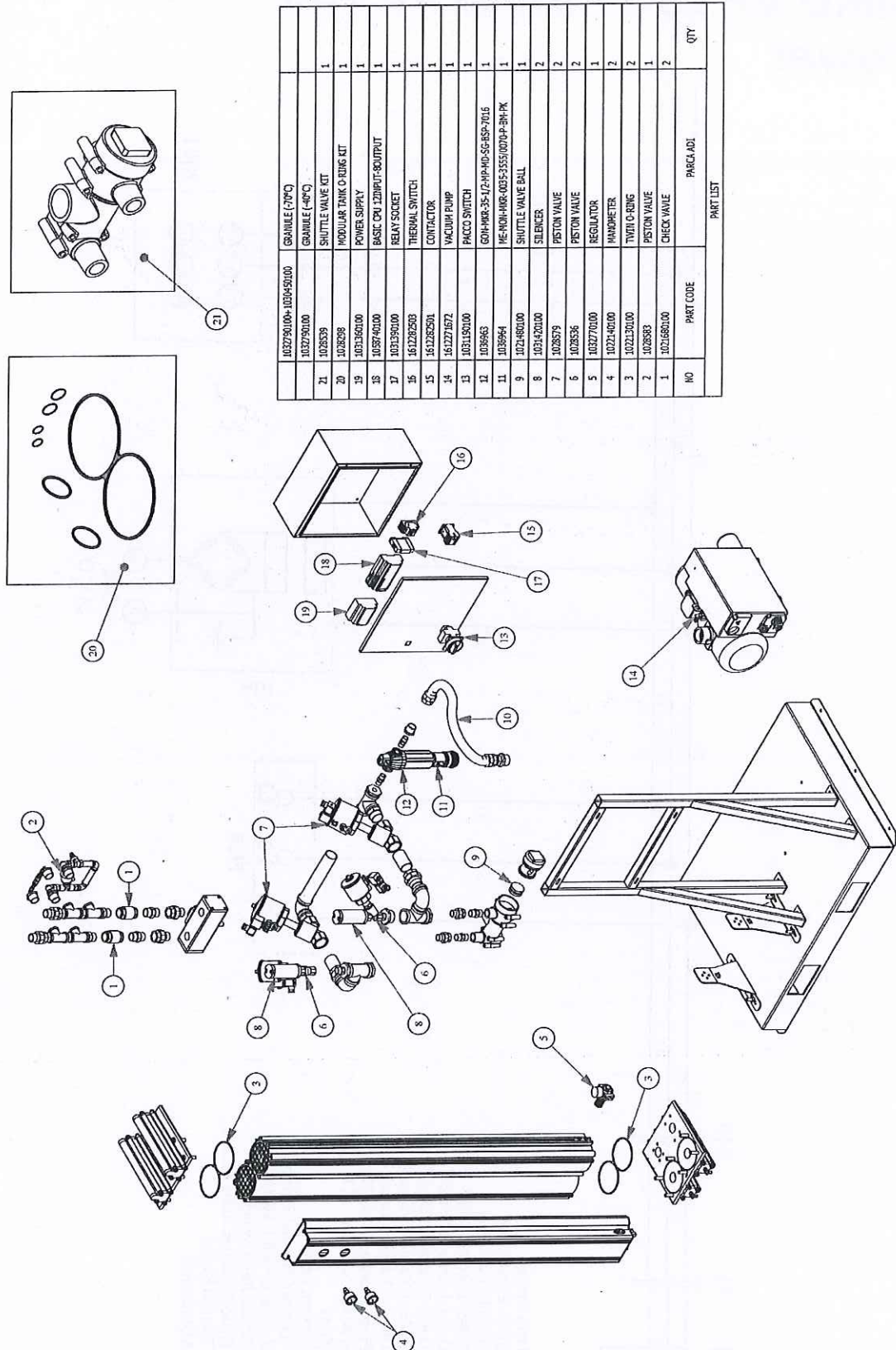
### 4.3. WD Drawing

MMD VP 180 - MMD VP 735

# Power

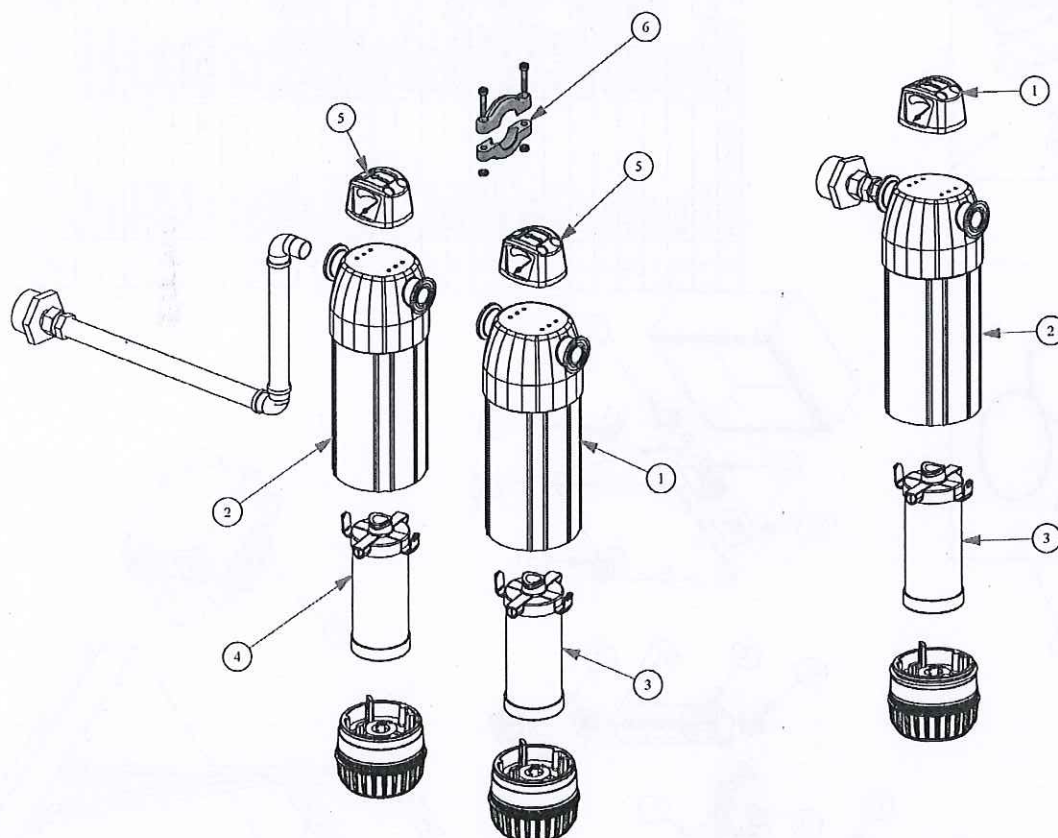


## 4.4. ED Drawing MMD VP 60



# 4.4. ED Drawing MMD VP 60

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AIR INLET FILTER

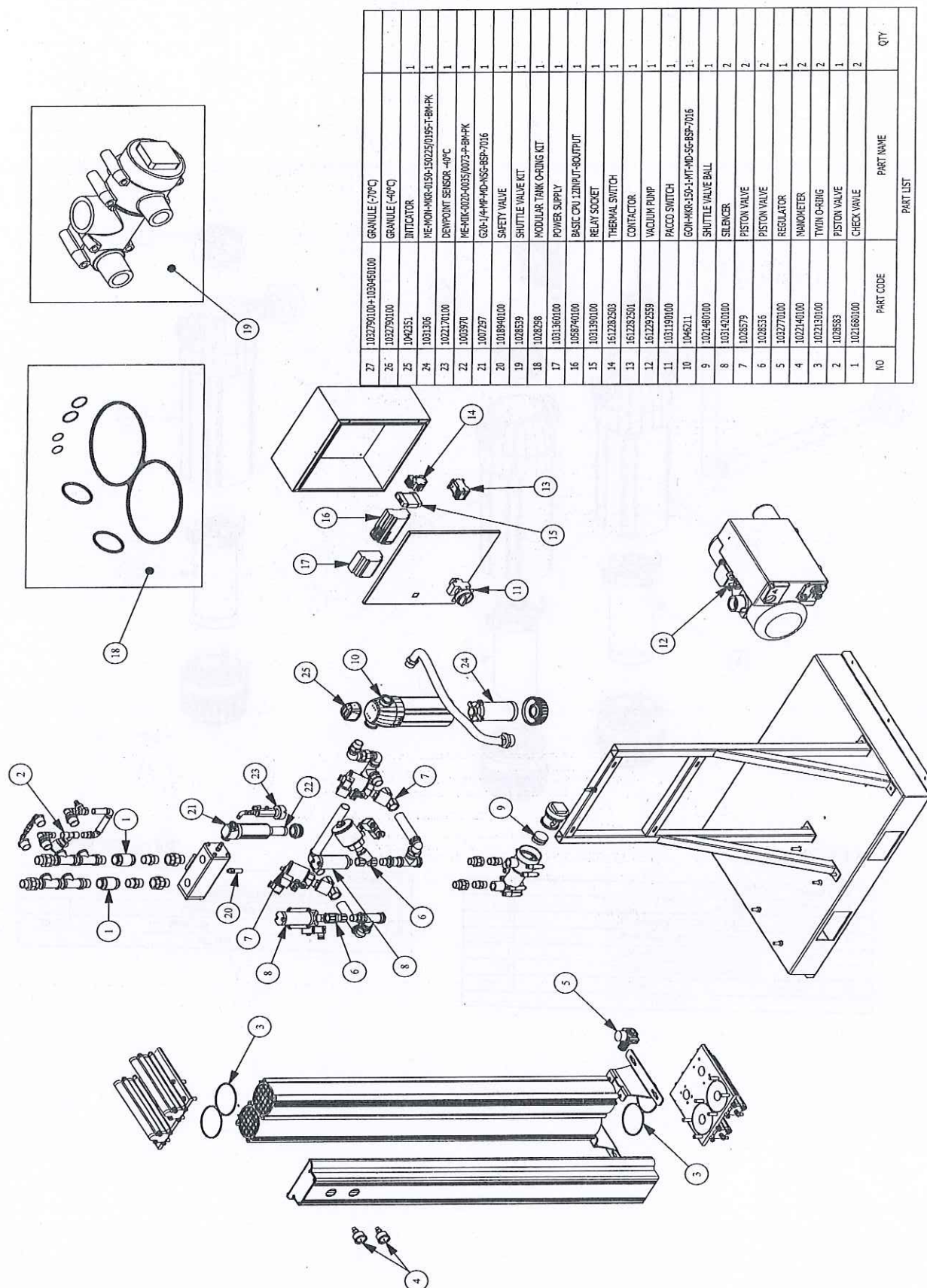
NO	PART CODE	PART NAME	QTY
6	1019759	FILTER CLAMP	1
5	1612277663	INDICATOR	2
4	1031303	ME-MON-MKR-0100-70125/0145-Y-8M-PK	1
3	1031302	ME-MON-MKR-0100-70125/0145-X-8M-PK	1
2	1040644	GON-MKR-100-1/2-MY-AD-SG-BSP-7016	1
1	1040643	GON-MKR-100-1/2-MY-AD-SG-BSP-7016	1
PART LIST			

AIR OUTLET FILTER

NO	PART CODE	PART NAME	QTY
3	1612277663	INDICATOR	1
2	1040679	ME-MON-MKR-0100-70125/0145-P-8M-PK	1
1	1040645	GON-MKR-100-1/2-MY-AD-SG-BSP-7016	1
PART LIST			

