Non-Metallic EODD Pump

COGNITO™ BY SANDPIPER

Certified Quality

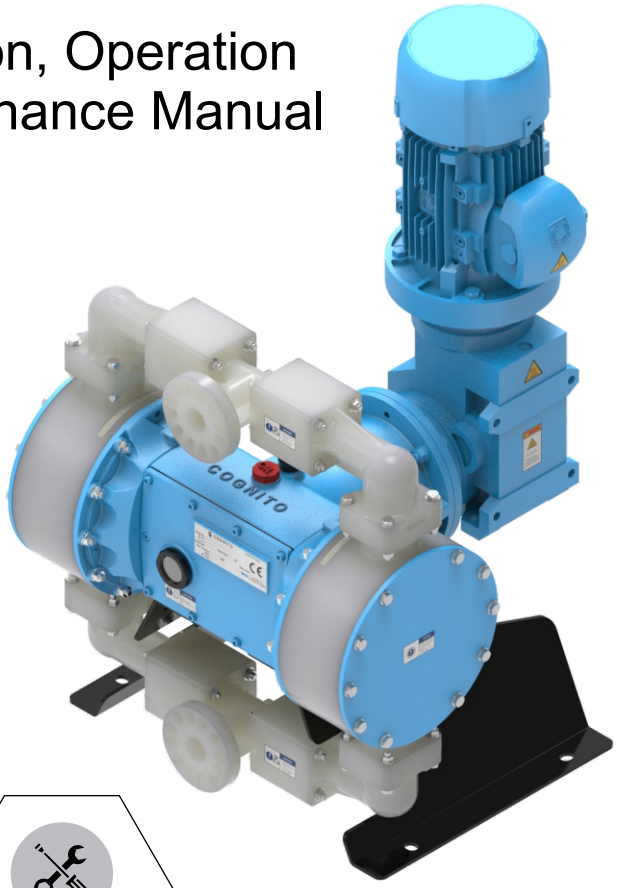
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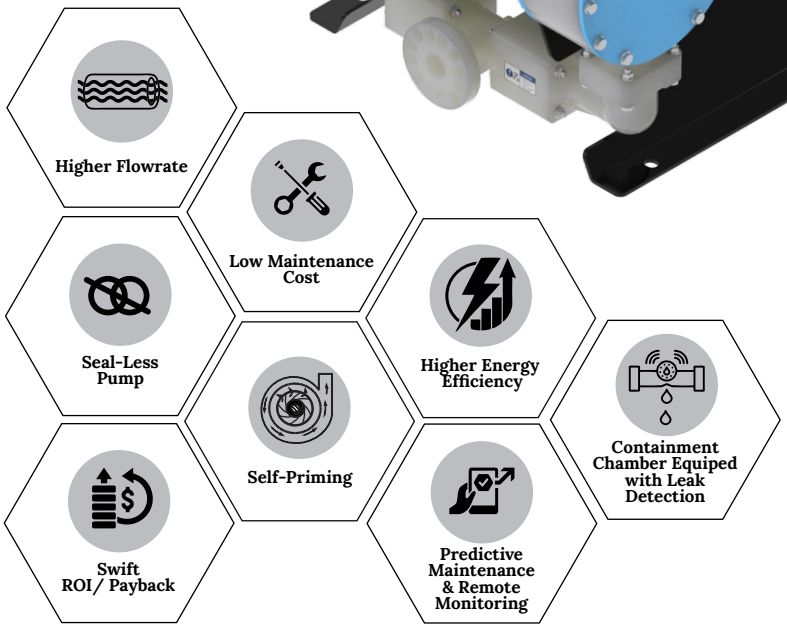
ENGINEERED WITH EXCELLENCE

IOT CAPABLE

LOW CARBON FOOTPRINT

Installation, Operation & Maintenance Manual





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A Unit of IDEX Corporation
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IDEX

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Safety Information

⚠ WARNING

INSTALLATION IN HAZARDOUS DUTY APPLICATIONS:
Pumps that will operate in environments defined as “hazardous locations” must only be installed, connected and set-up by qualified personnel with knowledge and understanding of protection classes, regulations and provisions for apparatus in hazardous areas, for the region where the pump will operate, because these regulations and provisions, along with the definition of what constitutes hazardous areas vary by location.

HAZARDOUS PRESSURE :
Can result in serious injury or property damage. Do not service or clean pump, hoses or dispensing valve while the system is pressurized. Disconnect and lockout / tagout power supply to electric motor and VFD. Relieve pressure from the system by opening dispensing valve or device and / or carefully and slowly loosening and removing outlet hose or piping from pump.

Excessive Fluid Pressure :
Fluid pressure developed by the pump should not exceed the maximum pressure as stated on the pump model plate. Be sure material hoses and other components are able to withstand fluid pressures developed by this pump. Check all hoses for damage or wear.

HAZARDOUS MATERIALS :
Safe handling practices must comply with local and national laws and safety code requirements. Obtain Material Safety Data Sheets on all materials from the supplier for proper handling instructions. Check before sending pump to factory. Do not attempt to return a pump to the factory or service center that contains hazardous material

EXPLOSION HAZARD:
Models containing aluminum wetted parts cannot be used with Methylene Chloride, 1-1-1 -Trichloroethane or other Halogenated Hydrocarbon solvents. These may react and explode. Check all wetted parts to assure compatibility before using with process fluid.

ELECTRIC SHOCK HAZARD :
Pump must be grounded. Improper grounding, setup, or usage of the system can cause electric shock. Turn off and remove power before servicing or installing equipment. Connect only to grounded power source. All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.

STATIC SPARK.
1. Sparks can ignite flammable material and vapors & can cause explosion resulting in severe injury or death.
2. The pumping system must be grounded when it is pumping, flushing, recirculating or spraying flammable materials.
3. Secure pump, connections and all contact points to avoid vibration and generation of contact or static spark.
4. Comply to local building codes and electrical codes for specific grounding requirements.
5. After grounding, periodically verify continuity of electrical path to ground. Test with an ohmmeter from each component (e.g., hoses, pump, clamps, container, spray gun, etc.) to ground to ensure continuity. Ohmmeter should show 0.1 ohms or less.
6. Submerse the outlet hose end, dispensing valve or device in the material being dispensed if possible. (Avoid free streaming of material being dispensed.)
7. Use proper ventilation.


When used for toxic or aggressive fluids, the pump should always be flushed prior to disassembly.


Before maintenance or repair, shut off the motor and bleed the pressure from the pump. Be certain that approved eye protection and protective clothing are worn at all times. Failure to follow these recommendations may result in serious injury.

⚠ CAUTION

CHEMICAL COMPATIBILITY :
Check the chemical compatibility of the pump wetted parts and the substance being pumped, flushed or recirculated before using. Chemical compatibility may change with temperature and concentration of the chemical(s) within the substances being pumped, flushed or circulated. For specific fluid compatibility,
consult the chemical manufacturer.

HOT SURFACE :
Precautions should be taken to restrict access to hot surfaces when needed. Metallic wetted sections can reach up to the same temperature as the fluid temperature (up to 100°C). Proper personal protective equipment (PPE) for hot surfaces should be worn. Check to ensure parts have cooled down sufficiently prior to any maintenance

When the Pump is used for the process fluid whose temperature is higher than the Ambient temperature or >50°C, the user should provide proper heat insulation or take necessary precautions to avoid burns.

Do not use the pump for the structural support of the piping system. Ensure the system components are properly supported to prevent stress on the pump parts.

Ensure all operators of this equipment have been trained for safe working practices, understand it’s limitations, and wear safety goggles / equipment when required.

Nonmetallic pumps and plastic components are not UV stabilized. Ultraviolet radiation can damage these parts and negatively affect material properties. Do not expose to UV light for extended periods of time.

Pressure relief valving or equivalent safeguards are required to prevent excess pressure on the discharge piping system.

The pump is pressurized internally with pressure during operation. Make certain that all fasteners and piping connections are in good conditions and are reinstalled properly during reassembly.
Use safe practices when lifting.

⚠ IMPORTANT

Read the safety warnings and instructions in this manual before pump installation and start-up. Failure to comply with the recommendations stated in this manual could damage the pump and void factory warranty.

When the pump is used for materials that tend to settle out or solidify, the pump should be flushed after each use to prevent damage. In freezing temperatures the pump should be completely drained between uses.

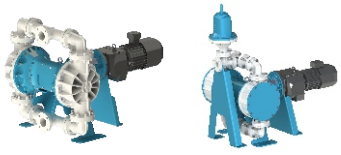
Torque all Fasteners before operation. Keep regular check. Creep of housing and gasket materials may cause fasteners to loosen.

Torque all fasteners to ensure against fluid or air leakage.

Pump installation floor must be flat, slope angle must be less than 5°

Machine will be off than only man interaction with the machine

If Power supply failure machine cannot start unexpectedly.



PUMP STICKERS



WARNING

Warm Surface.

- Do not touch, allow the surfaces to cool before servicing



WARNING

Rotating Parts Crush & Cut

- Do NOT Operate with Cover Removed.
- Follow Lockout procedure Before Servicing



NOTICE

- Read and Understand the Manual Before Operating or Servicing the machine.
- Do NOT Operate without guard or cover properly installed



NOTICE

- Use The RECOMMENDED Star torque pattern and values for the diaphragm cover, Failure may result in damage to Equipment
- Follow Lockout procedure Before Servicing



WARNING

- This Machine starts AUTOMATICALLY

NOTICE



- Use The RECOMMENDED Star torque pattern &values for the diaphragm cover, Failure may result in damage to Equipment
- Follow Lockout procedure Before Servicing

WARNING



Warm Surface.
Do NOT Touch,
Allow the surfaces to cool before servicing

NOTICE

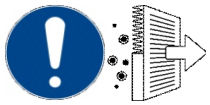


- Follow the instruction, prior to starting the equipment.
- Check the oil level
- Clean the vent filter
- Open Inlet and outlet valves connected
- Follow the safety protocol's



NOTICE

Check the oil level Before staring the machine



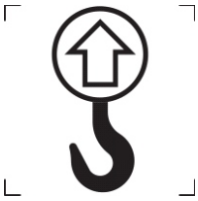
NOTICE

- Clean air filter daily, Failure to do so may cause the Equipment to Overheat & Malfunction



NOTICE

- Do note close the Inlet or outlet valve, While the pump is in Operation, close the Valves only when the Pump is "switched off"











REQUIRED PPE'S





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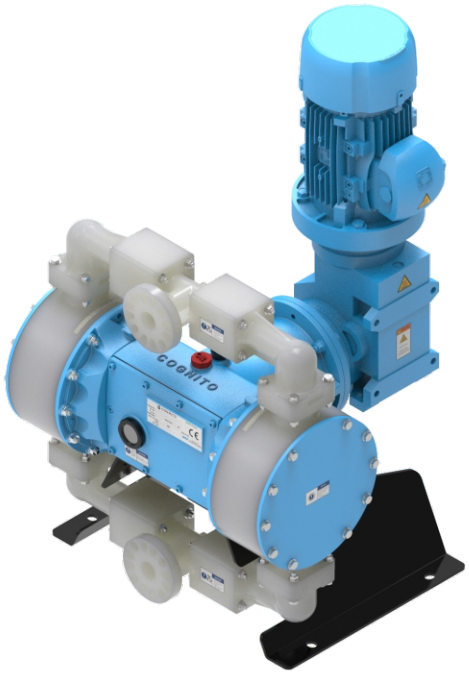
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1.0 INTRODUCTION

Cognito is a brand of IDEX Corporation which is committed to offer highly engineered products and services to solve customer critical problems and to meet their future expectations.

Cognito pumps are Smart IoT capable Electrically Operated Double Diaphragm Pumps designed with a robust mechanism to satisfy every customer's demands for increased production efficiency & to lower total cost of ownership while facilitating smooth handling of variety of fluids & slurries. With proper attention to installation & maintenance, Cognito EODD pumps will give efficient and trouble-free operation.