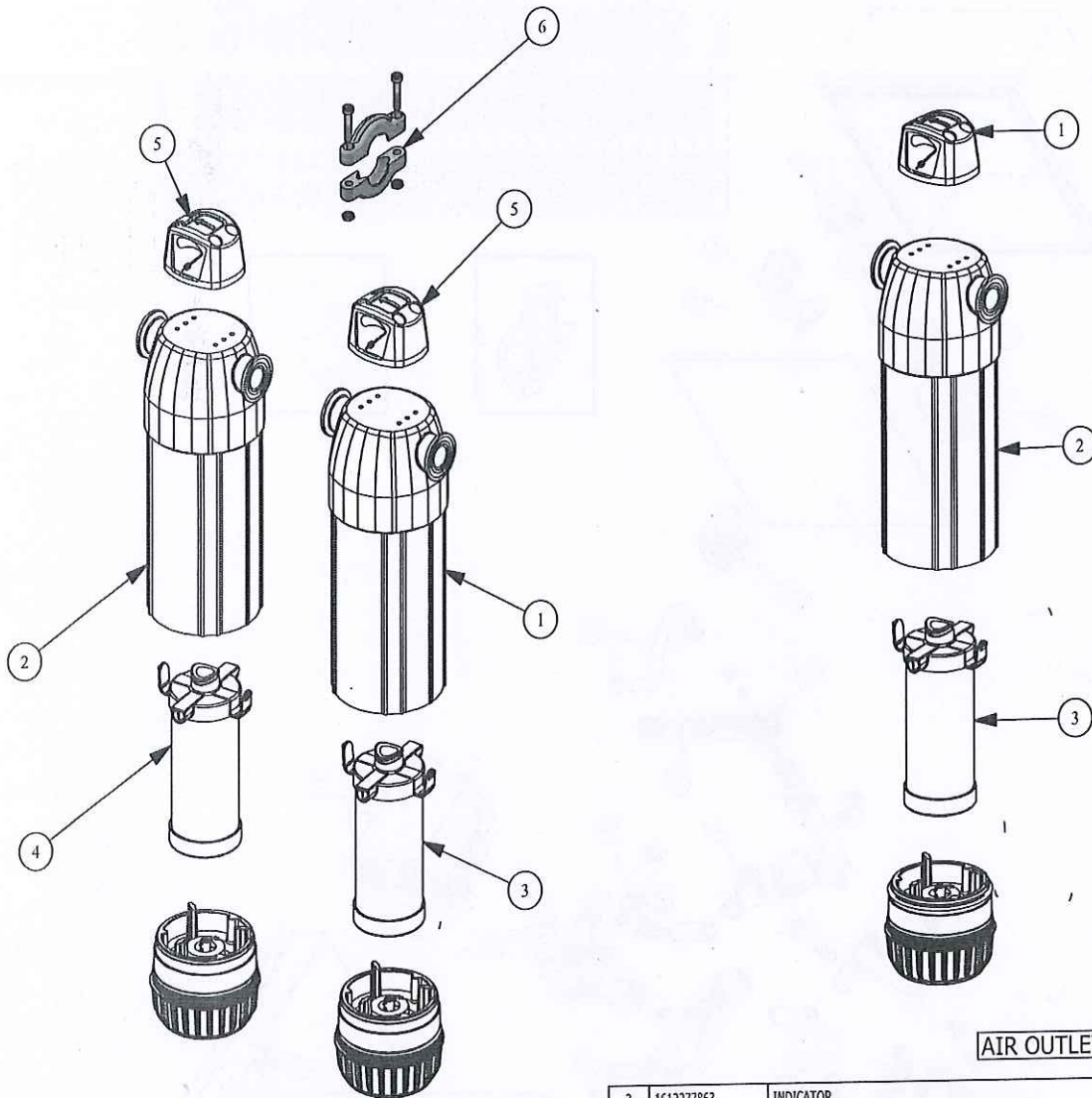


## 4.4. ED Drawing MMD VP 60 DWG



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## 4.4. ED Drawing MMD VP 60 DWG



### AIR INLET FILTER

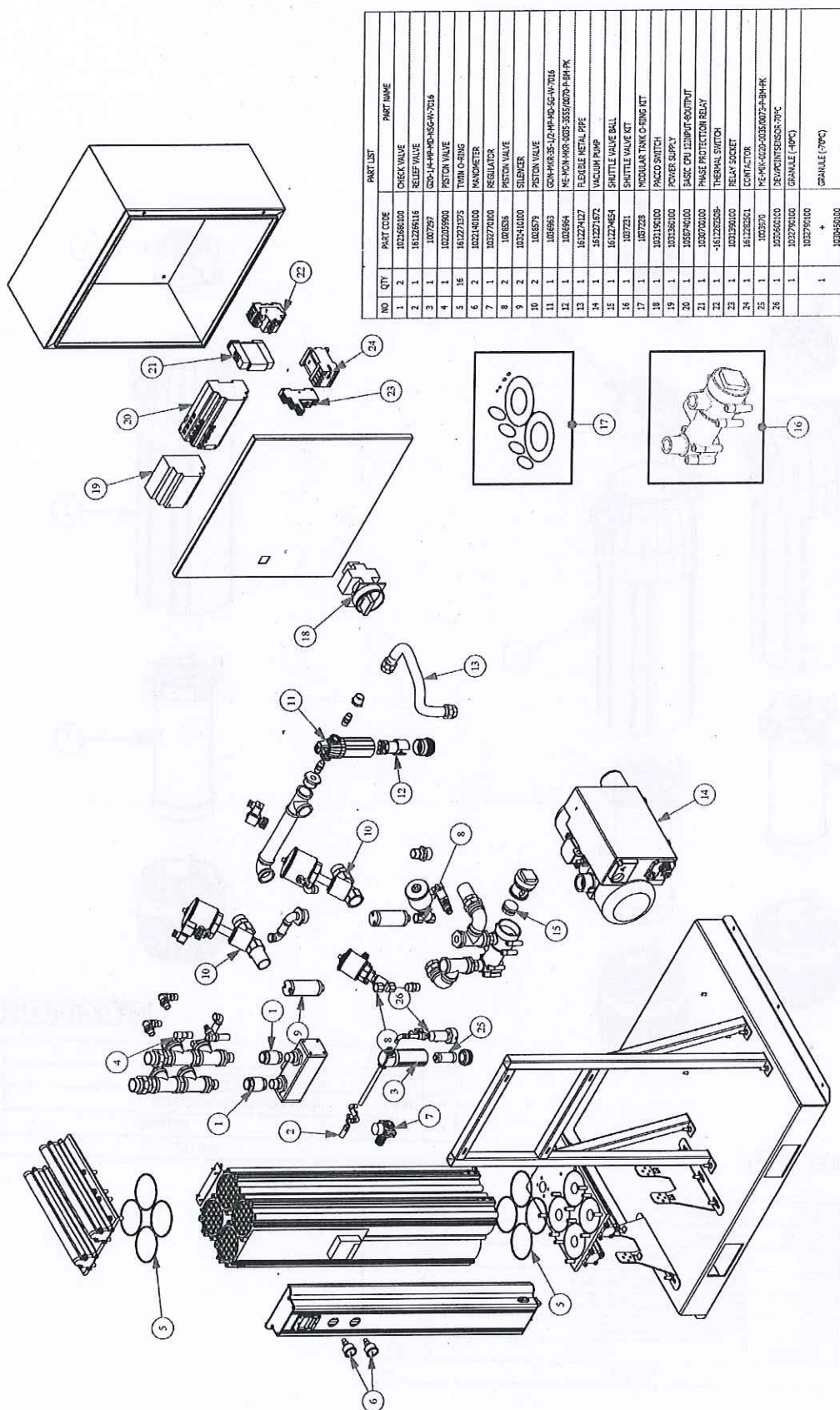
6	1019759	FILTER CLAMP	1
5	161227863	INDICATOR	2
4	1031303	ME-MON-MKR-0100-70125/0145-Y-BM-PK	1
3	1031302	ME-MON-MKR-0100-70125/0145-X-BM-PK	1
2	1040844	GON-MKR-100-1/2-MY-AD-SG-BSP-7016	1
1	1040843	GON-MKR-100-1/2-MX-AD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			

### AIR OUTLET FILTER

3	161227863	INDICATOR	1
2	1040879	ME-MON-MKR-0100-70125/0145-P-BM-PK	1
1	1040845	GON-MKR-100-1/2-MP-MD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			



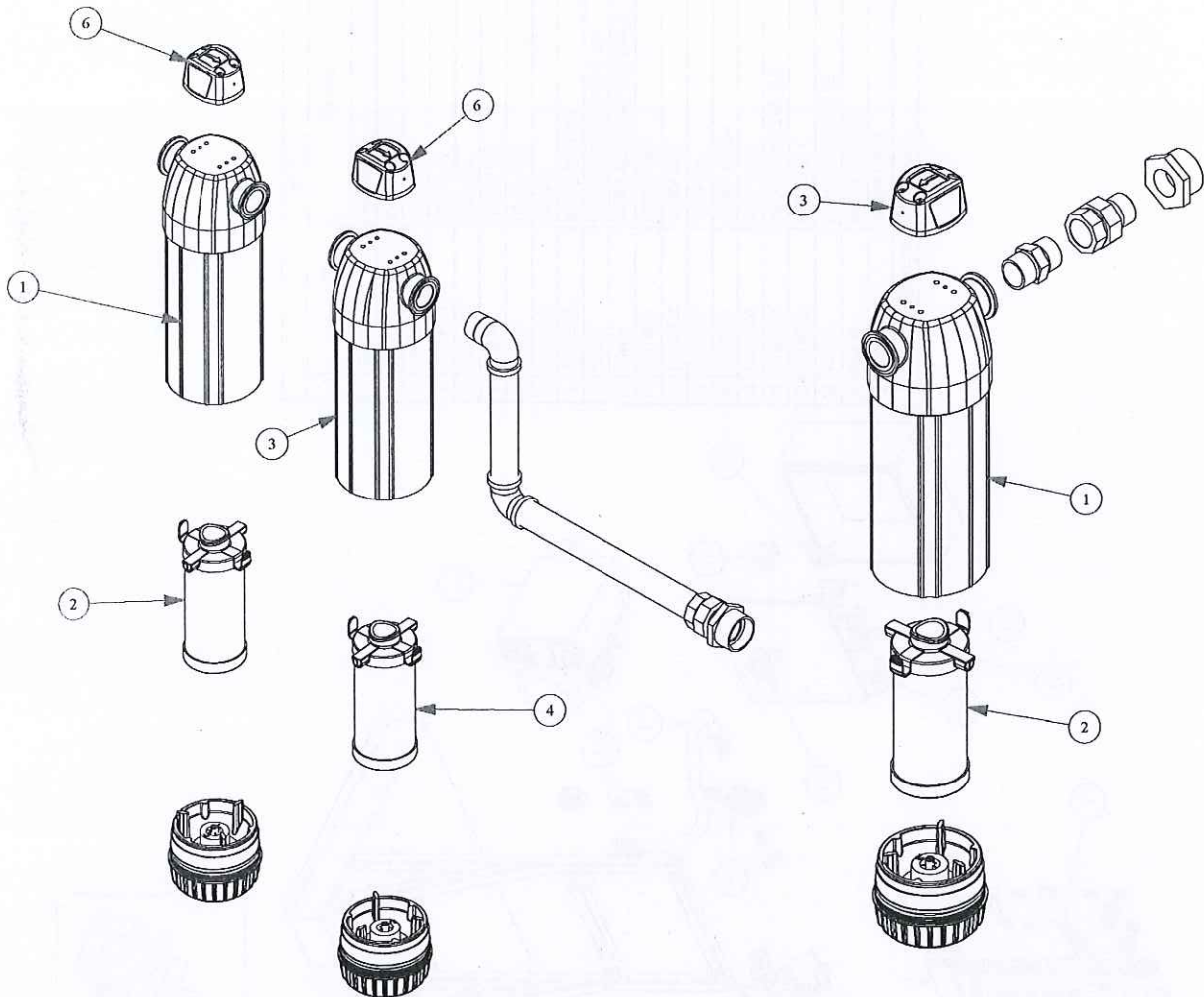
# 4.4. ED Drawing MMD VP 75



NO	QTY	PART CODE	PART NAME
1	2	102696100	CHECK VALVE
2	1	161226116	RELIEF VALVE
3	1	1007293	CO2-J-M-P-M-H-S-A-N-V-16
4	1	102205960	PISTON VALVE
5	16	1612271575	TORN O-RING
6	2	1022140100	MANOMETER
7	1	1032770100	REGULATOR
8	2	1006358	PISTON VALVE
9	2	102410100	SILENCER
10	2	1005579	PISTON VALVE
11	1	1006953	COMP-M-H-S-J-M-P-M-H-S-A-N-V-16
12	1	1006964	PC-MON-H-M-S-005-5555-0000-P-BH-PK
13	1	1612274127	FLEXIBLE METAL PIPE
14	1	1612271572	VACUUM PUMP
15	1	161227454	SHUTTLE VALVE BALL
16	1	1007293	SHUTTLE VALVE KIT
17	1	1007225	MODULAR TANK O-RING KIT
18	1	1021150100	PHASE SWITCH
19	1	103136100	POWER SUPPLY
20	1	10059740100	BASIC CPU INPUT-OUTPUT
21	1	1007702100	PHASE PROTECTION RELAY
22	1	161225558	THERMAL SWITCH
23	1	103136100	RELAY SOCKET
24	1	161225551	CONVECTOR
25	1	1005970	PC-M-H-S-005-5555-0000-P-BH-PK
26	1	1022796100	DEURPRINTSENSOR-70PC
		1022796100	GRANULE (-40PC)
		1022796100	GRANULE (-70PC)
		1022796100	GRANULE (-70PC)

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## 4.4. ED Drawing MMD VP 75



### AIR INLET FILTER

PART LIST			
NO	QTY	PART CODE	PART NAME
1	2	1038363	GON-MKR-150-1-MX-AD-SG-BSP-7016
2	1	1031307	ME-MON-MKR-0150-150225/0195-X-BM-PK
3	1	1038364	GON-MKR-150-1-MY-AD-SG-BSP-7016
4	1	1031308	ME-MON-MKR-0150-150225/0195-Y-BM-PK
5	16	1020002	FILTER CLAMP
6	2	1042351	INDICATOR

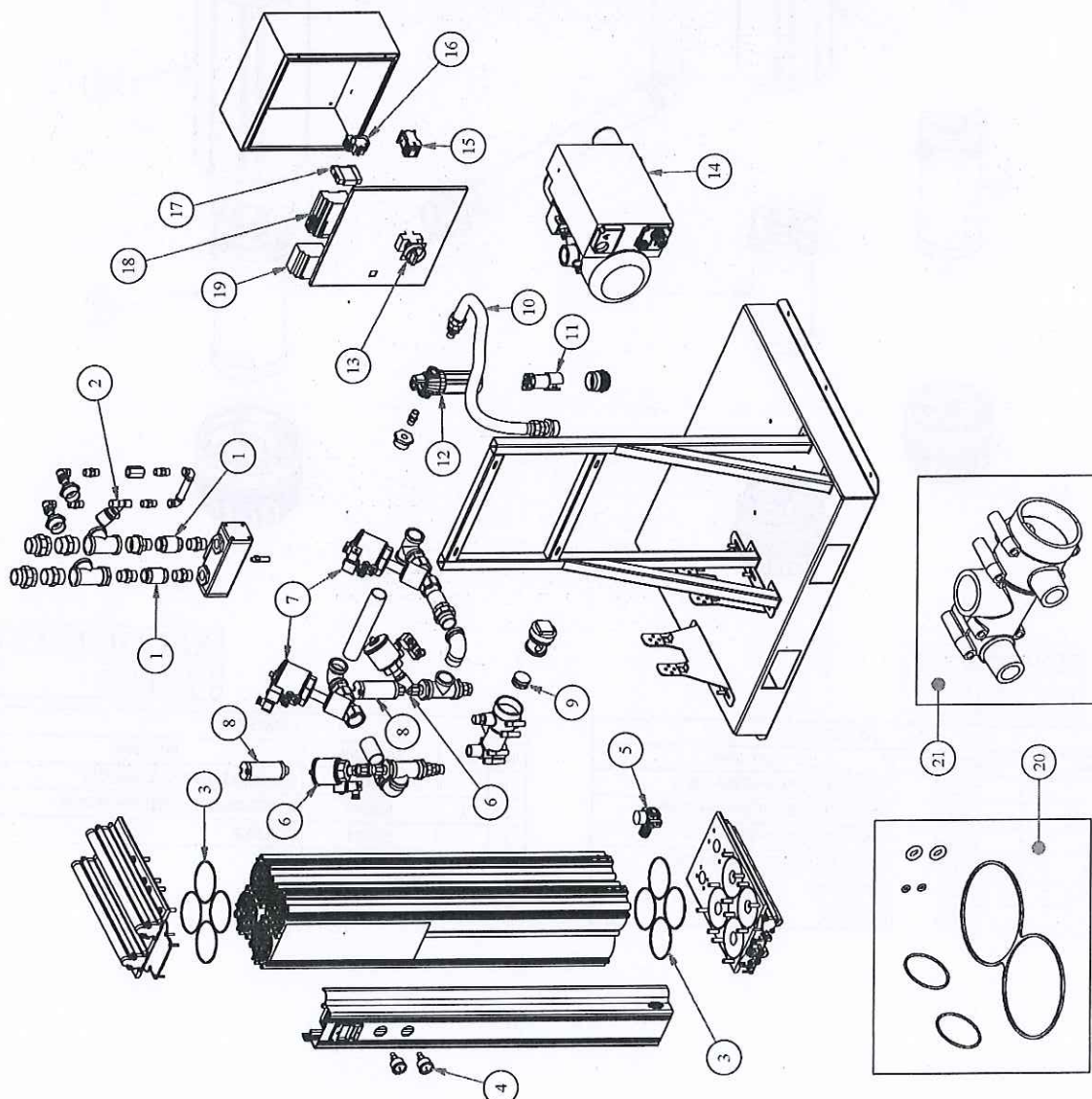
### AIR OUTLET FILTER

PART LIST			
NO	QTY	PART CODE	PART NAME
1	2	1036945	GON-MKR-150-1-MP-MD-SG-BSP-7016
2	1	1035643	ME-MON-MKR-0150-150225/0195-P-BM-PK
3	1	1042351	INDICATOR



# 4.4. ED Drawing MMD VP 100

NO	PART CODE	PART NAME	QTY
1	1032790100+1030450100	GRANULE (-70°C)	
2	1032790100	GRANULE (-40°C)	
3	1028539	SHUTTLE VALVE KIT	1
4	1028510	MODULAR TANK O-RING KIT	1
5	1031360100	POWER SUPPLY	1
6	1035740100	BASIC CPU 12INPUT-8OUTPUT	1
7	1031390100	RELAY SOCKET	1
8	1612282505	THERMAL SWITCH	1
9	1612282501	CONTACTOR	1
10	1612271673	VACUUM PUMP	1
11	1031190100	PACCO SWITCH	1
12	1035964	ME-MON-MKR-0035-3555/0070-P-BM-PK	1
13	1021480100	GON-MKR-35-1/2-MP-MD-SG-W-7016	1
14	1021480100	SHUTTLE VALVE BALL	1
15	1031420100	SILENCER	2
16	1028579	PISTON VALVE	2
17	1028536	PISTON VALVE	2
18	1032770100	REGULATOR	1
19	1022140100	MANOMETER	2
20	1022130100	TWIN O-RING	4
21	1028553	PISTON VALVE	1
22	1021680100	CHECK VALVE	2



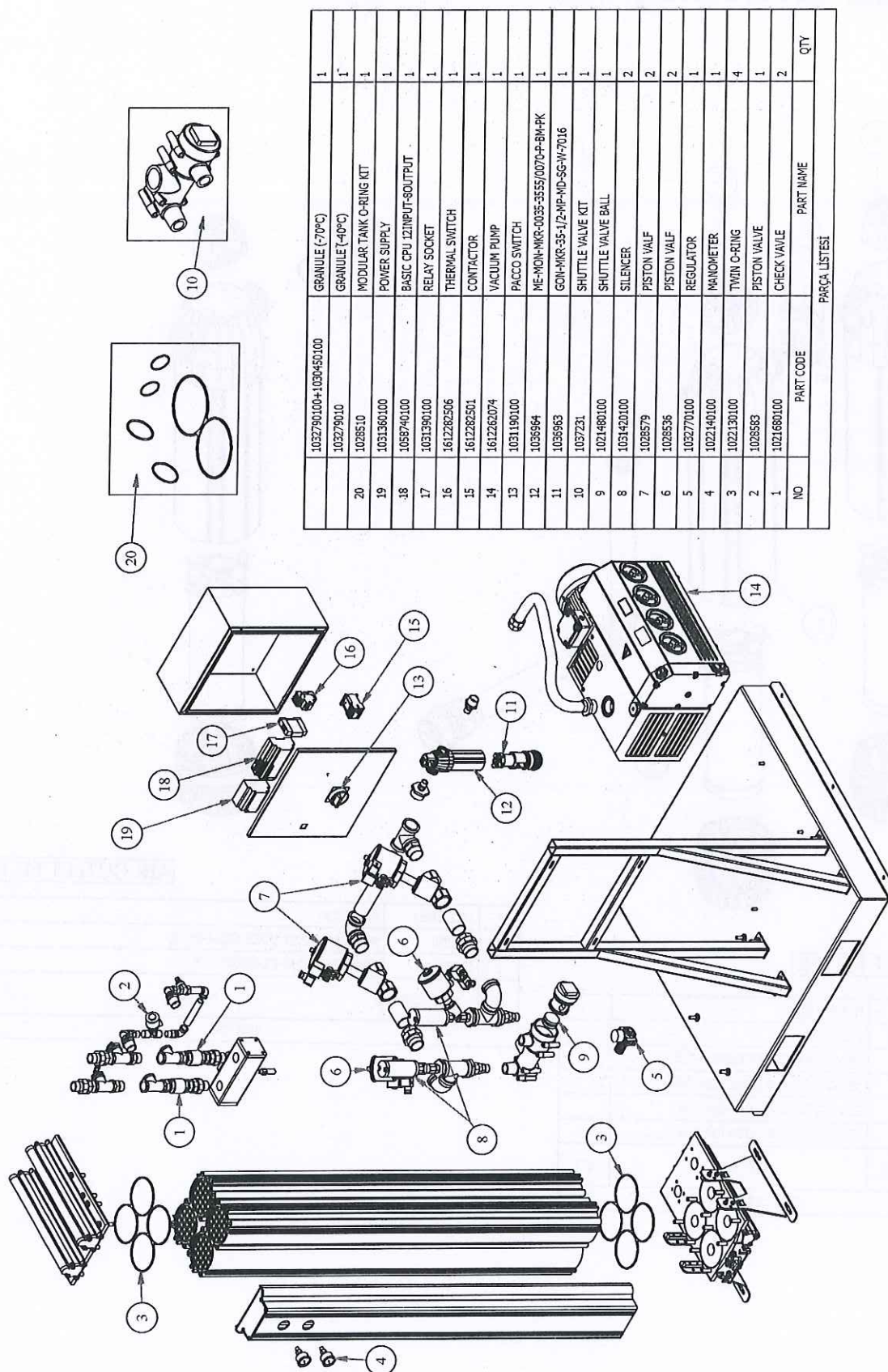
This exploded view diagram illustrates the components of a water filter assembly. The main body (1) is shown with its top cap (5) and a side handle (6). The filter element (3) is shown inserted into the main body. The bottom cap (4) is shown with its internal filter media. A long, curved pipe (2) is shown connected to the bottom of the main body. A separate view shows the bottom cap (4) with its internal filter media.

6	1019819	FILTER CLAMP	1
5	1612277863	INDICATOR	1
4	1031313	ME-MON-MKR-0225-150225/0225-Y-BM-PK	1
3	1031312	ME-MON-MKR-0225-150225/0225-X-BM-PK	1
2	1040853	GON-MKR-225-1-MY-AD-SG-BSP-7016	1
1	1040852	GON-MKR-225-1-MX-AD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			

3	1612277863	INDICATOR	1
2	1031310	ME-MON-MKR-0225-150225/0225-P-BM-PK	1
1	1040854	GON-MKR-225-1-MP-MD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			



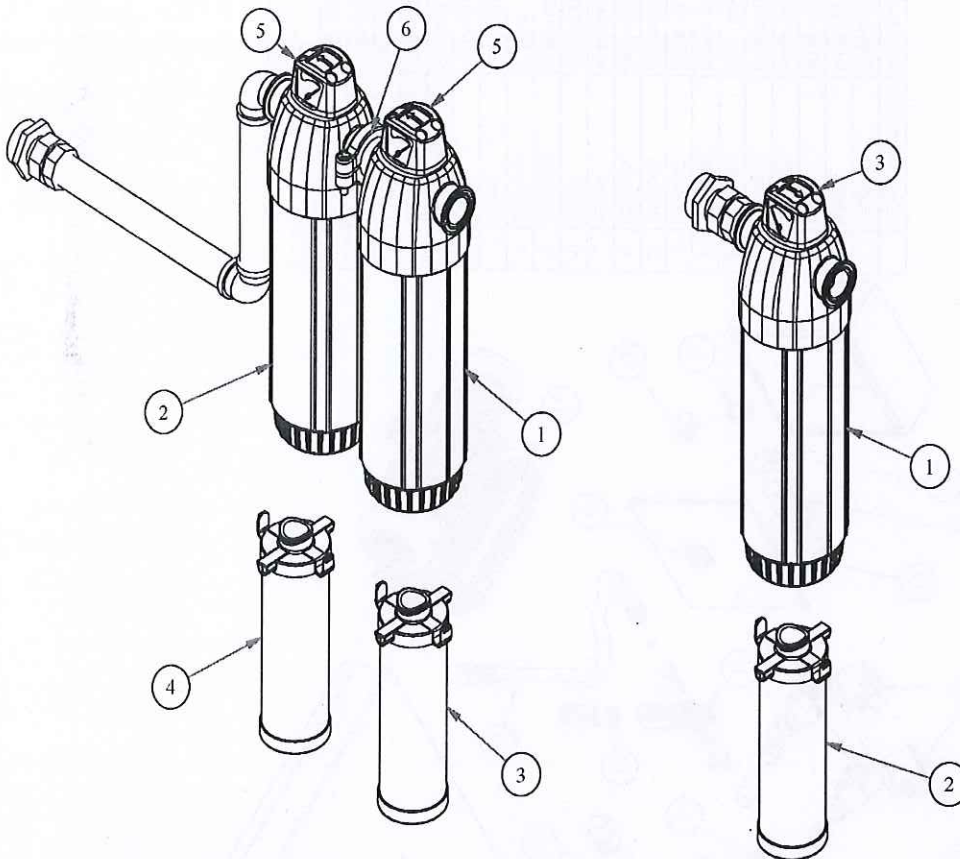
## 4.4. ED Drawing MMD VP 120





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## 4.4. ED Drawing MMD VP 120