Read the safety warnings & instructions in this manual before pump installation and start-up. One must strictly follow the IOM manual to avoid injury and life hazard which may occur otherwise. Failure to comply with the recommendations stated in this manual could damage the pump and void factory warranty. In case any instruction in this manual is unclear or any information is missing, please contact IDEX.

2.0 IMPORTANT WARNINGS & CAUTIONS

Read, Understand and Follow this information to avoid injury and Property Damage / Pump Damage

2.1 Lifting & Transportation

Follow below instructions to move the EODD pump to the required location –

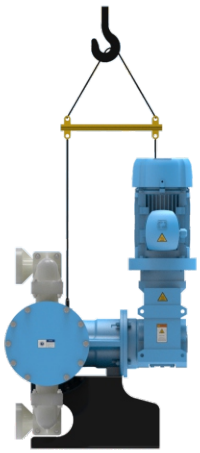


Figure - 1

- The pump is provided with two lifting hooks as shown in Figure - 1. Lift the pump only from these two points
- Lifting the pump from any other points may cause damage to the pump as well as injury to the person
- While relocating the pump, make sure to decouple from the pipeline only after releasing the pressure & disconnecting the power supply.
- Ensure adequate clearance around the pump for sufficient access and ventilation.

2.2 Storage

If the equipment is to be stored prior to installation, follow below instruction

- EODD pumps should be flushed with the compatible media and should be stored in a dry & dust free location protected from impacts and vibrations. Storage temperature should be in between 15 to 35 C & relative humidity below 70%.
- Do not remove the protective covers from the pump before use.
- In case of long-term storage, consult regional customer service. List on last page.

2.3 Unpacking

- After you unpack the pump, and before you use it for the first time, follow below instruction
- Check if the information on the nameplate correspond to the ordered pump configuration.
- Make sure all parts and accessories listed on the packing list are as per the ordering.
- Check for any damage which may be caused by inappropriate handling during shipment.
- Immediately report out any damage or material shortage to the transport company and to the manufacturer.

Before pump operation, inspect all gaskets and fasteners for any looseness caused due to gasket creep. Re-torque loose fasteners to prevent leakage.

2.4 Health & Safety

The pumps are designed to handle different applications. Do not use the pump on the application / media different from that for which it was ordered without consulting the manufacturer.

The pumps are tested with water at our facility. If your pumped product has the chances to react with water, please make sure the pump is completely dry before operation.

2.5 Qualification of personnel

The personnel in charge of the installation, commissioning and maintenance of the EODD pumps should be qualified, experienced and authorized personnel. The safety of people, animals and property must be ensured while handling these pumps.

2.6 Chemical hazard

Verify the chemical compatibility of the pump wetted parts and the substance being pumped, flushed or re-circulated. For specific fluid compatibility, consult IDEX. Whenever the pump is to be used for pumping a different fluid, it is essential to clean the pump beforehand in order to avoid any possible reaction between the two products.

When used for toxic or aggressive fluids, the pump should always be flushed prior to disassembly. User must ensure chemical compatibility, and any pressure / temperature limits are not exceeded. If pump is not used for long period, care must be taken when restarting. If in any doubt, remove pump from line and flush with a suitable cleaner. Solidified deposits within the pump may cause damage to the diaphragms.

2.7 Electric hazard

Do not carry out any maintenance or/and operation on the pump while it is in operation. Check the specification of power supply before operation.

2.8 Temperature hazard

While operating the pump, the mechanical parts and the gear-motor surface temperature should not exceed nominal working temperatues stated by the gear-motor manufacturer.

2.9 Grounding the pump

Take action to prevent static sparking. Fire or explosion can result, especially when handling flammable liquids. Make sure pump is grounded by connecting the earthing wire to the motor housing.

2.10 Safety during maintenance or repair

Before maintenance or repair, switch off the power. Shut off the compressed air lined, bleed all pressure, and disconnect the air line to the dampener. Wear protective clothing and safety goggles when operating and /or working in the vicinity of Cognito Pump. Failure to follow these recommendations may result in serious injury.

2.11 Spare parts replacement

The use of non-OEM replacement parts will void agency certifications and warranty clause.
We recommend to use only OEM replacement parts

3.0 TECHNICAL SPECIFICATIONS

3.1 Operating Principle

Cognito Electrically Operated Double Diaphragm pumps are highly engineered Pumps designed for various industrial application considering energy efficiency, safety, reliability, easy to use, maintenance friendly & long-lasting life.

The pump is driven by an electric motor with a reduction gearbox. This in turn drives an eccentric shaft to operate the Diaphragms. When the eccentric shaft rotates and reaches peak on one side, example right side of the chamber, at the same time left side of the chamber reaches valley. This causes extrusion of right diaphragm and intrusion of left diaphragm. As a result positive pressure is built on right side (green) and vacuum on the left side (blue).

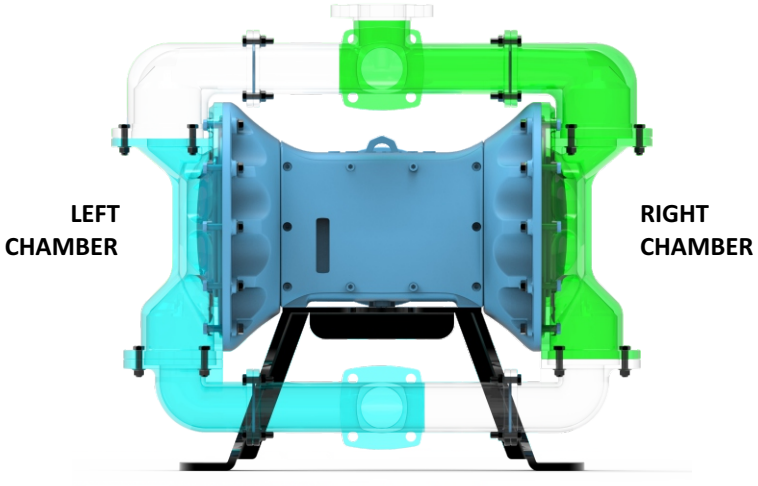


Figure-2: Working Mechanism

3.2 Pump

Pump Specification					
COGNITO EODD - SIZE: MM (IN)		**76 (3")**	**51 (2")**	**38 (1.5")**	**25 (1")**
Operations		Electric	Electric	Electric	Electric
Max. Flow	lpm (gpm)	590 (156)	325 (86)	140 (37)	87 (23)
Max. Operating Pressure	bar (psi)	3.5 (51)	5.5 (79)	5.5 (79)	5.5 (79)
Max. Suction Lift (ref.: tested with water)	m (ft)	7+ (22') Wet 3.5+ (11.5') Dry*	7+ (22') Wet 3.8 (12.5') Dry*	7+ (22') Wet 3.6 (11.8') Dry*	8+ (26') Wet 4 (13') Dry*
Material of Construction:					
a) Pump	-	Polypropylene			
b) Diaphragm & Check ball valve	-	Santoprene / PTFE			
Motor & Gearbox	kW (hp)	7.5 (10)	5.5 (7.5)	3.7 (5)	1.5 (2)
Sound Level	db	<80	<80	<80	<80
Solid Handling	mm (in)	9 (.35")	7 (.28")	5 (.19")	3 (.11")
Max. Heads	m (ft)	35 (115')	55 (180')	55 (180')	55 (180')
Displacement per cycle	l (gal)	4.72 (1.24)	2.88 (.76)	2.88 (.76)	.68 (.18)

* Applicable for Santoprene & PTFE Diaphragm only

Note: Santoprene® is a registered trademark of Celanese

3.3 Motor

3.3.1. Safe Area Motor Specification

Type	3Phase | AC Induction Motor
Rating	1.5 hp (1.1 kW) | 2 hp (1.5 kW) | 3 hp (2.2 kW) | 5 hp (3.7 kW) | 7.5 hp (5.5 kW) | 10 hp (7.5 kW)
Pole	4 POLE
RPM	~1450 at 50 Hz or ~1750 at 60 Hz
EFF Level	IE3
Frame Size	IEC 112M (5 hp) | IEC 132S (7.5 hp) | IEC 132M (10 hp) | IEC 90L (2 hp) | IEC 90S (1.5 hp)
Drive	VFD (Inverter) capable recommend
Power Supply	>200 V, 3 Phase, 50 or 60 Hz
Motor Enclosure	TEFC or as the motor manufacturer recommends per application
Application Area	SAFE (Non-Hazardous Environments)
Type of Protection	IP55
Temperature	Amb 50°C / 122 °F
Insulation Class	F
Mounting	Flange or Face (must match Gearbox interface)
TB Position	AS PER MFG. STANDARD
Lifting	2X Lifting Eye Casted or Fitted

3.3.3 Recommended NEMA AC Motor Specification

Type	3Phase | AC Induction Motor
Rating	2 hp (1.5 kW) | 5 hp (3.7 kW) | 7.5 hp (5.5 kW) | 10 hp (7.5 kW)
Pole	4 POLE
RPM	~1450 at 50 Hz or ~1750 at 60 Hz
EFF Level	NEMA Premium or IE3
Frame Size	NEMA 140T (2 hp) | NEMA 184T (5 hp) | NEMA 213T (7.5 hp) | NEMA 215T (10 hp)
Drive	VFD (Inverter) capable recommend
Power Supply	>200 V, 3 Phase, 50 or 60 Hz
Motor Enclosure	TEFC or as the motor manufacturer recommends per application
Application Area	SAFE (Non-Hazardous Environments)
Type of Protection	IP55
Temperature	Amb 50°C / 122 °F
Insulation Class	F
Mounting	Flange or Face (must match Gearbox interface)
TB Position	AS PER MFG. STANDARD
Lifting	2X Lifting Eye Casted or Fitted

Note: Consult motor manufacturer for recommendations with AC motor specifications in hazardous environments (explosive or fire) or DC motor specification per the end user application.

3.5 Cognito Pulsation Dampener

Pulsation Dampener plays a very important role in Positive Displacement Pumps to reduce pulsations & vibrations during pump operation, thus ensuring continuous & precise non-pulsed flow rate.

Cognito Dampeners are designed to provide vibration free smooth continuous flow that makes this component a suitable equipment for safeguarding the system.

It maintains a constant volume of air support at diaphragm by automatically adjusting to the current pressure and thereby absorbing the pulse.

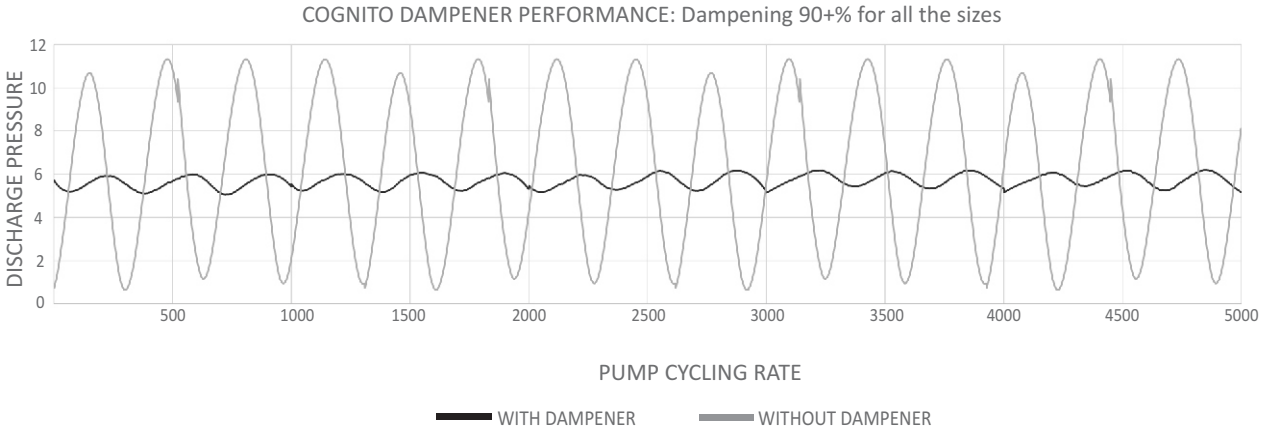
Working Principle

A pulsation dampener uses a flexible diaphragm to separate a liquid chamber from a compressed air chamber. A rod connected to the centre of the diaphragm activates the air inlet and exhaust which automatically admits or exhausts air to the air chamber. This maintains the diaphragms in mid-range of stroke to eliminate flow pulsation & pressure spikes.