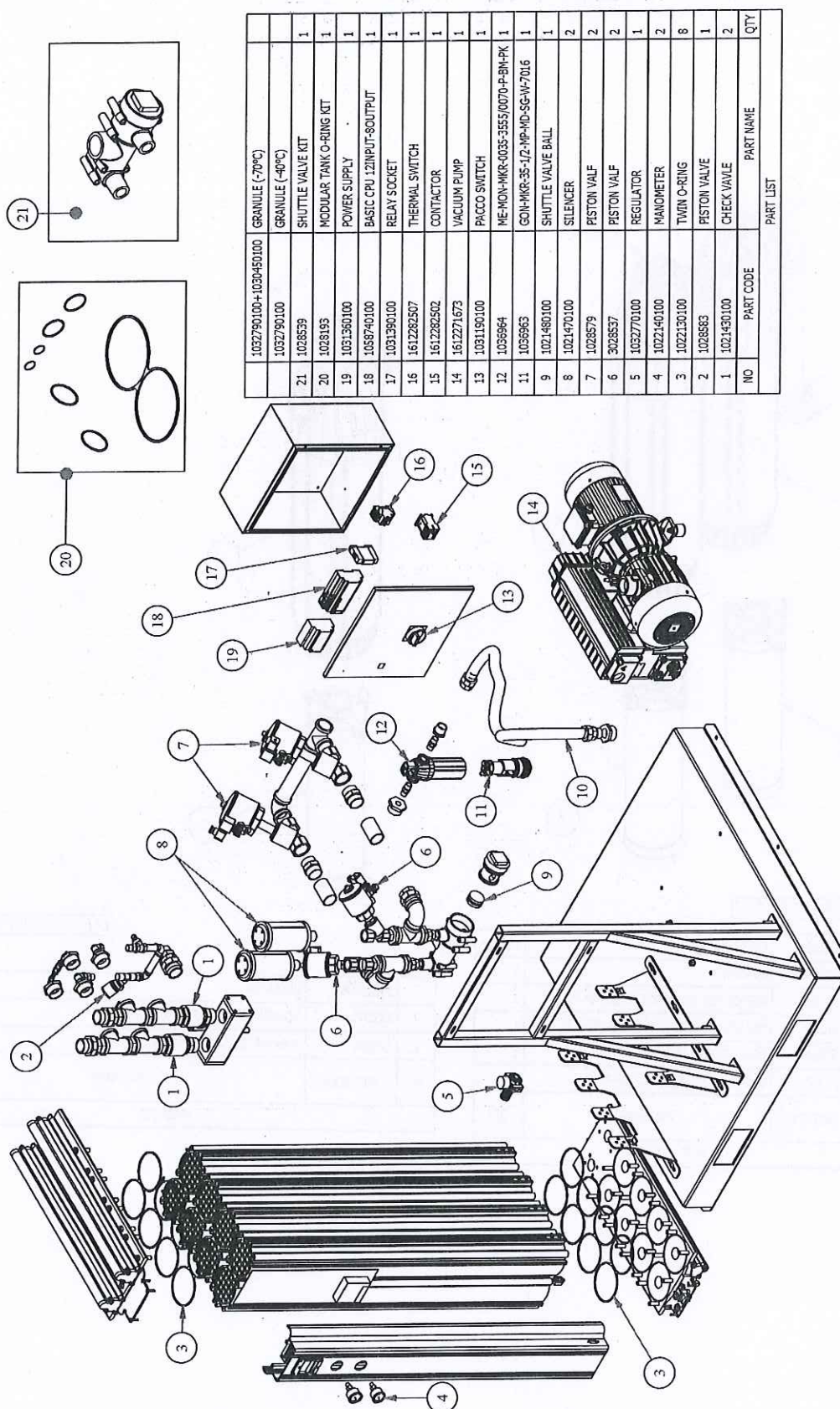
**AIR INLET FILTERS**

6	1019819	FILTER CLAMP	1
5	1612277863	INDICATOR	1
4	1031313	ME-MON-MKR-0225-150225/0225-Y-BM-PK	1
3	1031312	ME-MON-MKR-0225-150225/0225-X-BM-PK	1
2	1040853	GON-MKR-225-1-MY-AD-SG-BSP-7016	1
1	1040852	GON-MKR-225-1-MX-AD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			

**AIR OUTLET FILTER**

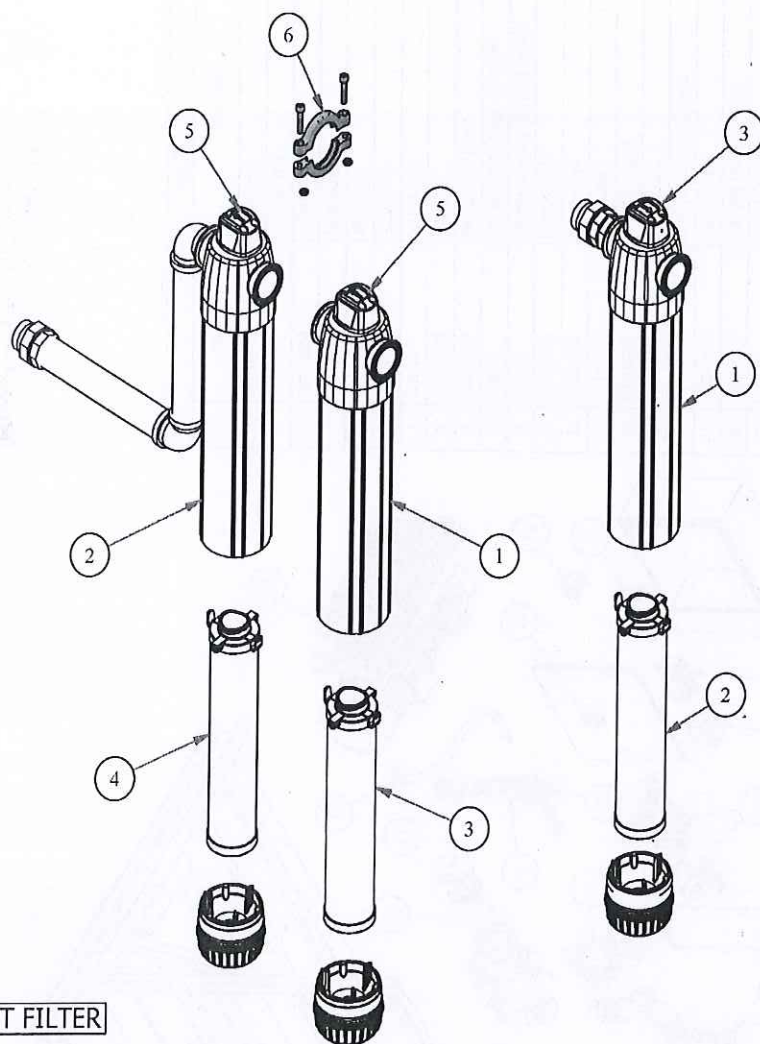
3	1612277863	INDICATOR	1
2	1031310	ME-MON-MKR-0225-150225/0225-P-BM-PK	1
1	1040854	GON-MKR-225-1-MP-MD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			

## 4.4. ED Drawing MMD VP 240



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## 4.4. ED Drawing MMD VP 240



AIR INLET FILTER

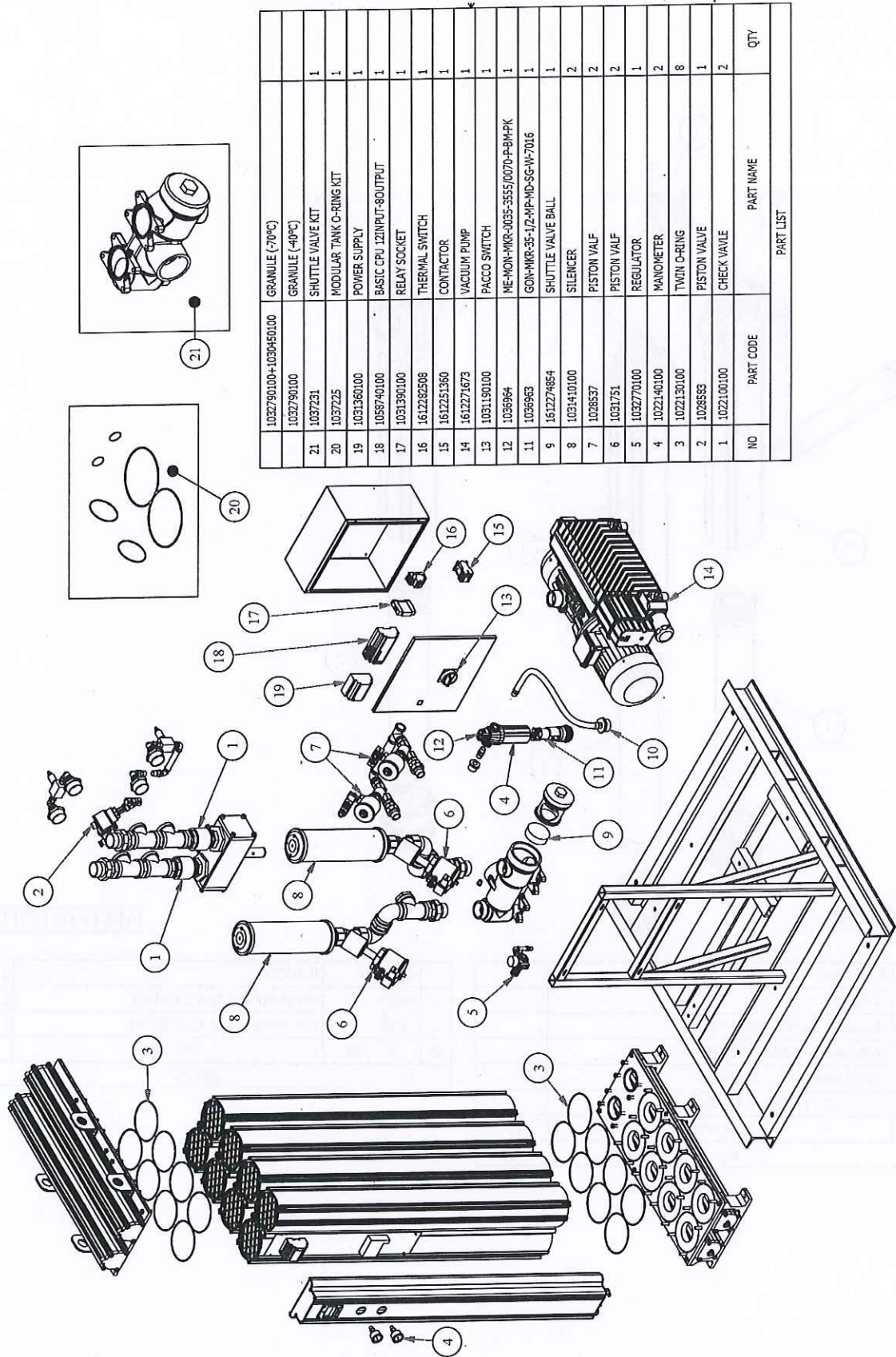
6	1020952	FILTER CLAMP	1
5	1612277663	INDICATOR	2
4	1032102	ME-MON-MKR-0500-5001200/0305-Y-BM-PK	1
3	1031321	ME-MON-MKR-0500-5001200/0305-X-BM-PK	1
2	1040865	GON-MKR-500-1 1/2-MY-AD-SG-BSP-7016	1
1	1040864	GON-MKR-500-1 1/2-MX-AD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			

AIR OUTLET FILTER

3	1612277863	INDICATOR	1
2	1040879	ME-MON-MKR-0100-70125/0145-P-BM-PK	1
1	1040866	GON-MKR-500-1 1/2-MP-MD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			