Cognito Dampeners are suitable for EODD pump models and are available in Aluminium and Stainless-steel wetted housings.

Recommended Air Inlet Pressure : 1 bar higher from the Discharge Pressure

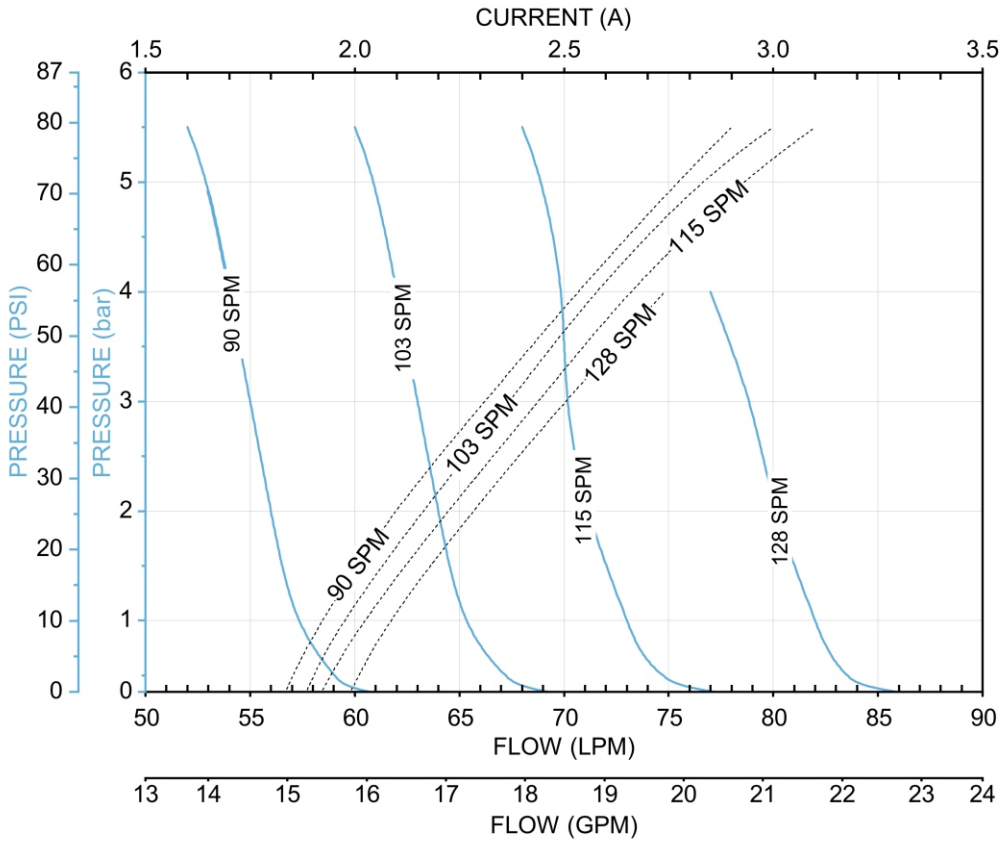


TECHNICAL SPECIFICATION				AVAILABLE WETTED MATERIALS		
				Wetted Parts	Diaphragm	
DAMPENER SIZE	COMPATIBLE PUMP SIZE	AIR INLET SIZE	Max. Pressure	PP	SANTOPRENE	SANTOPRENE PTFE OVERLAY
1''	1''	1/8'' NPT	8 bar	YES	YES	YES
1.5''	1.5''	1/8'' NPT	8 bar	YES	YES	YES
2''	2'' & 3" metallic	1/8'' NPT	8 bar	YES	YES	YES
3''	3''	1/8'' NPT	8 bar	YES	YES	YES
3''	4'' metallic	1/8'' NPT	8 bar	YES	YES	YES

Consult the Dampener product manual for more information.

3.6 Performance Curve

1. Cognito 25 MM (1") PP EODD Pump

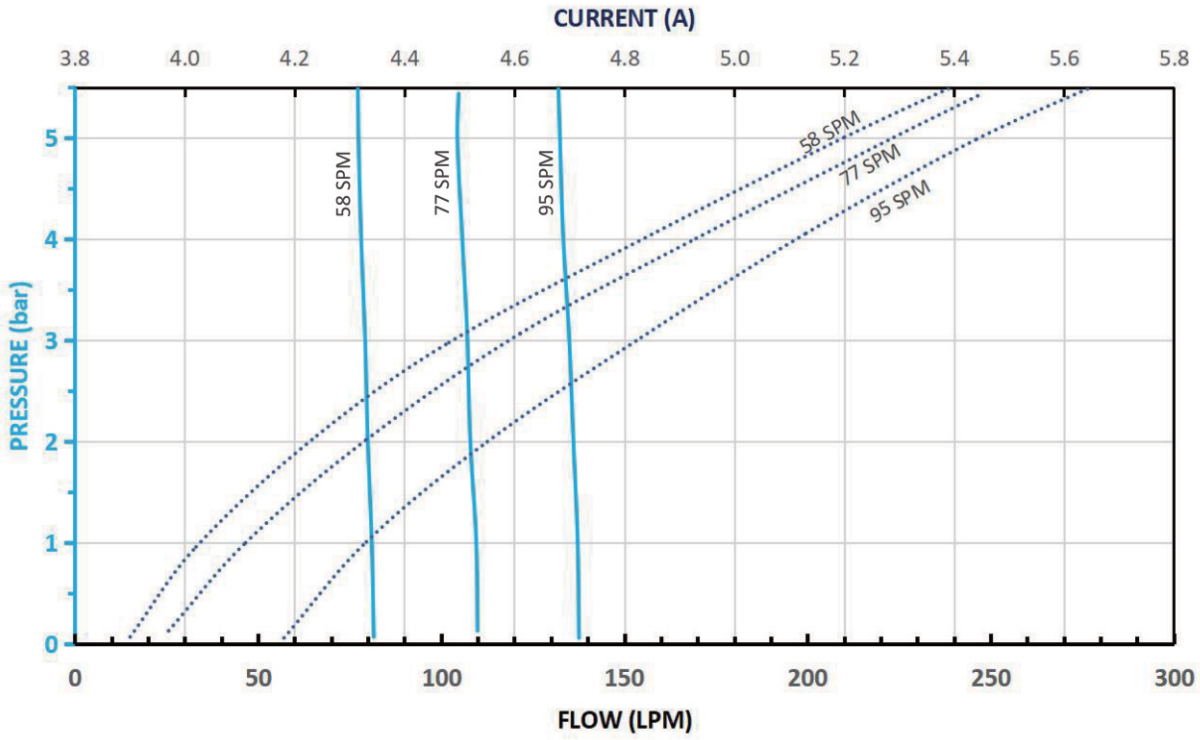


Notes :

1. Use 2 HP / 1.5 KW motor for above 2.5 AMPs.
2. The performance curve is based on following: Santoprene elastomer fitted pump, flooded suction, water at ambient conditions 25°C (77°F), with Cognito Dampener.
3. The performance result may deviate in excess of 5% based on elastomer.
4. Performance vary based on viscosity.

	SPM			
	56	74	93	Others
PRESSURE (bar)	**Energy Consumption (kWh)**			
0.05	0.27	0.42	0.42	Consult IDEX for more data.
1	0.41	0.60	0.60	
2	0.58	0.81	0.81	
3	0.72	1.03	1.03	
4	0.89	1.21	1.21	
5	1.03	1.41	1.41	
5.5	1.12	1.50	1.50	

2. Cognito 38 MM (1.5") PP EODD Pump

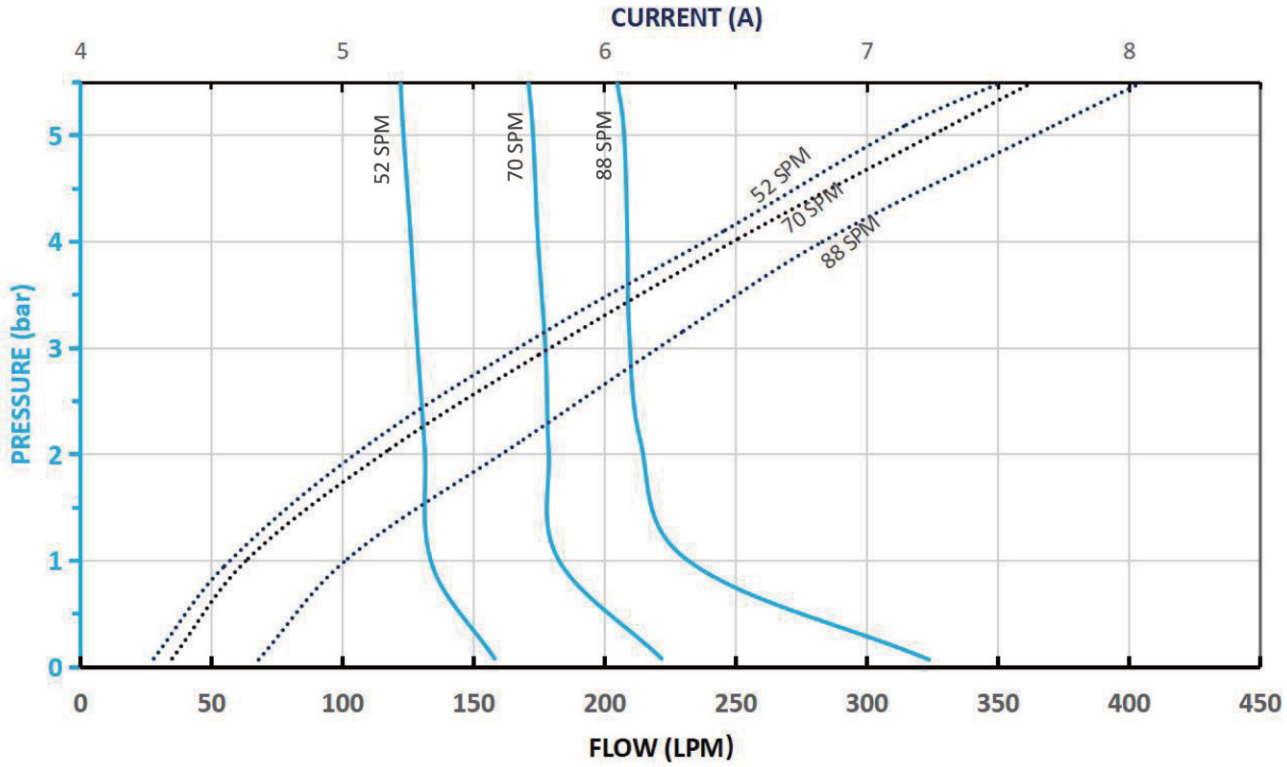


Notes :

1 Use 5 hp / 3.7 kW motor for above 4 AMPs.
2 Above 93 SPM, contact IDEX.
3 The performance curve is based on following: SANTOPRENE elastomer fitted pump, flooded suction, water at ambient conditions 25°C, with COGNITO Dampener
4 The performance result may deviate in excess of 5% based on elastomer.
5 Performance vary based on Viscosity.

	SPM			
	56	74	93	Others
PRESSURE (bar)	**Energy Consumption (kWh)**			
0.05	0.27	0.42	0.42	Consult IDEX for more data.
1	0.41	0.60	0.60	
2	0.58	0.81	0.81	
3	0.72	1.03	1.03	
4	0.89	1.21	1.21	
5	1.03	1.41	1.41	
5.5	1.12	1.50	1.50	

3. Cognito 51 MM (2") PP EODD Pump

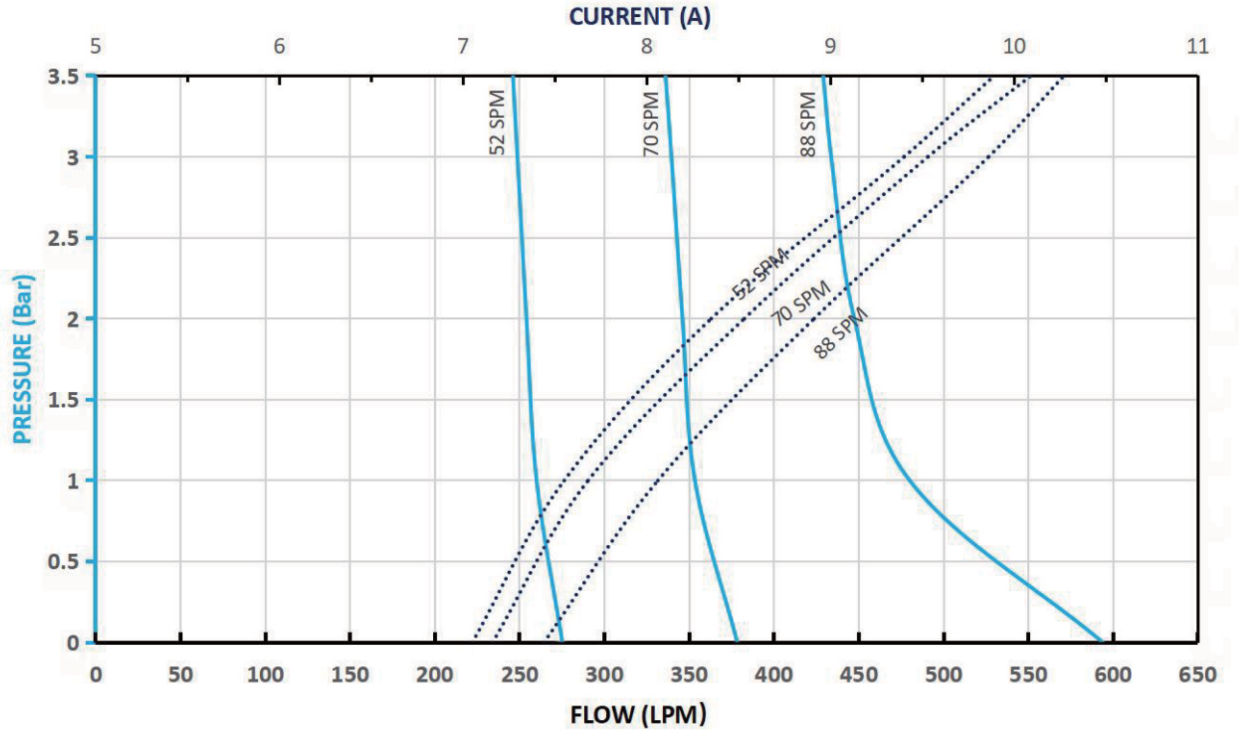


Notes :

1 Use 7.5 hp/ 5.5 kW motor for above 7 AMPs.
2 Above 85 SPM, contact IDEX.
3 The performance curve is based on following: SANTOPRENE elastomer fitted pump, flooded suction, water at ambient conditions 25°C, with COGNITO Dampener.
4 The performance result may deviate in excess of 5% based on elastomer.
5 Performance vary based on Viscosity.

	SPM			
	51	68	85	Others
PRESSURE (bar)	Energy Consumption (kWh)			
0.05	0.33	0.50	0.80	Consult IDEX for more data.
1	0.57	0.85	1.28	
2	0.88	1.23	1.78	
3	1.18	1.55	2.23	
4	1.44	1.93	2.54	
5	1.72	2.31	3.01	
5.5	1.84	2.47	3.21	

3. Cognito 76 MM (3") PP EODD Pump



Notes :

1 Use 10 hp/ 7.5 kW motor for above 10 AMPs.
2 Above 85 SPM, contact IDEX.
3 The performance curve is based on following: SANTOPRENE elastomer fitted pump, flooded suction, water at ambient conditions 25°C, with COGNITO Dampener.
4 The performance result may deviate in excess of 5% based on elastomer.
5 Performance vary based on Viscosity.

	SPM			
	51	68	85	Others
PRESSURE (bar)	**Energy Consumption (kWh)**			
0.05	1.06	1.46	1.94	Consult IDEX for more data.
0.5	1.16	1.58	2.15	
1	1.28	1.75	2.35	
1.5	1.42	1.92	2.56	
2	1.53	2.10	2.78	
2.5	1.67	2.27	2.96	
3	1.80	2.44	3.22	
3.5	1.94	2.65	3.42	

3.7 Model configuration

COGNITO EODD CODE LOGIC

COGNITO PUMP ASSEMBLY CODE LOGIC

*Note: Limited offerings, consult IDEX.

PUMP ASSEMBLY

1	2	3	4	5	6	7	8,9	10,11	12	13	14	15	16
CODE COMPLIANCE	WETTED PARTS	PUMP SIZE	PORT CONNECTION	PRESSURE RATING	PUMP SUB-ASSEMBLY CONFIG.	ELASTOMER MATL. CONFIG	MOTOR RATING IN HP	SENSOR CONFIGURATION	GEARBOX SPEED RANGE	GEARBOX TYPE & MAKE	STARTER TYPE	DAMPENER	ACCESSORIES KIT
C	A	4	F	4	M	S	10	04	G	P	V	D	

POSTION 1: CODE COMPLIANCE

C	STANDARD
X	ATEX
I	IECEX
K	UKCA
U	CE
F	ONLY FLAME PROOF
Z	SPECIAL CONSTRUCTION MOC

POSTION 2: WETTED PARTS

P	Polyproylene

POSTION 3: PUMP SIZE

1	1'' PUMP
2	2'' PUMP
3	3'' PUMP
5	1.5'' PUMP

POSTION 4: PORT CONNECTION

U	UNIVERSAL_PP

POSTION 5: PRESSURE RATING

3	LIGHT DUTY_ BELOW 4 BAR
4	STANDARD DUTY -METALLIC_4 TO 6 BAR

POSTION 6: PUMP SUB-ASSEMBLY CONFIGURATION

B	BARE PUMP WITH COUPLING HOUSING
C	BARE PUMP WITH COUPLING HOUSING AND COUPLING
G	BARE PUMP WITH COUPLING HOUSING , COUPLING AND GEARBOX
M	BARE PUMP WITH COUPLING HOUSING , COUPLING, GEARBOX AND MOTOR
Z	CUSTOM

POSTION 7: ELASTOMER MATERIAL. CONFIGURATION (DIAPHRAGM)_CHECK BALL_SEAT_FLANGE ORINGS_SEAL

P	(PTFE_ SANTOPRENE)_PTFE_PTFE_PTFE_PU-STD
S	(SANTOPRENE)_SANTOPRENE_SS-410_PTFE_PU-STD
V	(VITON)*
H	(HYTREL)*
C	(SANTOPRENE)_NEOPRENE_SS-410_BUNA(NITRILE)_PU-STD
E	(PTFE_ SANTOPRENE)_SANTOPRENE_SS-410_BUNA(NITRILE)_PU-STD
F	(PTFE_ SANTOPRENE)_SANTOPRENE_PTFE_PTFE_PU-STD
B	(BUNA(NITRILE)_BUNA(NITRILE)__FKM(VITON)_FKM(VITON)*
X	(SANTOPRENE)_SANTOPRENE_SS-410_FKM(VITON)_FKM(VITON)
U	(PTFE_ SANTOPRENE)_PTFE_PTFE_PTFE_FKM(VITON)

POSTION 8,9: MOTOR RATING IN HP

01	1	55	5.5
15	1.5	75	7.5
02	2	10	10
03	3	20	15*
05	5		

POSTION 10,11: SENSOR CONFIGURATION

00	NO SENSOR & NO MOTOR
01	CONDUCTIVE SENSOR & NO MOTOR
02	CE CAPACTIVE SENSOR & NO MOTOR
03	W/O SENSOR & 50 HZ, NON HAZARDOUS MOTOR [ABB, SIEMENS, WEG, NIDEC, CG, JIE, KDRIVE, WANNAN]
04	CONDUCTIVE SENSOR & 50 HZ, NON HAZARDOUS MOTOR [ABB, SIEMENS, WEG, NIDEC, CG, JIE, KDRIVE, WANNAN]
05	CE CAPACTIVE SENSOR & 50 HZ, NON HAZARDOUS MOTOR [ABB, SIEMENS, WEG,NIDEC, CG, JIE, KDRIVE, WANNAN]
06	CE CAPACTIVE SENSOR & 50 HZ, CE MOTOR CGL
11	W/O SENSOR & 60 HZ, NON HAZARDOUS NEMA MOTOR [WEG, NORD,CG]
12	CONDUCTIVE SENSOR & 60 HZ, NON HAZARDOUS MOTOR [WEG ,NORD,CG]
13	CE CAPACTIVE SENSOR & 60 HZ, NON HAZARDOUS MOTOR [WEG,NORD,CG]
14	CE CAPACTIVE SENSOR & 60 HZ, CE MOTOR CGL

POSTION 12: GEARBOX SPEED RANGE (SPM) (GEAR RATIO @50HZ) (GEAR RATIO @ 60HZ)

A	(30 - 40)(48 - 36)(58 - 43)
B	(41 - 50)(36 - 29)(43 - 35)
C	(51 - 60)(29 - 24)(35 - 29)
D	(61 - 70)(24 - 20)(29 - 25)
E	(71 - 80)(20 - 18)(25 - 21)
F	(81 - 90)(18 - 16)(21 - 19)
G	(91 - 100)(16 - 14)(19 - 17.5)
H	(101 - 110)(14 - 13)(17.5 - 16)
I	(111 - 120)(13 - 12)(16 - 14.5)
J	(121-130)(12 - 11)(14.5 - 13.5)
K	(131-140)(11 - 10)(13.5 - 12.5)

POSTION 13: GEARBOX TYPE & MAKE

0	NO GEARBOX
H	HORIZOTAL GEARBOX KIT (BONFIGLOLI)
V	VERTICAL GEARBOX KIT (BAUER)
P	HORIZOTAL GEARBOX KIT (POWERBUILD)
T	VERTICAL GEARBOX KIT (POWERBUILD)
R	HORIZOTAL GEARBOX KIT (ROTOMOTIVE)
N	HORIZOTAL GEARBOX KIT (NORD)
A	VERTICAL GEARBOX KIT (NORD)
W	VERTICAL GEARBOX KIT (POWERBUILD (ATEX))
U	HORIZOTAL GEARBOX KIT (POWERBUILD (NEMA))
C	VERTICAL GEARBOX KIT (POWERBUILD (NEMA))
J	HORIZOTAL GEARBOX KIT + MOTOR (JIE DRIVE)
K	HORIZOTAL GEARBOX KIT + MOTOR (K DRIVE)
M	HORIZOTAL GEARBOX KIT (WEG)
N	VERTICAL GEARBOX KIT (WEG)
S	VERTICAL GEARBOX KIT (SEW)