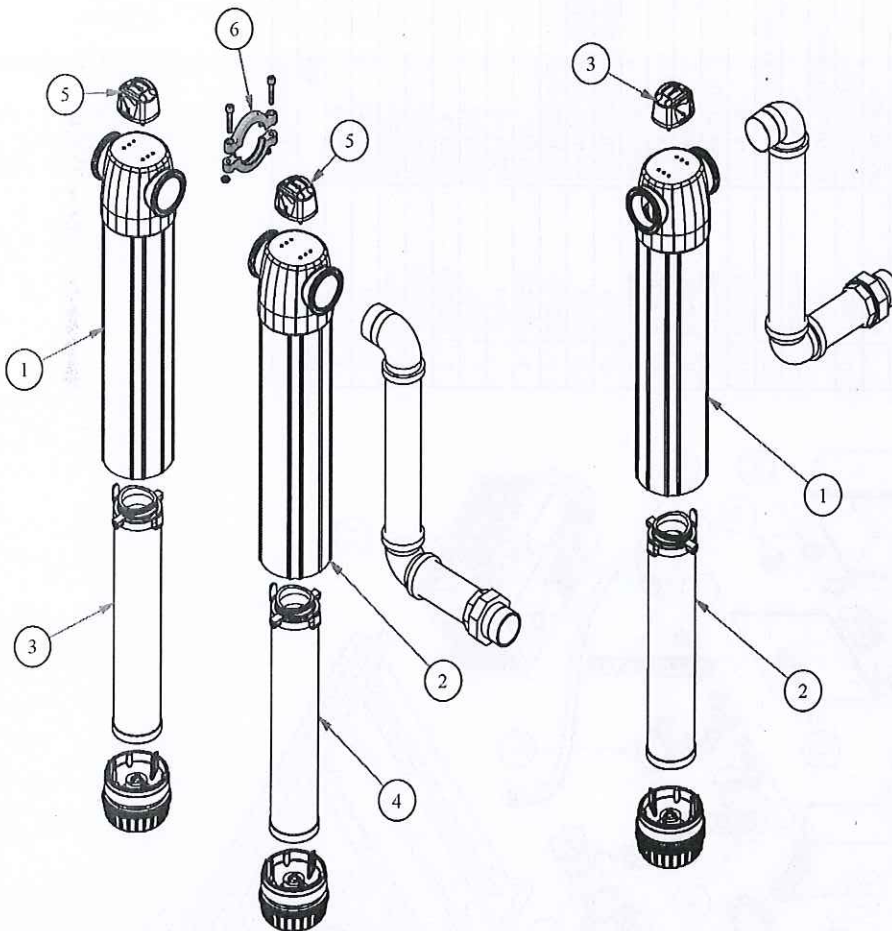
# 4.4. ED Drawing MMD VP 340



PART LIST		PART NAME		QTY
NO	PART CODE			
	1032790100+1039450100	GRANULE (-70°C)		
	1032790100	GRANULE (-40°C)		
21	1037231	SHUTTLE VALVE KIT		1
20	1037225	MODULAR TANK O-RING KIT		1
19	1031360100	POWER SUPPLY		1
18	1059740100	BASIC CPU 12IN PUT-8OUT PUT		1
17	1031390100	RELAY SOCKET		1
16	1612282508	THERMAL SWITCH		1
15	1612251360	CONTACTOR		1
14	1612271673	VACUUM PUMP		1
13	1031190100	PACCO SWITCH		1
12	1036964	ME-MON-MKR-0035-3555/0070-P-BWPK		1
11	1036963	GON-MKR-35-1/2-MP-MD-SG-W-7016		1
9	1612274854	SHUTTLE VALVE BALL		1
8	1031410100	SILENCER		2
7	1028537	PISTON VALF		2
6	1031751	PISTON VALF		2
5	1032770100	REGULATOR		1
4	1022140100	MANOMETER		2
3	1022130100	TWIN O-RING		8
2	1028583	PISTON VALVE		1
1	1022100100	CHECK VALVE		2

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## 4.4. ED Drawing MMD VP 340



AIR INLET FILTER

6	1020952	FILTER CLAMP	1
5	161227863	INDICATOR	2
4	1036590	ME-MON-MKR-0600-5001200/0420-Y-BM-PK	1
3	1031323	ME-MON-MKR-0600-5001200/0420-X-BM-PK	1
2	1044132	GON-MKR-600-2-MY-AD-SG-BSP-7016	1
1	1044131	GON-MKR-600-2-MX-AD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			

AIR OUTLET FILTER

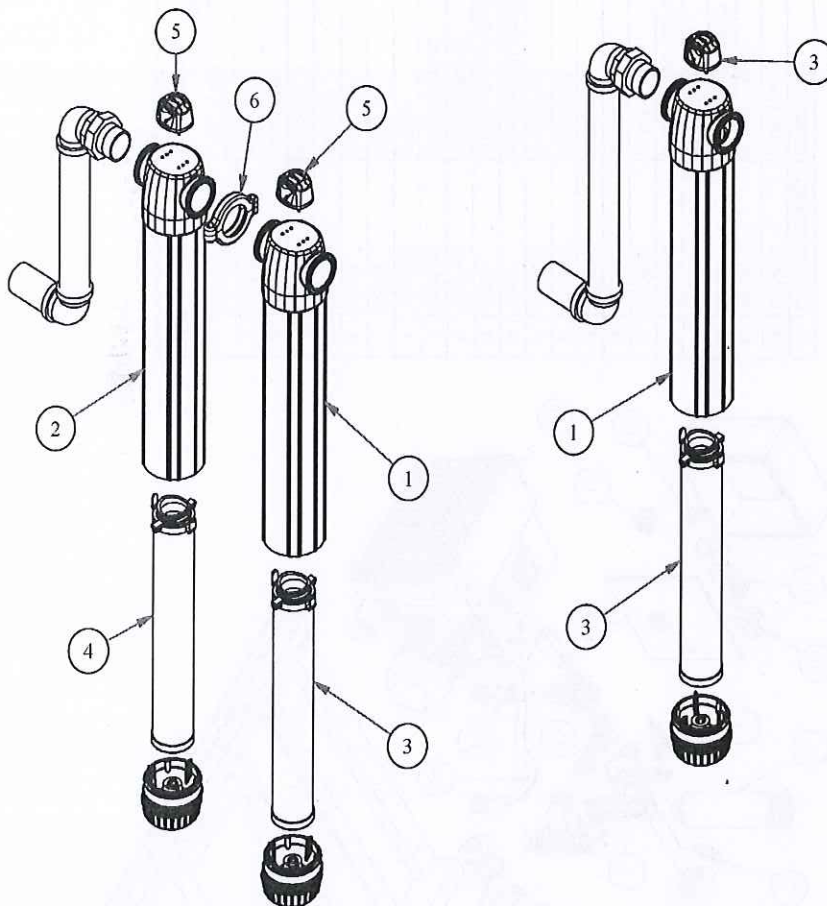
3	161227863	INDICATOR	1
2	1031323	ME-MON-MKR-0600-5001200/0420-P-BM-PK	1
1	1044133	GON-MKR-600-2-MP-MD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			







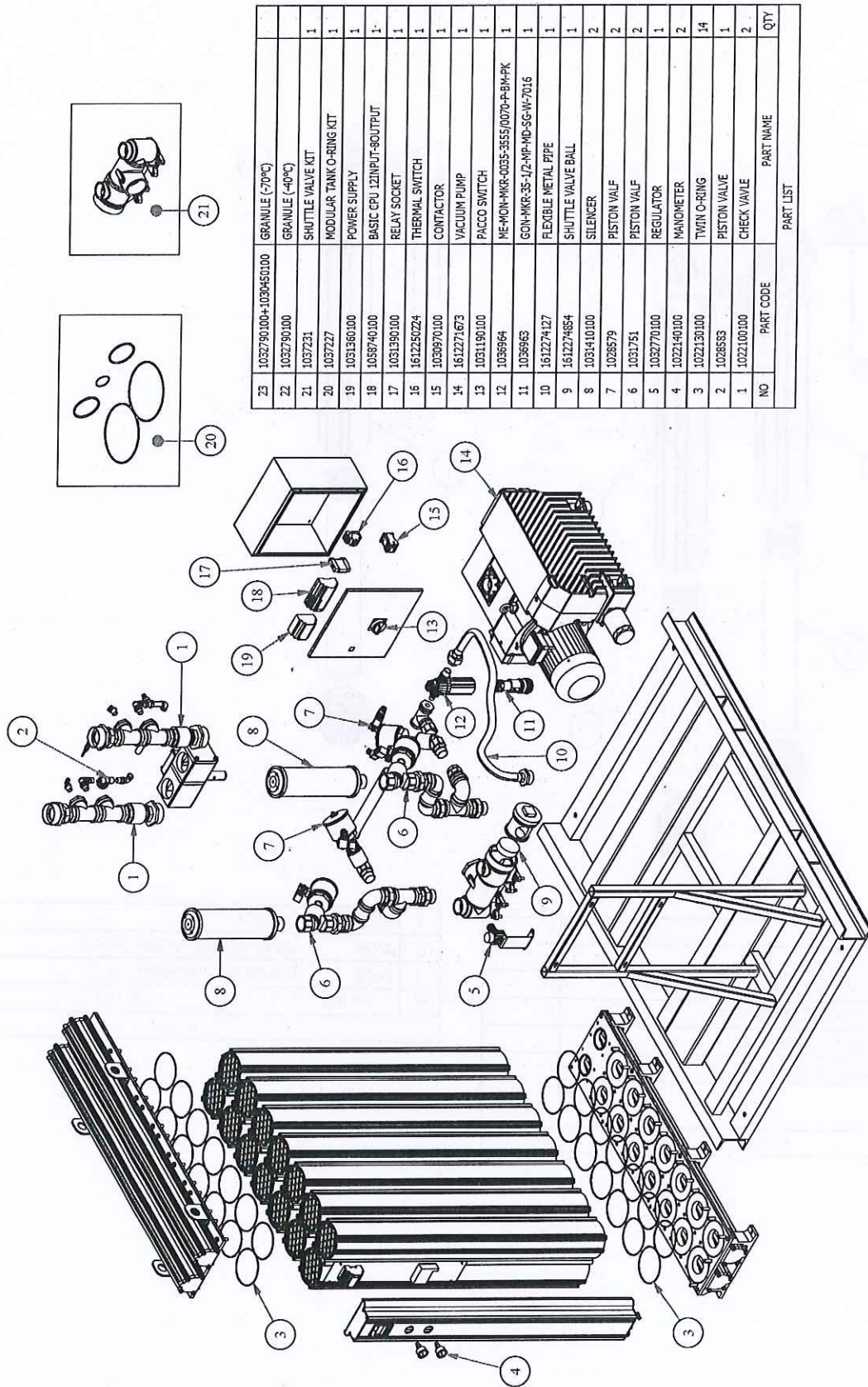
## 4.4. ED Drawing MMD VP 400



6	1020002	FILTER CLAMP	1
5	1612277863	INDICATOR	2
4	1031325	ME-MON-MKR-0800-5001200/0490-Y-BM-PK	1
3	1031324	ME-MON-MKR-0800-5001200/0490-X-BM-PK	1
2	1043632	GON-MKR-800-2-MY-AD-SG-BSP-7016	1
1	1043631	GON-MKR-800-2-MX-AD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			

3	1612277863	INDICATOR	1
2	1041941	ME-MON-MKR-0800-5001200/0490-P-BM-PK	1
1	1043633	GON-MKR-800-2-MP-MD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			