POSTION 14: STARTER TYPE

0	NO VFD
V	380 V - 500 V (STANDARD)
W	200 V - 240 V
S	STAR DELTA
Z	SPECIAL VFD
B	BLANK PANEL W/O VFD

POSTION 15: DAMPENER

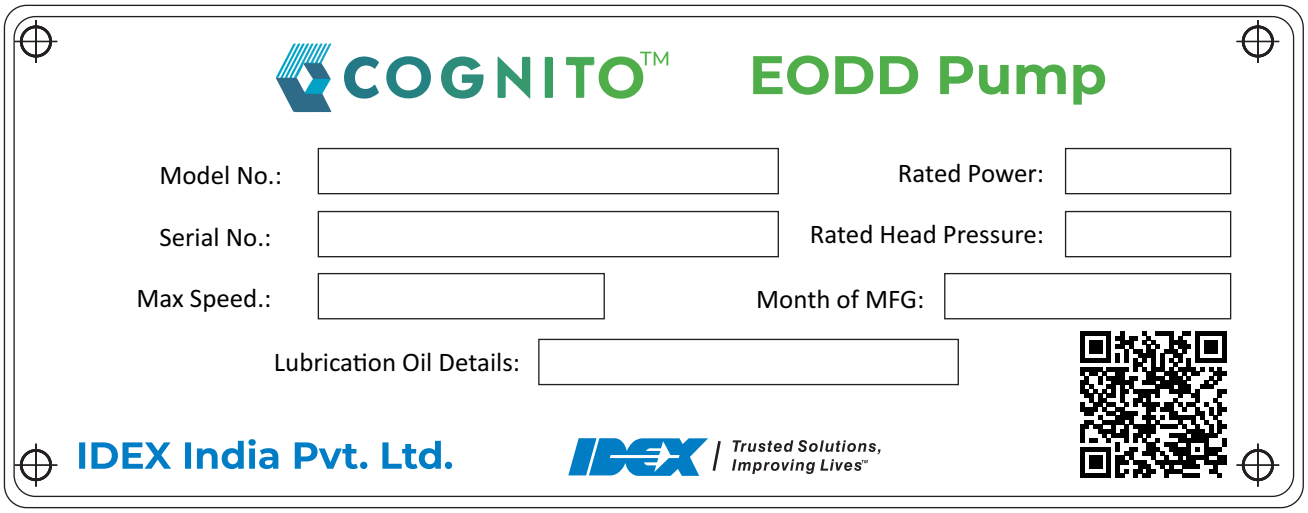
0	NO DAMPENER
D	DAMPENER

POSTION 16: ACCESSORIES KIT

I	IOT KIT

3.8 Name Plate Details

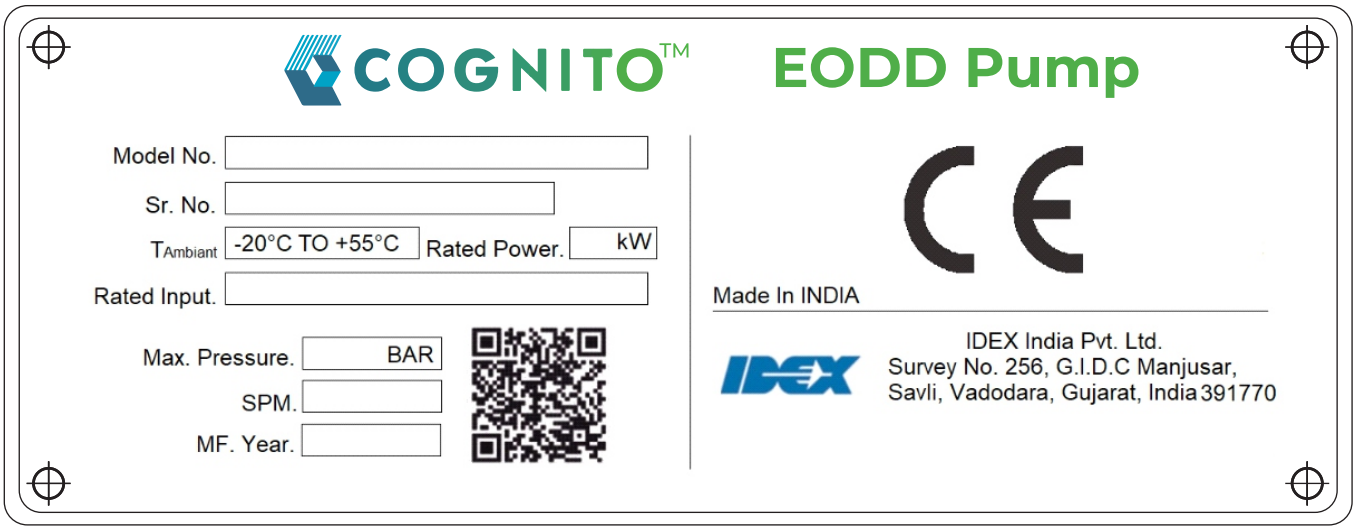
3.8.1 Standard Name Plate Details



Definitions

1. Pump Model - Configured Pump Model Number
2. Serial No. - Pump Serial No.
3. Max. Speed - Pump RPM
4. Lubrication Oil - Pump Lubricating Oil Grade & Qty.
5. Motor Rating - Motor Rating in hp & kW
6. Max. discharge Pressure - Pump Head / Rated Pressure
7. Month of MFG - Manufacturing Month & Year

3.8.2 CE Name Plate



4.0 GENERAL ARRANGEMENT DRAWING

4.1 Inline Arrangement

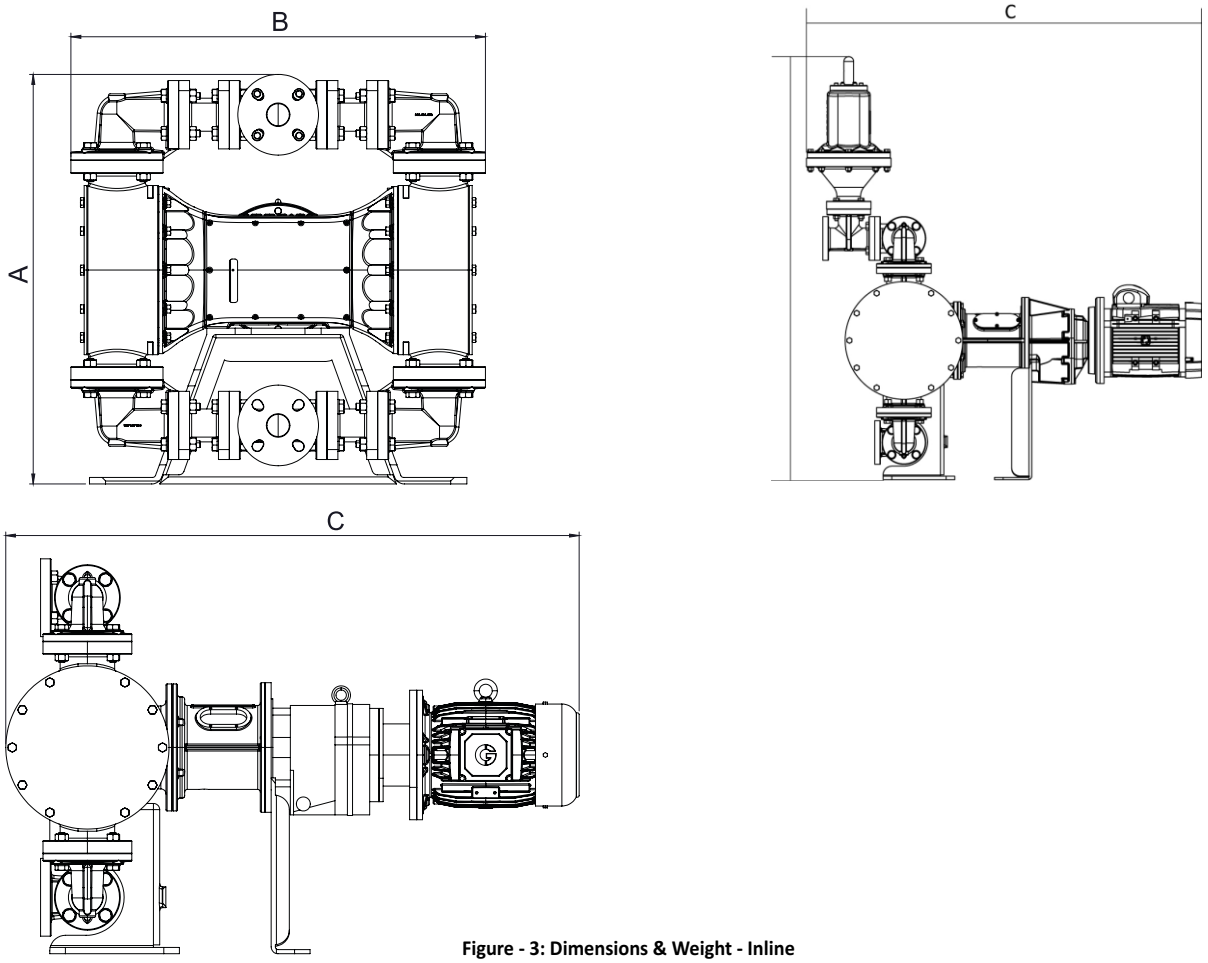


Figure - 3: Dimensions & Weight - Inline

DIMENSION & WEIGHT DETAILS			76 mm (3")	51 mm (2")	38 mm (1.5")	25 mm (1")
INLINE	**Polypropylene**					
	Height w/o Dampener: mm (in)	A	1075 mm (42.32")	920 mm (36.22")	750 mm (29.53")	N/A
	Width: mm (in)	B	1070 mm (42.13")	892 mm (35.12")	771 mm (30.35")	
	Length: mm (in)	C	1590 mm (62.60")	1315 mm (51.77")	1105 mm (43.50")	
	Approx Shipping Weight: kg (lbs) Bare Pump	W	390 kg (859 lbs)	230 kg (507 lbs)	115 kg (253 lbs)	
	Approx Shipping Weight: kg (lbs)Pump, Motor, Gear Box**	W	565 kg (1245 lbs)	355 kg (782 lbs)	205 kg (451 lbs)	

*Final Pump Assembly Weights And Dimensions Dependent On Gear Box And Motor Manufacturer
**Excluded VFD Panel, Dampener & Dampener Support

ANCHORING DETAILS			76 mm (3")	51 mm (2")	38 mm (1.5")	25 mm (1")
INLINE	**Polypropylene**					
	Width mm (in)	E	760 mm (29.92")	676 mm (26.61")	575 mm (22.64")	N/A
	Length: mm (in)	F	300 mm (11.81")	170 mm (6.69")	168 mm (6.61")	
	Distance: mm (in)	G	395 mm (15.55")	370 mm (14.56")	270 mm (10.63")	
	Width mm (in)	H	425 mm (16.73")	350 mm (13.78")	300 mm (11.81")	
	Anchor Fastener Size	I	M16X80	M16X80	M12X80	

4.2 Vertical Arrangement

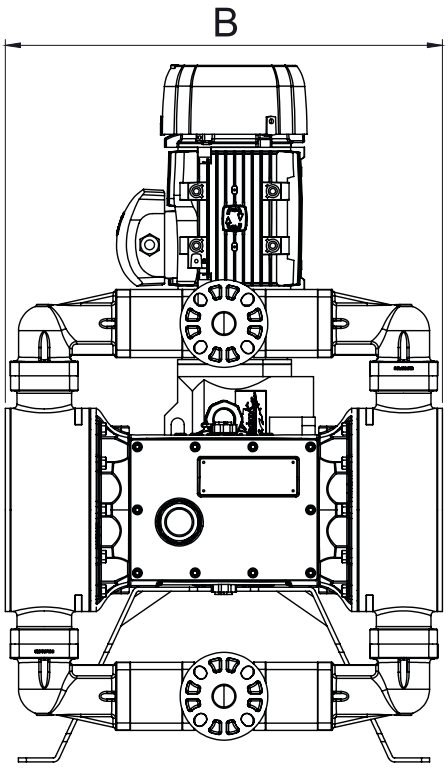
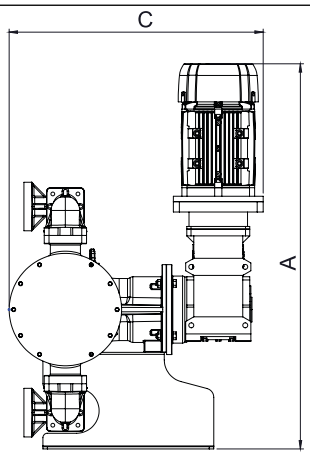


Figure – 3: Dimensions & Weight – Inline



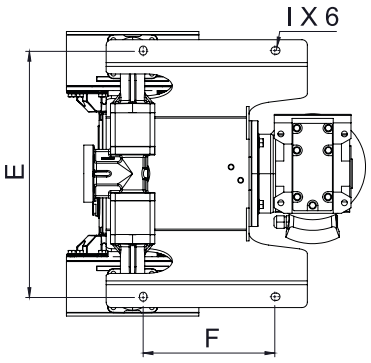


Figure – 4: Installation Anchoring Details – Inline

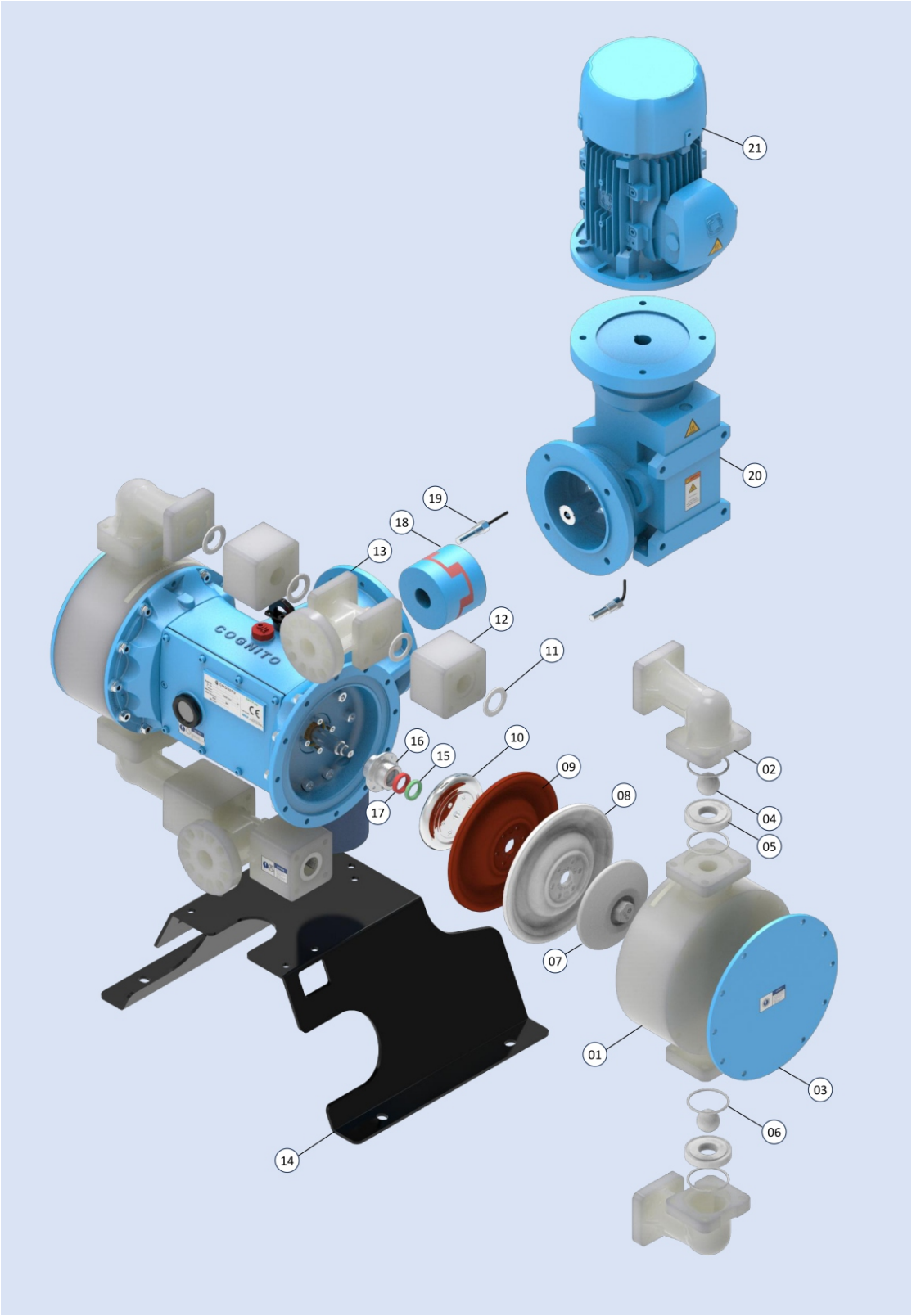
DIMENSION & WEIGHT DETAILS			76 mm (3")	51 mm (2")	38 mm (1.5")	25 mm (1")
INLINE	**Polypropylene**					
	Height w/o Dampener: mm (in)	A	1075 mm (42.32")	920 mm (36.22")	750 mm (29.53")	460 mm (18.11")
	Width: mm (in)	B	1070 mm (42.13")	892 mm (35.12")	771 mm (30.35")	540 mm (21.26")
	Length: mm (in)	C	1120 mm (44.09")	825 mm (32.48")	775 mm (30.51")	565 mm (22.24")
	Approx Shipping Weight: kg (lbs) Bare Pump	W	390 kg (859lbs)	230 kg (507 lbs)	115 kg (253 lbs)	75 kg (165 lbs)
	Approx Shipping Weight: kg (lbs)Pump, Motor, Gear Box**	W	555 kg (1,223 lbs)	345 kg (760 lbs)	295 kg (650 lbs)	150 kg (330 lbs)

*Final Pump Assembly Weights And Dimensions Dependent On Gear Box And Motor Manufacturer
**Excluded VFD Panel, Dampener & Dampener Support

ANCHORING DETAILS			76 mm (3")	51 mm (2")	38 mm (1.5")	25 mm (1")
INLINE	**Polypropylene**					
	Width mm (in)	E	760 mm (29.92")	676 mm (26.61")	575 mm (22.64")	465 mm (18.30")
	Length: mm (in)	F	300 mm (11.81")	170 mm (6.69")	168 mm (6.61")	250 mm (9.84)
	Distance: mm (in)	G	510 mm (20.08")	395 mm (15.55")	330 mm (12.99")	N/A
	Width mm (in)	H	650 mm (25.59")	485 mm (19.09")	350 mm (13.78")	N/A
	Anchor Fastener Size	I	M16X80	M16X80	M12X80	M12X50

5.0 EXPLODED VIEW WITH PARTS LIST

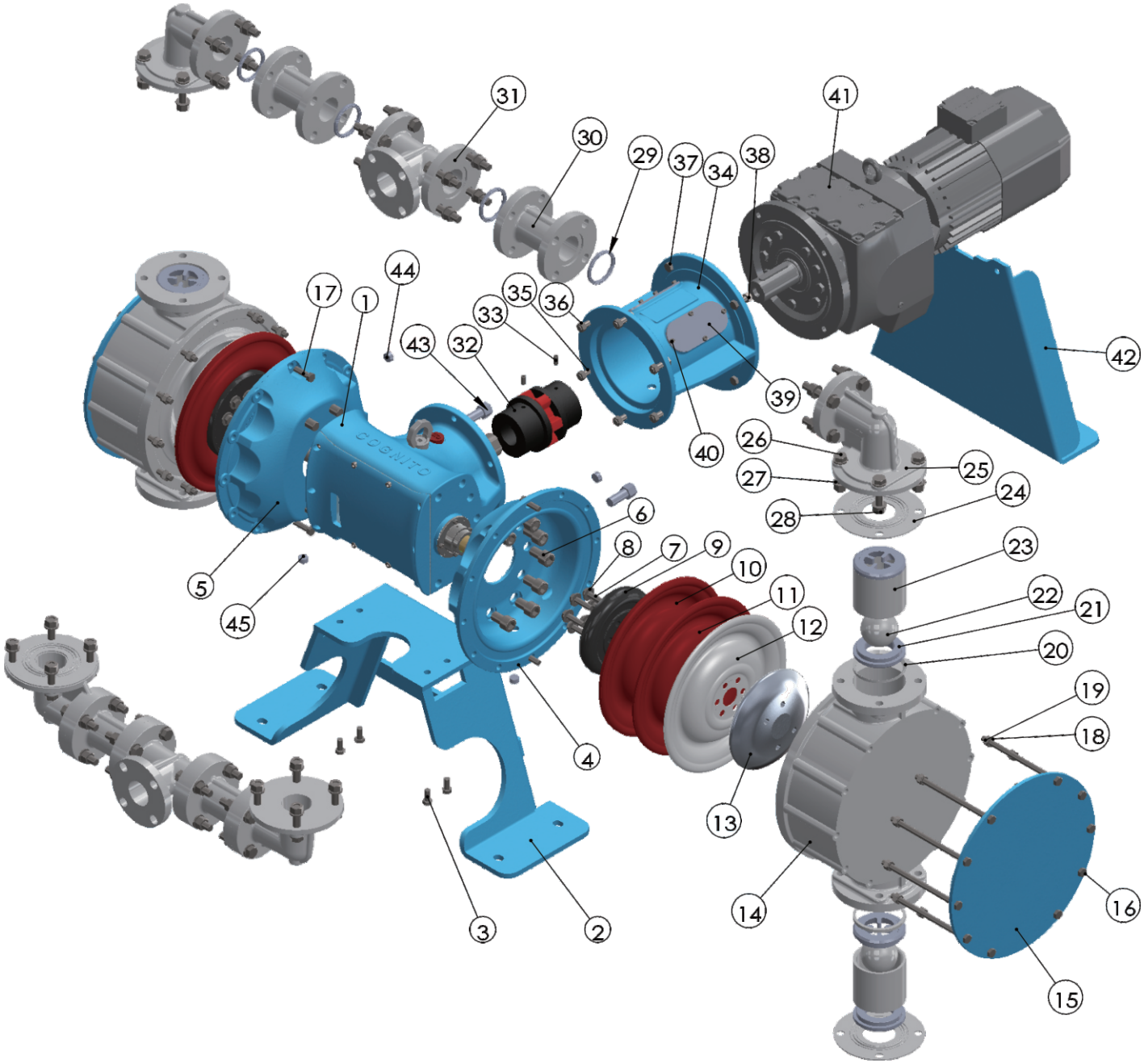
5.1 25 MM (1" PP Exploded View)



Composite Part Identification

1" PP Composite Part Identification							
Item	Part No.	Description	Qty	Item	Part No.	Description	Qty
1	88960050	WET-CHAMBER 1'' PP	2	12	88960053	MANIFOLD EXTENSIONS PP	4
2	312.126.552	DISCHARGE ELBOW PP	4	13	518.232.552	MANIFOLD DISCH 1'' PP	2
3	88960052	BACK PLATE 1'' PP	2	14	88960054	PUMP SUPPORT 1'' PP	1
4	050.028.600	CHECK BALL VALVE 1'' PTFE	4	15	26660006	WIPER SEAL SKF HW-22 X 30 X 5-J2G	2
	050.028.354	CHECK BALL VALVE 1'' SANTOPRENE	4	16	88960004	SEAL SLEEVE 1''	2
5	722.134.552	CHECK VALVE SEAT PP	4	17	26660007	ROD SEAL SKF S02P 22 X 30 X 6.3	2
6	560.215.604	CHECK VALVE SEAL	8	18	—	COUPLING	1
7	88960051	DIAPHRAGM PLATE 1'' PP	2	19	26640028	CONDUCTIVE SENSOR	2
8	88960010	PTFE OVERLAY DIAPHRAGM Ø210	2		15600090	CE SENSOR	2
9	88960008	SANTOPRENE DIAPHRAGM Ø210	2	20	—	GEARBOX	1
10	88960014	PISTON PLATE 1'' CF8M, A351	2	21	—	MOTOR	1
11	720.044.600	MANIFOLD SEAL	8				