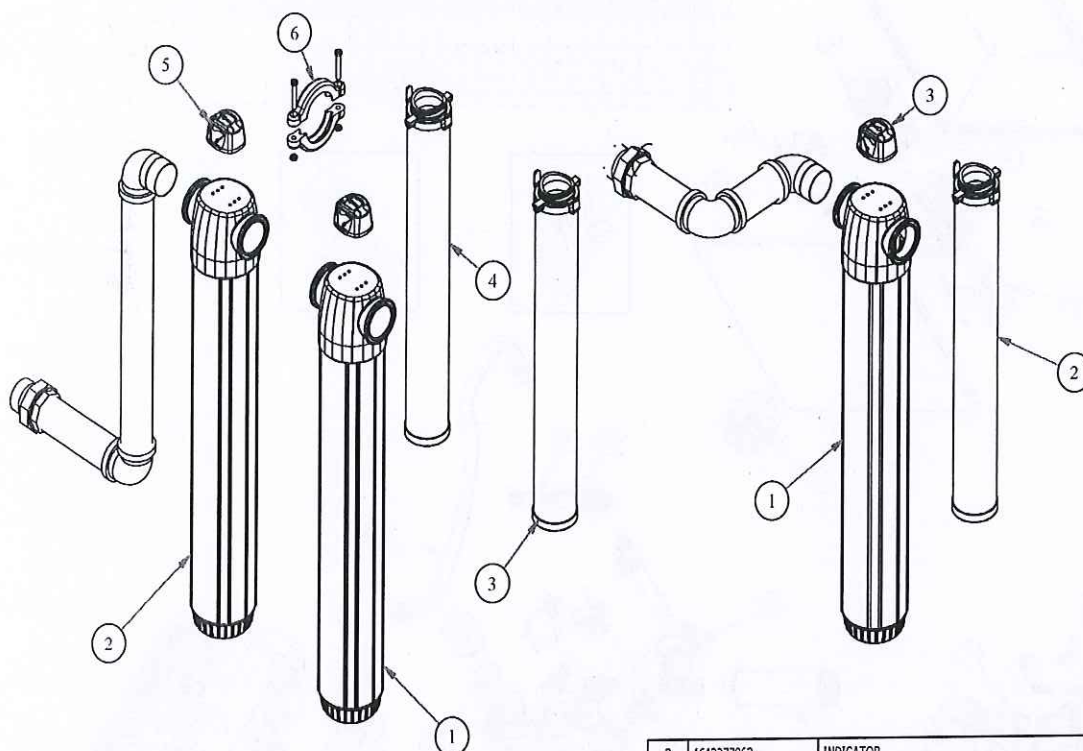
4.4. ED Drawing MMD VP 500



NO	PART CODE	PART NAME	QTY
23	1032790100+1039450100	GRANULE (-70°C)	
22	1032790100	GRANULE (-40°C)	
21	1037231	SHUTTLE VALVE KIT	1
20	1037227	MODULAR TANK O-RING KIT	1
19	1031360100	POWER SUPPLY	1
18	1038740100	BASIC CPU I2NPUT-8OUTPUT	1
17	1031390100	RELAY SOCKET	1
16	161225024	THERMAL SWITCH	1
15	1038770100	CONTACTOR	1
14	1612271673	VACUUM PUMP	1
13	1031190100	PACCO SWITCH	1
12	1036964	ME-MON-MKR-0035-3555/0070-P-BM-PK	1
11	1036963	GON-MKR-35-1/2-MP-MD-SG-W-7016	1
10	1612274127	FLEXIBLE METAL PIPE	1
9	1612274854	SHUTTLE VALVE BALL	1
8	1031410100	SILENCER	2
7	1028579	PISTON VALF	2
6	1031751	PISTON VALF	2
5	1032770100	REGULATOR	1
4	1022140100	MANOMETER	2
3	1022130100	TWIN O-RING	14
2	1028583	PISTON VALVE	1
1	1022100100	CHECK VALVE	2

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## 4.4. ED Drawing MMD VP 500

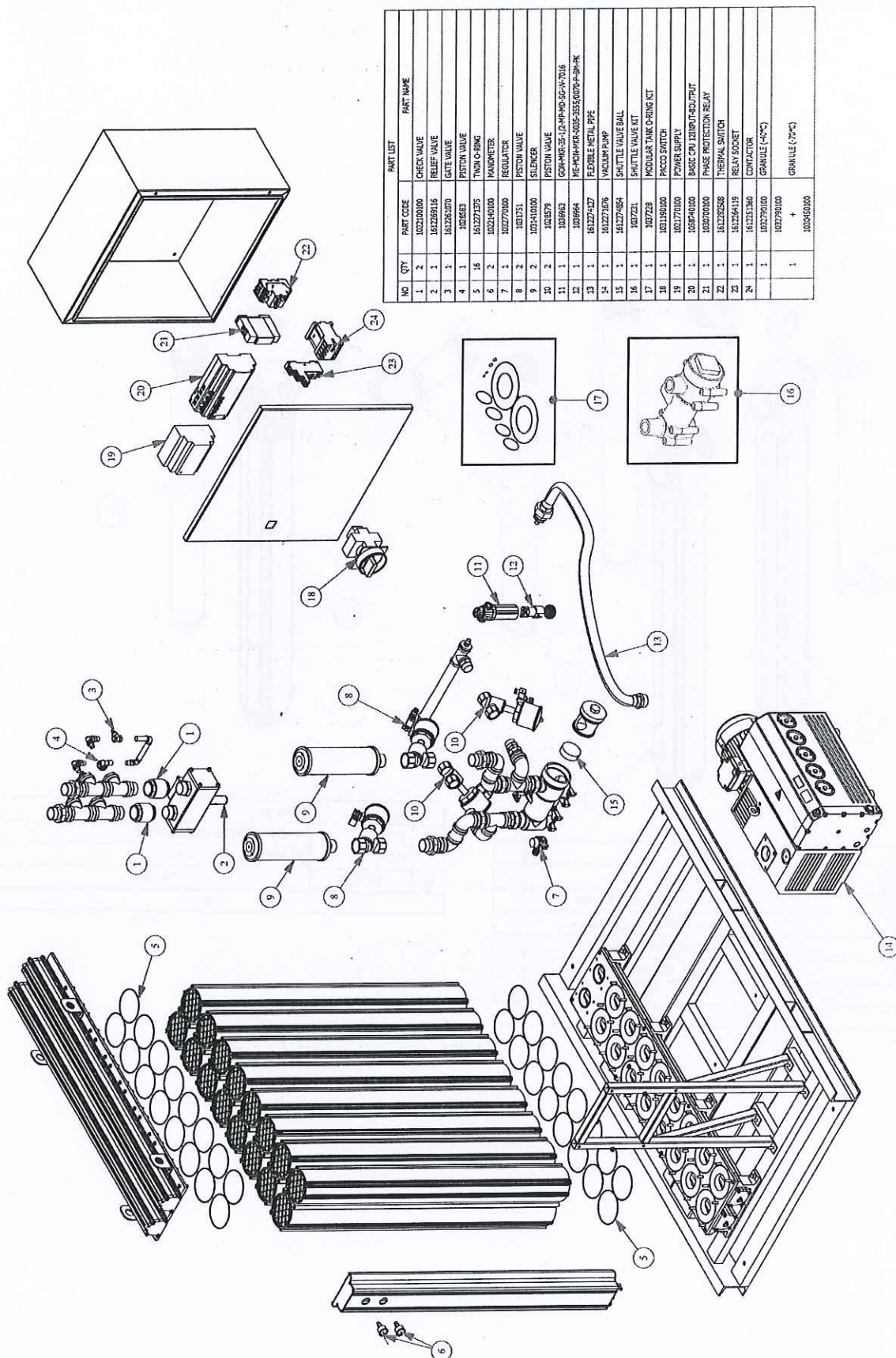


6	1020002	FILTER CLAMP	1
5	161227863	INDICATOR	2
4	1031328	ME-MON-MKR-1000-5001200/0645-Y-BM-PK	1
3	1031327	ME-MON-MKR-1000-5001200/0645-X-BM-PK	1
2	1042731	GON-MKR-1000-2-MY-AD-SG-BSP-7016	1
1	1042730	GON-MKR-1000-2-MX-AD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			

3	161227863	INDICATOR	1
2	1041954	ME-MON-MKR-1000-5001200/0645-P-BM-PK	1
1	1042732	GON-MKR-1000-2-MP-MD-SG-BSP-7016	1
NO	PART CODE	PART NAME	QTY
PART LIST			



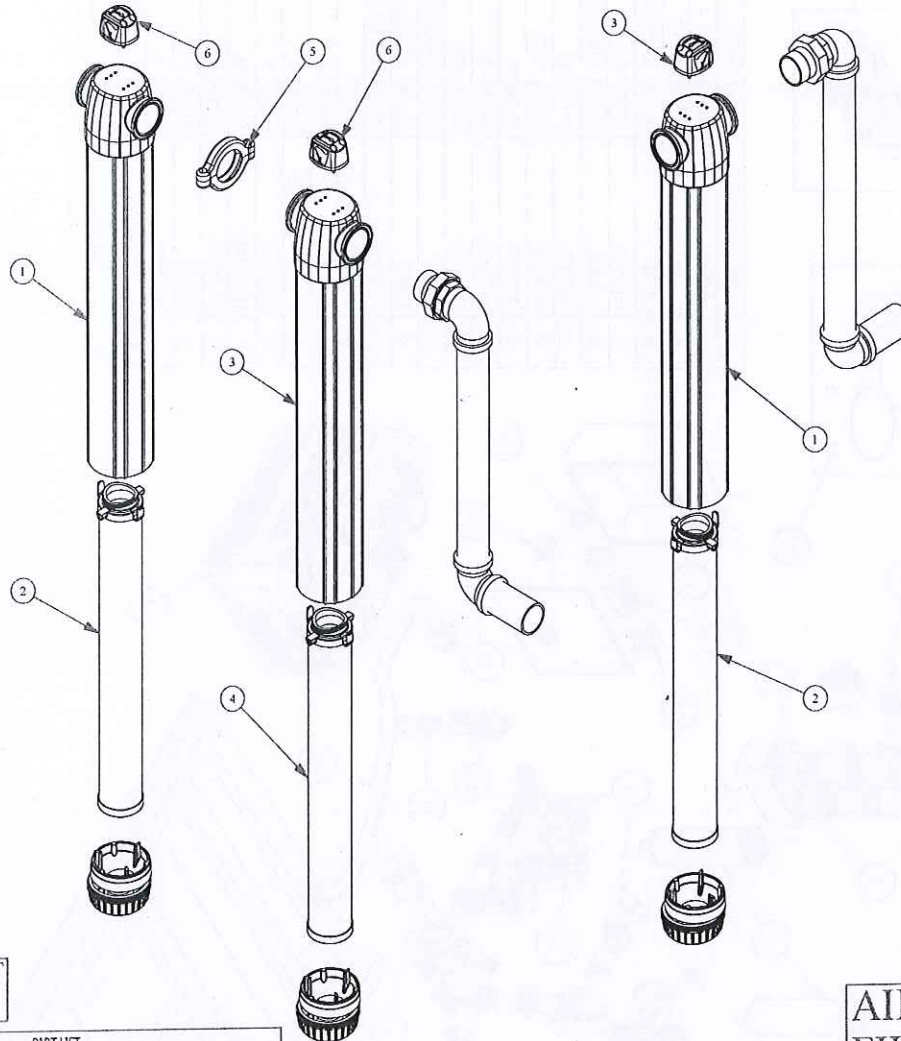
# 4.4. ED Drawing MMD VP 590



NO	QTY	PART CODE	PART LIST	PART NAME
1	2	10210000	CHECK VALVE	CHECK VALVE
2	1	10220016	RELIEF VALVE	RELIEF VALVE
3	1	10220020	GATE VALVE	GATE VALVE
4	1	10220023	PISTON VALVE	PISTON VALVE
5	16	10220025	TWIN O-RING	TWIN O-RING
6	2	10220026	MANOMETER	MANOMETER
7	1	10220027	REGULATOR	REGULATOR
8	2	10220028	PISTON VALVE	PISTON VALVE
9	2	10220029	SLIPPER	SLIPPER
10	2	10220030	PISTON VALVE	PISTON VALVE
11	1	10220031	GOV-MMS-55-1/2MM-MD-55-M-7616	GOV-MMS-55-1/2MM-MD-55-M-7616
12	1	10220032	ME-MOM-MMS-005-255/0070-P-BH-PK	ME-MOM-MMS-005-255/0070-P-BH-PK
13	1	10220033	FLEXIBLE METAL PIPE	FLEXIBLE METAL PIPE
14	1	10220034	VACUUM PUMP	VACUUM PUMP
15	1	10220035	SHUTTLE VALVE BALL	SHUTTLE VALVE BALL
16	1	10220036	SHUTTLE VALVE KIT	SHUTTLE VALVE KIT
17	1	10220037	MODULAR TANK O-RING KIT	MODULAR TANK O-RING KIT
18	1	10220038	PACKO SWITCH	PACKO SWITCH
19	1	10220039	POWER SUPPLY	POWER SUPPLY
20	1	10220040	BASIC CPU J200PIT-40/UT	BASIC CPU J200PIT-40/UT
21	1	10220041	PHASE PROTECTION RELAY	PHASE PROTECTION RELAY
22	1	10220042	THERMAL SWITCH	THERMAL SWITCH
23	1	10220043	RELAY SOCKET	RELAY SOCKET
24	1	10220044	CONTACTOR	CONTACTOR
	1	10220045	GRANULE (-45°C)	GRANULE (-45°C)
	1	10220046	GRANULE (-75°C)	GRANULE (-75°C)