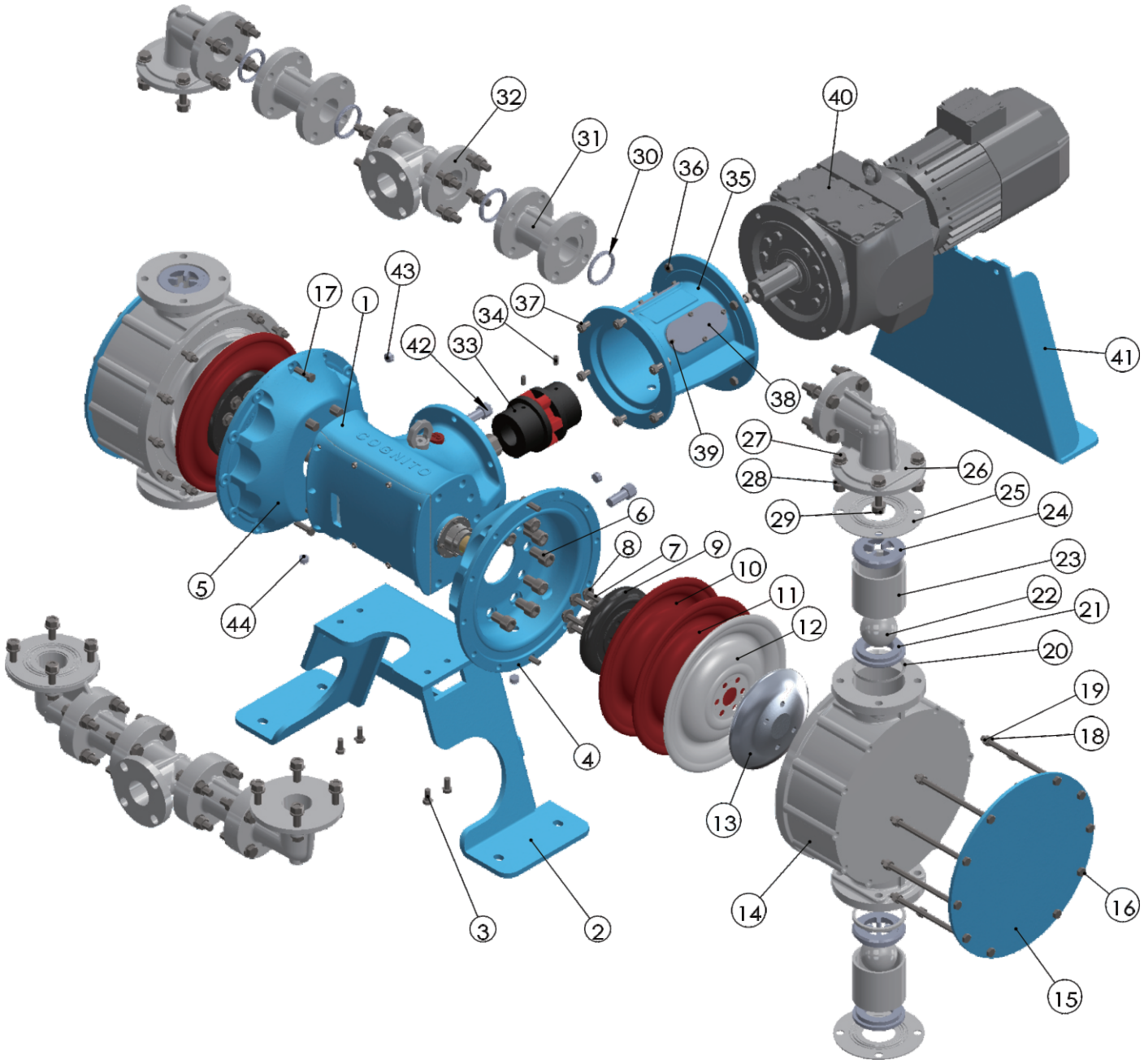
5.2 38 MM (1.5" PP Exploded View)



Composite Part Identification

COGNITO EODD–1.5", PP							
Item	Part No.	Description	Qty	Item	Part No.	Description	Qty
1	ECP15	1.5 INTEGRATED CENTRE ASSEMBLY	1	37	26640027	M12X35 HEX BOLT BLACKODIZED	4
2	88940013PP	PUMP SUPPORT 1.5'' IS-2062 GR.B	1	38	26600023	M12 HEX NUT BLACKODIZED	4
3	26640013	M10X25 HEX BOLT BLACODIZED	4	39	88940026	COVER GLASS C.HOUSING 2''	2
4	88940011PP	BACK CHAMBER RHS 1.5''	1	40	26600027	M6X12 SOCKET HEAD CAP SCREW	8
5	88940012PP	BACK CHAMBER LHS 1.5''	1	41		WJRTRF79DN112M4 -15.6-M1-270°	1
6	26640014	M12X24 SOCKET HED CAP SCREW SS	14	42	88940014PP	GB. SUP 1.5'' 5&3HP INLINE	1
7	26640022	M10X35 SOCKET HEAD CAP SCREW	12	43	26640028	CONDUCTIVE SENSOR 1/4'' BSP	2
8	26640023	M10 NORD-LOCK WASHER	12	44	26640012	WENT PLUG 1/4'' BSP	2
9	88940037	PISTON PLATE 2'', WCB ZINC	2	45	26620002	OIL PLUG 3/8'' NPT M.S	2
10	88940045	BACKUP DIAPHRAGM Ø270	2				
11	88940044	OVERLAY DIAPHRAGM Ø270	2				
12	88940039	OVERLAY DIAPHRAGM Ø270 PTFE	2				
13	CED612.204.552	1.5" PP OUT DIAPHRAGM PLATE	2				
14	CED196.188.552	WET-CHAMBER 1.5''	2				
15	CED196.189.330	BACKPLATE 1.5"	2				
16	CED170.001.330	M10x1.5x170 HEX BOLT	20				
17	CED170.002.330	M10x1.5x35 HEX BOLT FULL THREAD	4				
18	CED902.001.330	SPRING WASHER M10	20				
19	CED545.001.330	M10 HEX NUT	20				
20	720.035.600	SEAL, CHECK VALVE ASSEMBLY	8				
21	722.074.552	CHECK VALVE SEAT 1.5''	4				
22	050.036.354	CHECK BALL VALVE 1.5" SANTO.	4				
23	670.045.552	RETAINER,BALL	4				
24	60300016	SEAL,ELBOW	4				
25	312.101.552	ELBOW DISCHARGE 1.5'' PP	4				
26	CED170.003.330	CAPSCREW, HEX HD,M12x1.5x65	48				
27	CED545.002.330	NUT, HEX,M12x1.5	48				
28	CED901.001.330	FLAT WASHER, M12x1.5	96				
29	720.037.600	SEAL,MANIFOLD	8				
30	CED518.198.552	MANIFOLD CONNECTOR 1.5"	4				
31	518.228.552	MANIFOLD DISCHARGE 1.5''	2				
32	26640046	PTG42-1-1a (P_40X14 G_40X12)	1				
33	26600030	M10X20 SET SCREW BLACKODIZED	2				
34	88940025	COUP. HOUSING 2'' Ø250 X 180	1				
35	26620014	M10X35 HEX BOLT BLACKODIZED	6				
36	26620018	M10 HEX NUT BLACKODIZED	6				

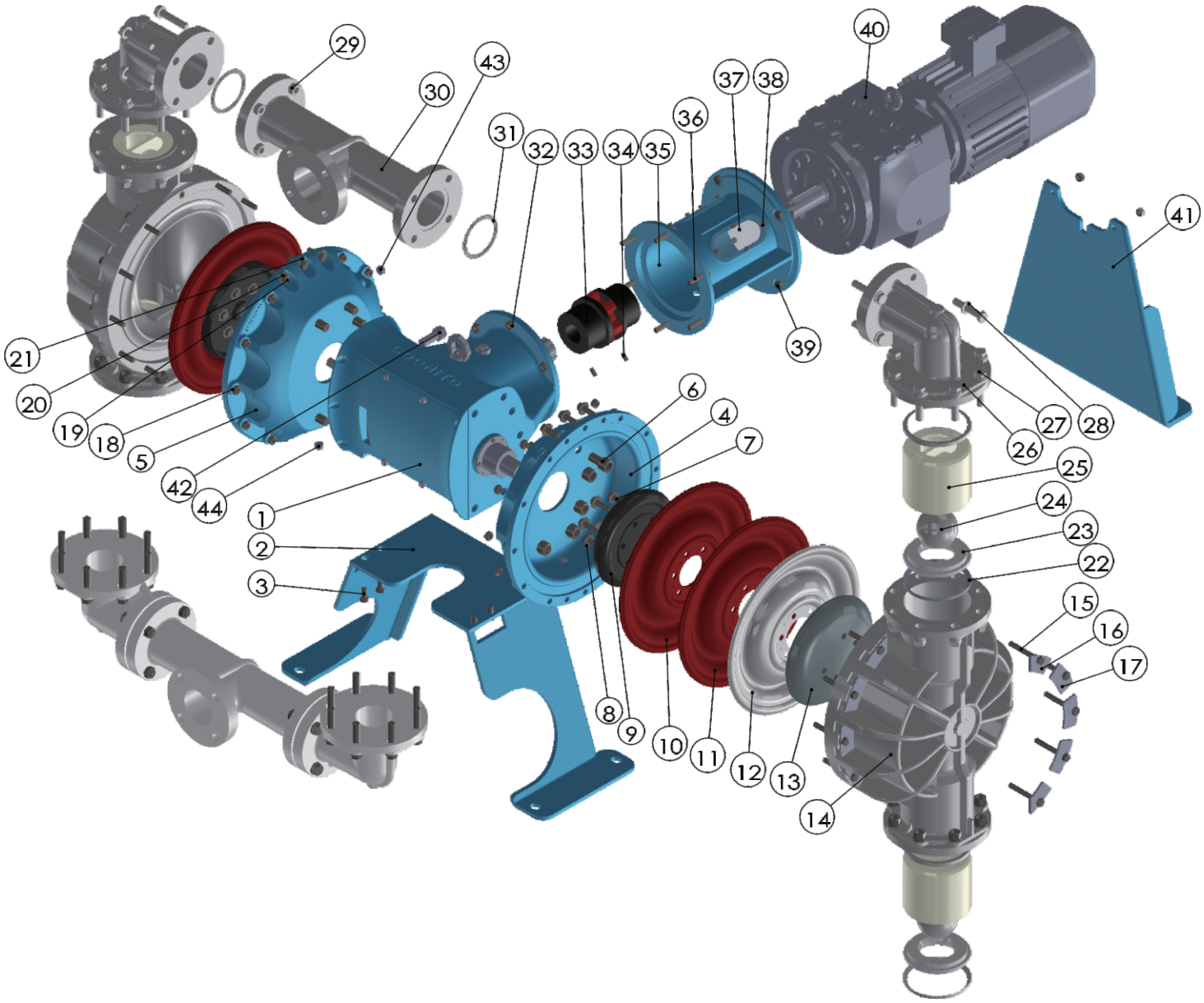
5.3 51 MM (2" PP Exploded View)



Composite Part Identification

COGNITO EODD–2", PP							
Item	Part No.	Description	Qty	Item	Part No.	Description	Qty
1	ECP20	2 INTEGRATED CENTRE Assembly/2	1	34	26600030	M10X20 SET SCREW BLACKODIZED	2
2	CED88920012	PUMP SUPPORT 2'' IS-2062 GR.B	1	35	88900026	COUP. HOUSING 4-2'' (5.5 KW JIE)	1
3	26600031	M12X24 HEX BOLT BLACODIZED	4	36	26600025	M12X50 HEX BOLT BLACKODIZED	10
4	88920010PP	BACK CHAMBER RHS 2''	1	37	26600023	M12 HEX NUT BLACKODIZED	10
5	88920011PP	BACK CHAMBER LHS 2''	1	38	88900035	C.GLASS INLINE C.HOUSING 4-3''	2
6	26620010	M20X30 SOCKET HED CAP SCREW	14	39	26600027	M16X12 SOCKET HEAD CAP SCREW	8
7	26600048	M12X45 HEX HEAD BOLT S.S A2-70	12	40		5.5 kw JIE GEARMOTOR, RATIO 17.08	1
8	26600053	M12 NORD-LOCK WASHER	12	41	CED88920014	2" PP GEARBOX SUPPORT	1
9	88920059	PISTON PLATE 3'', WCB ZINC	2	42	CED88920014	SENSOR	2
10	88920044	BACKUP DIAPHRAGM SANTO Ø350	2	43	26600049	WENT PLUG 1/2'' BSP	2
11	88920045	OVERLAY DIAPHRAGM SANTO Ø350	2	44	26600050	OIL PLUG 1/2'' NPT M.S	2
12	88920042	DIAPHRAGM PTFE Ø350	2				
13	CED612.225.552	2" PP OUT DIAPHRAGM PLATE	2				
14	CED196.190.552	WET-CHAMBER,2" PP	2				
15	CED196.191.330	BACK PLATE 2"	2				
16	CED170.004.330	M12x1.75x210 HEX BOLT	20				
17	CED170.005.330	M12x1.75x40 HEX BOLT FULL THREAD	4				
18	CED902.002.330	SPRING WASHER M12	20				
19	CED545.002.330	M12 HEX NUT	20				
20	720.041.600	SEAL,CHECK VALVE	4				
21	722.075.552	SEAT CHECK VALVE 2''	4				
22	050.038.354	BALL CHECK VALVE 2''	4				
23	275.019.552	CYLINDER, CHECK VALVE	4				
24	670.046.552	RETAINER,BALL	4				
25	60300009	SEAL,ELBOW	4				
26	312.102.552	ELBOW DISCHARGE 2'' PP	4				
27	CED170.006.330	CAPSCREW,HEX HD,M16x2x80	48				
28	CED901.002.330	FLAT WASHER, M16x2	96				
29	CED545.003.330	NUT, HEX ,M16x2	48				
30	720.038.600	SEAL,MANIFOLD	8				
31	CED518.200.552	MANIFOLD CONNECTOR 2"	4				
32	518.199.552	MANIFOLD DISCHARGE 2''	2				
33	26600064	PTG55-1-1a(50,50) P_50X16 G_ 50X14(5.5KW JIE)	1				