# 4.4. ED Drawing MMD VP 590

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AIR INLET  
FILTER

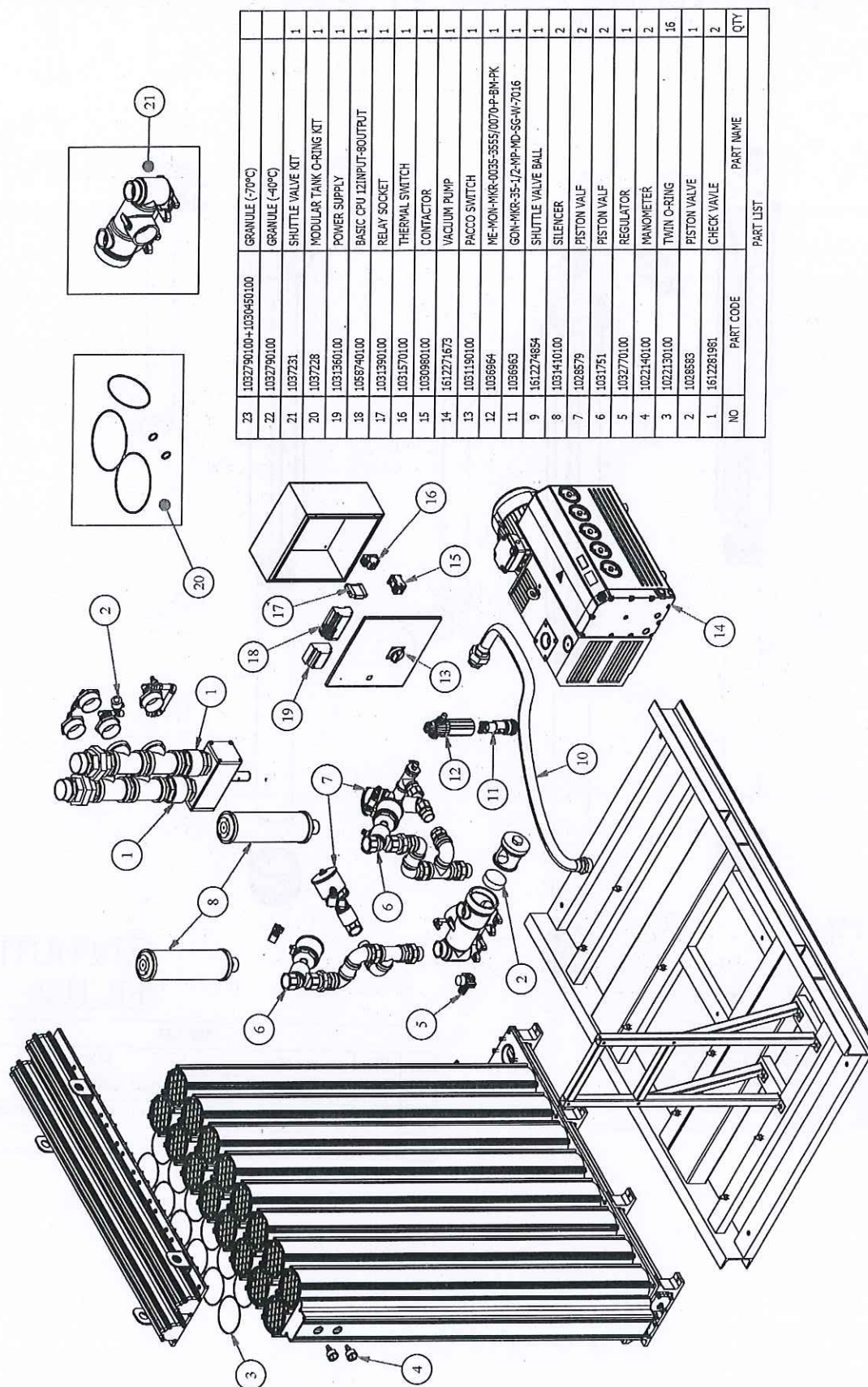
PART LIST			
NO	QTY	PART CODE	PART NAME
1	2	1042730	GON-MKR-1000-2-MX-AD-SG-W-7016
2	1	1031327	ME-MON-MKR-1000-5001200/0645-X-BM-PK
3	1	1042731	GON-MKR-1000-2-MY-AD-SG-W-7016
4	1	1031328	ME-MON-MKR-1000-5001200/0645-Y-BM-PK
5	16	1020002	FILTER CLAMP
6	2	1028934	INDICATOR

AIR OUTLET  
FILTER

PART LIST			
NO	QTY	PART CODE	PART NAME
1	2	1042732	GON-MKR-1000-2-MP-MD-SG-W-7016
2	1	1041954	ME-MON-MKR-1000-5001200/0645-P-BM-PK
3	1	1028934	INDICATOR



## 4.4. ED Drawing MMD VP 735

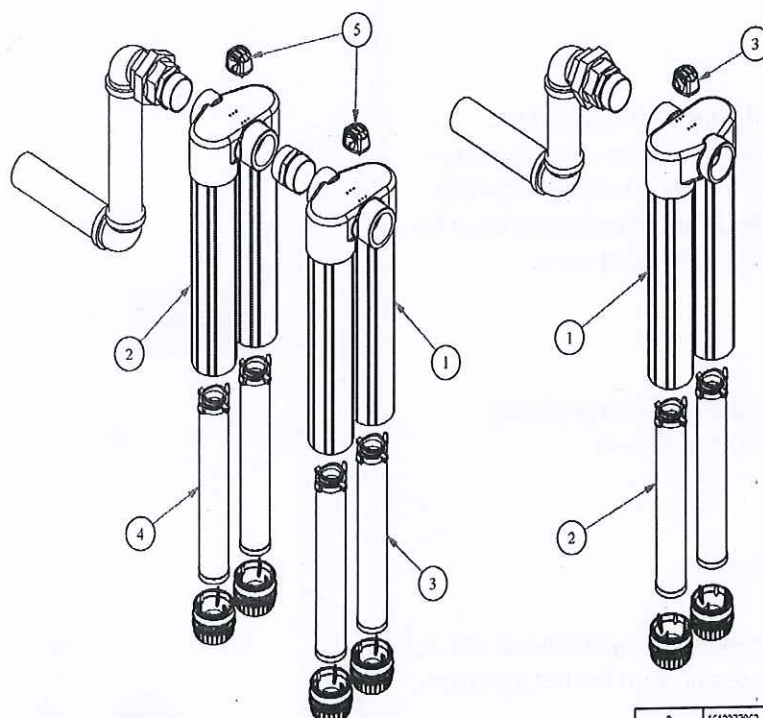


NO	PART CODE	PART NAME	QTY
23	1032790100-H-1030450100	GRANULE (-70°C)	1
22	1032790100	GRANULE (-40°C)	1
21	1037231	SHUTTLE VALVE KIT	1
20	1037228	MODULAR TANK O-RING KIT	1
19	1031360100	POWER SUPPLY	1
18	1036740100	BASIC CPU 12INPUT-8OUTPUT	1
17	1031390100	RELAY SOCKET	1
16	1031570100	THERMAL SWITCH	1
15	1030980100	CONTACTOR	1
14	1612271673	VACUUM PUMP	1
13	1031190100	PACCO SWITCH	1
12	1036964	ME-MOH-MKR-0035-3555/0070-P-BN-PK	1
11	1036963	GON-MKR-35-1/2-MP-MD-SG-W-7016	1
9	1612274854	SHUTTLE VALVE BALL	1
8	1031410100	SILENCER	2
7	1028579	PISTON VALF	2
6	1031751	PISTON VALF	2
5	1032770100	REGULATOR	1
4	1022140100	MANOMETER	2
3	1022130100	TWIN O-RING	16
2	1028583	PISTON VALVE	1
1	1612281981	CHECK VALVE	2



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## 4.4. ED Drawing MMD VP 735



AIR INLET FILTER

NO	PART CODE	PART NAME	QTY
5	161227863	INDICATOR	2
4	1032103	ME-MONHCHMKR-1550-5001200/0500-Y-BM-PK	1
3	1035584	ME-MONHCHMKR-1550-5001200/0500-X-BM-PK	1
2	1040873	GON-MKR-HC-1550-3-MY-AD-SG-8SP-7016	1
1	1040872	GON-MKR-HC-1550-3-MX-AD-SG-8SP-7016	1

PART LIST

AIR OUTLET FILTER

NO	PART CODE	PART NAME	ADET
3	161227863	INDICATOR	1
2	1040987	ME-MONHCHMKR-1550-5001200/0500-P-BM-PK	1
1	1040874	GON-MKR-HC-1550-3-MP-MD-SG-8SP-7016	1

PART LIST

# SECTION 5

## STARTUP AND OPERATION

### 5.1 INITIAL STARTUP



Ensure a suitable supply of compressed air between 4,1 bar (60 psi g) and 16 bar (230 psi g) pressure is available and check that the dryer cannot be overflowed.

#### IMPORTANT NOTE



Control air pressure is to be below 10 bars. If the working pressure is above 10 bars then use a pressure regulator and set it below 10 bars. (Pressure regulator is not supplied with the dryer.) Inlet temperature must be between 5°C (40°F) to 50°C (120°F) at all times.

#### IMPORTANT NOTE



Ensure all valves are opened and closed gradually. Proceed as follows: (Refer to Figure 3-2)

### 5.2 NORMAL OPERATION



Following the start-up procedure the operation of the dryer is fully automatic and requires no further attention until shut down.

The green 'power on' LED and the green 'correct operation' LED should be illuminated continuously.

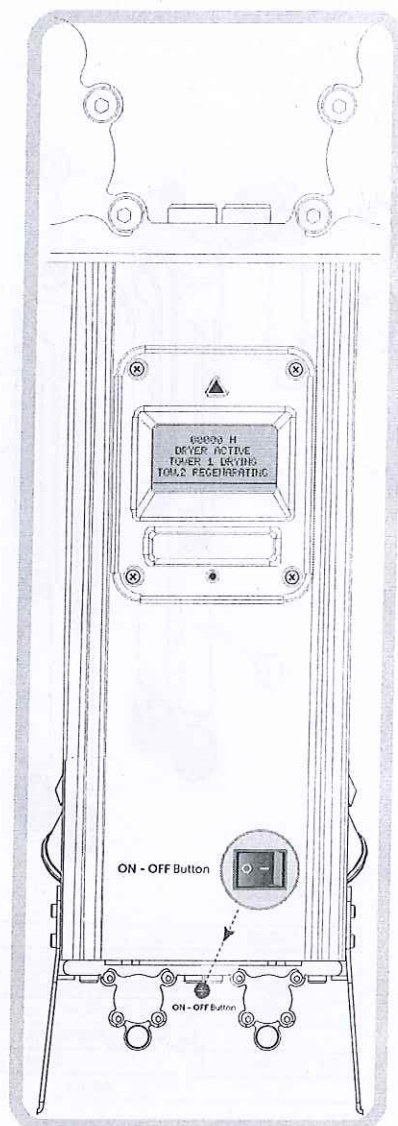


The dryer contains two desiccant chambers, while one chamber is drying the compressed air (adsorption),

The other chamber is simultaneously undergoing regeneration (desorption). At a pre-determined time both exhaust valves close and repressurisation begins. Every two and a half minutes the chambers are reversed in function, this is the changeover point. Changeover is characterised by an immediate venting of compressed air from the chamber entering regeneration.



The dryer can be shut down at any point in its cycle and when restarted will enter an automatic repressurisation stage. After repressurisation the cycle will commence at the point at which it stopped. If power is switched on, the dryer will enter an automatic repressurisation stage at the point at which it stopped.





### 5.3 SHUT-DOWN PROCEDURE TO DEPRESSURIZE THE DRYER



Prior to isolating the electrical supply close the outlet valve while simultaneously opening the by-pass valve if fitted. Close the inlet valve. The dryer will now be isolated from supply pressure. Cycle the dryer for a minimum of 5 minutes to ensure the dryer vents and is completely depressurized. When the dryer is completely depressurized, isolate the electrical supply.

The by-pass valve should only be opened if the dryer is undergoing maintenance.

### 5.4 ALARM SIGNAL



It is possible to get an alarm signal and control the dryer by a remote control. In order to get the alarm and/or remote control the connector under the dryer is to be used. Refer to the wiring diagram for wiring details.



Note: Drytec kindly reminds that the Mini PLC is the standard controller and HMI Color Touch Screen PLC is the optional controller of the dryer.

In that MMD-VP system, two towers allow for continuous adsorption of water vapor from compressed air by using the alumina with high crush strength and a high surface/ volume ratio. Firstly, pre-filtered compressed air flows into one of the towers. In that tower, water is held at high pressure. After the adsorbent has been saturated. Then, the adsorption of water vapor is switch over to the other tank and the second tank starts to adsorption. Meanwhile, the regeneration process started in the first tank by depressurizing the tower without the use of heat. The wet bed is dried by a small portion of dry air from the outlet at nearly -0,7 barg atmospheric pressure and with help of a vacuum pump. The output of the dried air efficiency is increased by using the vacuum pump. Just only 2% of dried air need to be used for the regeneration process of dried air. The regeneration time is 122 seconds for each tower, and the cycle time for the two towers is 304 seconds. After the regeneration process will be finished and the adsorption process will be taken over in the first tank again. With that cycle -40°C (-70°C optional) dew point can be achieved continuously.

During the initial startup, it is recommended to close the compressed air outlet in the dryer and operate it for a minimum of 8 hours before initiating the regeneration process. This procedure is carried out by enabling the VLESS mode, as described below, in MMD-VP dryers. Meanwhile, the vacuum pump is not in operation. To account for the possibility of alumina becoming saturated with moisture after this process, the Vacuum Drying mode is executed by disabling the VLESS mode. The machine starts with the pressurization step and AutoStart Mode. The transition from the initial AutoStart mode to other modes and the meanings of these modes are explained below.



# 

MMD-VP has 3 modes which Autostart, Eco, Vless.

When Autostart Mode is selected, it starts working immediately when the machine energized. When this mode is turned off, it operates using the remote start switch (DI1) connected by the customer.



Figure 1: AutoStart Mode

When it has chosen Eco mode, after the regeneration time is completed, the regeneration step continues to work extra considering the adjusted dewpoint value and the set Economy Mode Time. If the dewpoint value is below the dewpoint set value, the economy time starts operating. When the dewpoint value goes above the dewpoint set value, it moves to the next tower waiting for the economy time to end.

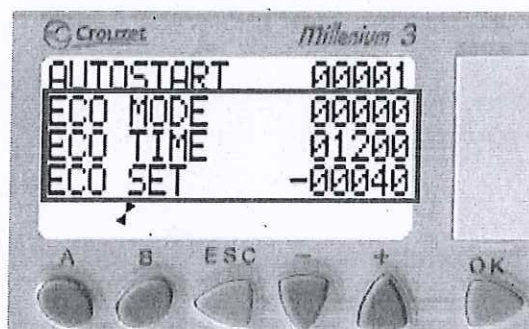


Figure 2: Eco Mode and Default Values of Eco Mode

"Vless mode" means vacuum-less mode. This mode is used when the vacuum pump is malfunctioning or undergoing service maintenance; it operates similarly to a heatless-type dryer with 18% compressed air pressure.



Figure 3: VLESS Mode

The functions of the buttons on the Crouzet part of the machine, described in the modes, are explained below. Initially, please press the buttons "A" and "OK" simultaneously to unlock the screen. After the unlocking, the menu selection is activated. When pressed with A, the pages in the menu are changed.



1.

2. (while continuing to press A)

Figure 4: To Unlock



Figure 5: To Change Menu

When the screen is unlocked, the selection is available in the menu with the "A" and "B" button.



Figure 3: Homepage

It indicates that a value of 1 represents enable, while a value of 0 represents disable. In this example, Figure 4 shows that Autostart is enabled, while Eco Mode is disabled. Eco Time indicates the maximum drying time in economy mode for the tower. The Eco Set is the dewpoint value set for the machine to enter economy mode.



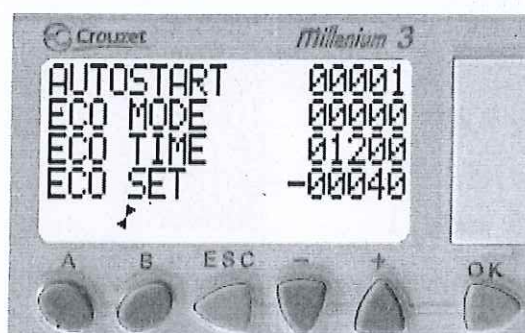


Figure 4: Menu Screen

The selection in Figure 5 should be made to operate the machine in MDA mode.



Figure 5: VLESS Mode Enable

In VLESS mode, the time set values are as follows.

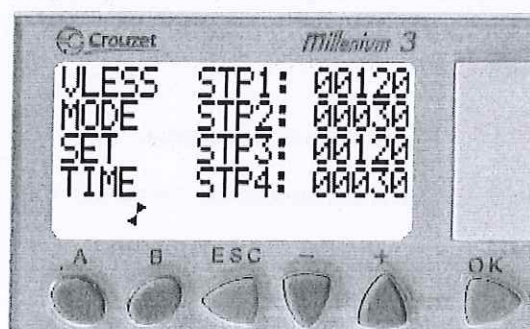


Figure 6: VLESS Mode Set Values

To change the parameter values displayed on the menu screen, navigate to the desired parameter using the up and down arrow buttons (+, -). Then, press the OK button to select the parameter. Adjust the desired parameter value using the up and down arrow buttons, and press OK.

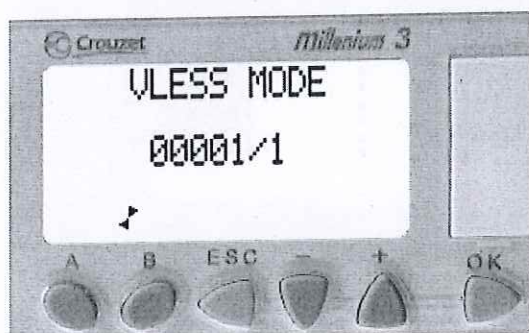


Figure 7: To Change machine mode



Figure 8: When the machine mode is changed



Figure 9: Screen that appears each time the machine mode is changed

After switching to the vacuum mode, the displayed set values are as shown in Figure 10, Figure 11, and Figure 12.



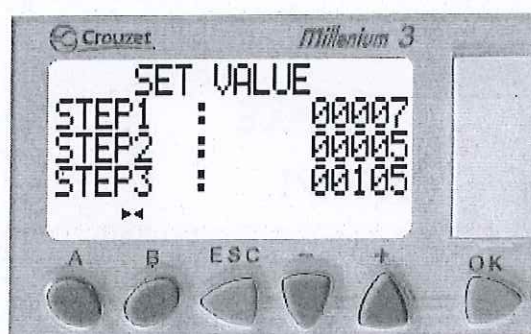


Figure 10: Set Values of Step1-2-3

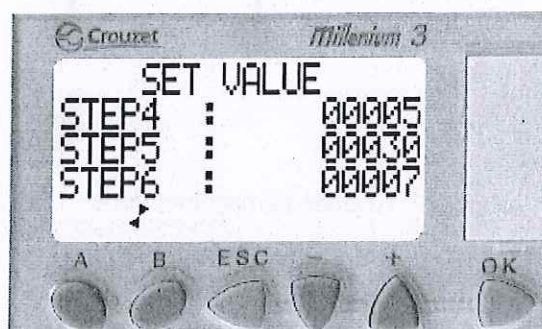


Figure 11: Set Values of Step4-5-6

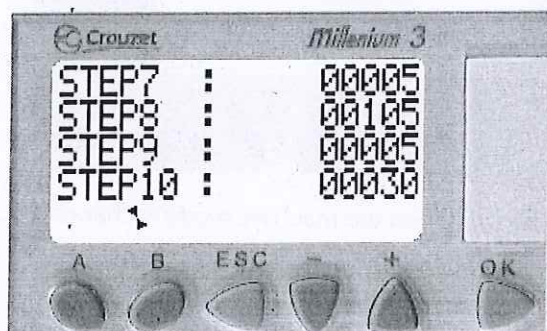


Figure 12: Set Values of Step7-8-9-10

The machine goes into alarm mode when there is a problem related to the thermal switch or contactor of the vacuum pump, and it appears as shown in Figure 13.

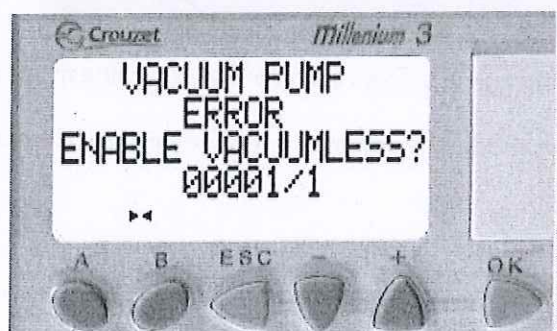


Figure 13: Vacuum Pump Error

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## SECTION 6 MAINTENANCE

**IMPORTANT: Maintenance operations should only be carried out by authorised personnel**

### 6.1 MAINTENANCE GUIDELINES



- Maintenance operations should be held only when the system is shut down and fully depressurised



- Do not modify or change the control settings



- Use only approved replacement parts

- Always check connections against leakage

- Ensure all loose parts are removed and secured to the dryer before operation

### 6.2 DAILY CHECKS

Functional and visual checks are to be done daily. Ensure the Green power-on led is illuminated.



- Check any external damages.
- If the service led (red led) appears, contact local distributor for Service.
- Remove the dust and dirt from the dryer. Clean all surfaces which are contaminated.

### 6.3 GENERAL SERVICE



A full product service is recommended every 2 years or 12.000 hours of operation (whichever occurs first). Desiccant to be replaced. Valves and silencers are to be checked and replaced if necessary.



No	Part Name (Description)	Comment	Event	Period		
				Working Hour		Time
1	Granule (-40°C)	Dryer Tank	Change	20000 h	or	5 years
2	Granule (-70°C)	Dryer Tank	Change			
3	Twin O-ring	Dryer Tank O-ring Kit	Change	20000 h	or	5 years
4	Piston Valve	Purge Valve	Change (If Necessary) after Service Control	12000 h	or	2 years
5	Manometer	Pressure Gauges	Change	20000 h	or	5 years
6	Check valve	Outlet Line	Change (If Necessary) after Service Control	15000 h	or	2,5 years
7	Shuttle valve ball	Inlet Valve (Shuttle Valve Ball)	Change	12000 h	or	2 years
8	Dew Point Sensor (-40°C)	Outlet line	Calibration (If Necessary)	12000 h	or	2 years
9	Silencer	Purge Line	Change	6000 h	or	1 year
10	Filter Element (For Dew Point Control- led Units only)	Sample Air Filter	Change	6000 h	or	1 year
11	Vacuum Pump Oil Separators	Elements	Change	6000 h	or	1 year
12	Vacum Pump P Filter	Vacum Pump Line	Change	6000 h	or	1 year



# SECTION 7

## TROUBLESHOOTING

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Problem	Indication	ProbableCause	Remedy
Poor Dewpoint	n/a	High inlet temperature	Checkafter cooler condition and clean as necessary
		Entrained Water	Checkpre-filtration andpre-filtration drains
		Excessive air flow demand	Check actual flow against rated flow of dryer Check for recent additions to air system
		Inlet pressure too low	Check against technical specification
		Excessive inlet air temperature	Check against technical specification
		Insufficient purge air flow	Factory set for 100 psig system pressure
		Exhaust silencers blocked	Change by Drytec trained personnel
		Contaminated desiccant	Eliminate source of contamination. Desiccant change by Drytec trained personnel
Electrical Fault	Power LED 'OFF'	Hardwarefault	Contact Drytec customer service
Failure to Purge	No depressurisation and poor dewpoint	Purge valve blocked or shut	Drytec trained personnel to adjust
		Exhaust silencer blocked	Change by Drytec trained personnel
Outlet Air Flow Stops	Downstream pressuredrops	No air suply to the dryer	Check compressor air supply to dryer Check all pipework and fittings for leaks
Constant depressurisation	Erraticair flow from exhaust	Damaged valve	Change by Drytec trained personnel
Vacuum pump engine is not working	Vacuum pump stops working	The system is not working properly	Drytec trained personnel to adjust
Vacuum pump exhaust oil vapor	There is visible oil vapor around the vacuum separator		Vaccum separator is needed to change

# Warranty Statement for Desiccant Air Dryers

When used under the conditions recommended by the manufacturer, Drytec Air Dryers are warranted to be free from defects in material and workmanship for a period of 24 months from startup date, which should not exceed 30 days from the factory ship date, provided that Drytec is furnished the startup form. This warranty is subject to the restrictions outlined below concerning misuse, abuse or accident. All electrical components in the product have a limited warranty for 3 months. It is always possible to send the failed electrical and electronical parts back to Drytec for detailed inspection and a report. If the inspection result of Drytec or the manufacturer of the equipment shows that the failure is due to a production fault, then the parts will be considered under warranty.

This warranty will apply to equipment installed, operated and maintained in accordance with the procedures and recommendations as outlined in the owner's manual published by Drytec during the life of this warranty. Drytec reserves the right to ask for the photos of the failed part or the part itself delivered to its warehouse. After inspection, if Drytec warranty department examination of the photo or returned part concludes that such defect has occurred in normal service and was not due to apparent misuse, abuse or accident, Drytec will repair or replace, at its sole discretion, the defective part free of charge and deliver it FOB from its warehouse.

This warranty is not transferable. Any warranty service performed in the field must be authorized by Drytec prior to service. Unauthorized service voids the warranty and any resulting charges will not be paid for by Drytec.

Drytec makes no other warranties or guarantees, expressed or implied. Drytec assumes no liability for indirect or consequential damages.