5.4 76 MM (3" PP Exploded View)

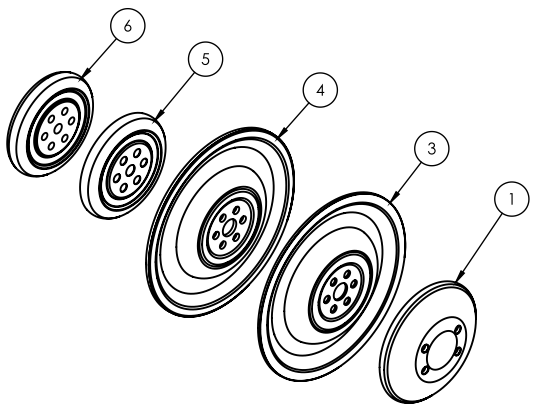


Composite Part Identification

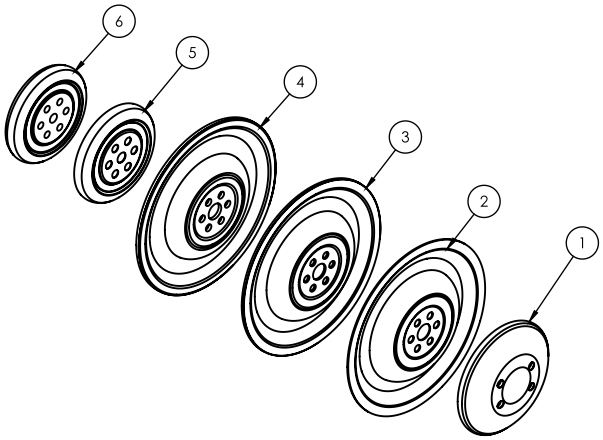
COGNITO EODD–3", PP							
Item	Part No.	Description	Qty	Item	Part No.	Description	Qty
1	ECP30	3 INTEGRATED CENTRE Assembly/3	1	37	88900035	C.GLASS INLINE C.HOUSING 4-3''	2
2	88900012-A	PUMP BASE 3'', HORIZONTAL	1	38	26600027	M6X12 SOCKET HEAD CAP SCREW	8
3	26600031	M12X24 HEX BOLT BLACODIZED	4	39	CED170.003.330	M12X65 HEX BOLT BLACKODIZED	2
4	88900009PP	BACK CHAMBER RHS 3''/内腔	1	40		10HP JIE GEARMOTOR, 17.08 GEAR RATIO	1
5	88900010PP	BACK CHAMBER LHS 3''/内腔	1	41	88900012-1-A	ASSISTANCE BASE	1
6	26600044	M20X35 SOCKET HEAD CAP SCREW	14	42	CED88920014	SENSOR	2
7	CED170.008.115	M12X50 HEX HEAD BOLT S.S A4	12	43	26600049	WENT PLUG 1/2'' BSP	2
8	26600053	M12 NORD-LOCK WASHER	12	44	26600050	OIL PLUG 1/2'' NPT M.S	2
9	88900062	PISTON PLATE 3'' WCB ZINC	2	34	26600030	M10X20 SET SCREW BLACKODIZED	2
10	88900053	BACKUP DIAPHRAGM SANTO Ø408	2	35	88900040	COUP. HOUSING 4-3'' Ø300X266	1
11	88900054	OVERLAY DIAPHRAGM SANTO Ø408	2	36	26600025	M12X50 HEX BOLT BLACKODIZED	8
12	88900051	DIAPHRAGM PTFE Ø408	2				
13	CED612.253.552	DIAPH. PLATE 3'' PP, SANTO.	2				
14	CED196.151.552	WET-CHAMBER 3'' PP SANTOPRENE	2				
15	CED170.007.330	M12X90 HEX BOLT, HALF THREAD	20				
16	CED903.001.330	3" SPECIAL WASHER, EDGE	8				
17	CED903.003.330	3" SPECIAL WASHER, MIDDLE	12				
18	CED545.002.330	M12 HEX NUT	20				
19	CED170.005.330	M12x1.75x40 HEX BOLT FULL THREAD	12				
20	CED902.002.330	SPRING WASHER, M12	12				
21	CED901.001.330	M12 FLAT WASHER	12				
22	720.043.600	SEAL,VALVE MODULE	8				
23	722.131.552	CHECK VALVE SEAT 3'' PP	4				
24	050.014.354	BALL, CHECK VALVE	4				
25	670.056.552	RETAINER, BALL	4				
26	312.103.552	ELBOW DISCHARGE 3'', MACHINING	4				
27	CED170.006.330	M16X80 HEX BOLT	48				
28	CED901.002.330	Washer, Flat M16	96				
29	CED545.003.330	Nut, Hex M16	48				
30	CED518.226.552	MANIFO DISCH 3'', PP SANTO.	2				
31	720.039.600	SEAL, MANIFOLD	4				
32	26600023	M12 HEX NUT BLACKODIZED	10				
33	CED26600065	Coupling PTG75-1-1a(50,50) P_50X16 G_50X14	1				

5.5 Exploded View of Diaphragm Assembly

(a) SANTOPRENE Diaphragm Assembly



(b) SANTOPRENE + PTFE Diaphragm Assembly



LABLE NO	ITEM
1	Diaphragm Plate
2	PTFE Overlay Diaphragm
3	Santoprene Overlay Diaphragm
4	Santoprene Backup Diaphragm
5	PTFE Soft Washer
6	Piston Plate

COLOR CODE	
Material	Diaphragm Color
Santoprene	Red
PTFE	White

5.6 Torque Specification

Unit ： N ·m

	1" PP		1.5" PP		2" PP		3" PP	
RESPECTIVE PART BOLTS	Size	Torque	Size	Torque	Size	Torque	Size	Torque
BACK-CHAMBER BOLT	M10	30	M12	40	M20	50	M20	50
DIAPHRAGM ROD WITH CARRIAGE	M20	BUTT	M20	BUTT	M24	BUTT	M30	BUTT
BUNA DIAPHRAGM ASSEMBLY	M10	25						
SANTOPRENE DIAPHRAGM ASSEMBLY	M10	25	M10	30	M12	40	M12	50
SANTOPRENE+PTFE DIAPHRAGM ASSEMBLY	M16	30	M10	40	M12	50	M12	60
DIAPHRAGM ASSLY. WITH DIAPHRAGM ROD	M16	BUTT	M16	BUTT	M20	BUTT	M24	BUTT
WET-CHAMBER OUTER BOLTS	M8	30	M10	45	M12	45	M12	70
MANIFOLD & ELBOW OUTER BOLTS	M8	15	M12	50	M16	50	M16	50

6.0 CONTROL PANEL

Control Panel is used to control the pump operation. It integrates with the pump to control its flow by increasing or decreasing the speed of the motor through variable frequency drive (VFD) as per the requirement / application of the user.

It receives signals from the leak sensor installed on the pump and trips the motor in case of diaphragm rupture.

6.1 Control Panel components

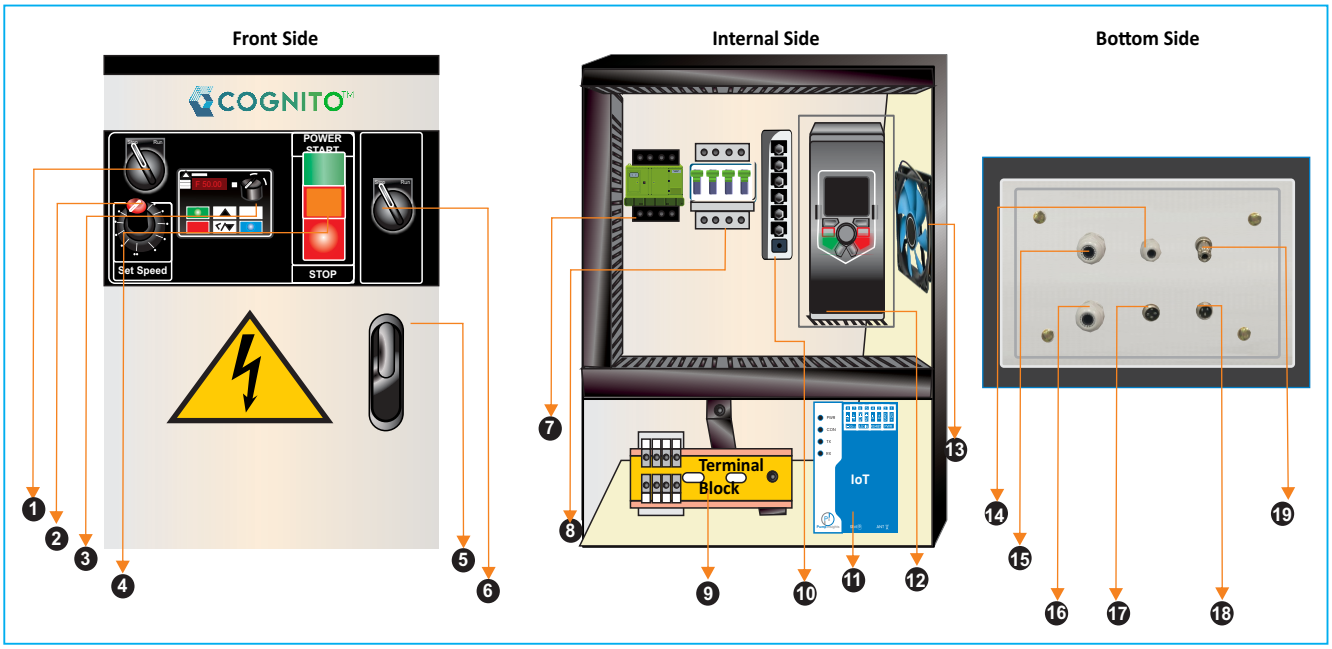


Figure - 10: Control Panel Components

CONTROL PANEL COMPONENTS							
1	Pump Stop/Start Switch	6	Auto/Manual Switch	11	Smart IoT Gateway	16	3 Phase O/P Power to Motor
2	Speed Controller	7	Incoming Power MCB	12	VFD	17	Left Diaphragm Leak Sensor
3	VFD Local Display	8	Contactor	13	Cooling Fan	18	Right Diaphragm Leak Sensor Connector
4	VFD Power ON/OFF Pushbutton	9	Terminal Block	14	Antenna Cable Entry	19	Future Use
5	Door Lock	10	SMPS	15	3 Phase I/P Power Supply to Control Panel		

Note:

1. The above Control Panel is designed for safe area application.

6.2 Control Panel Components – CE Certified

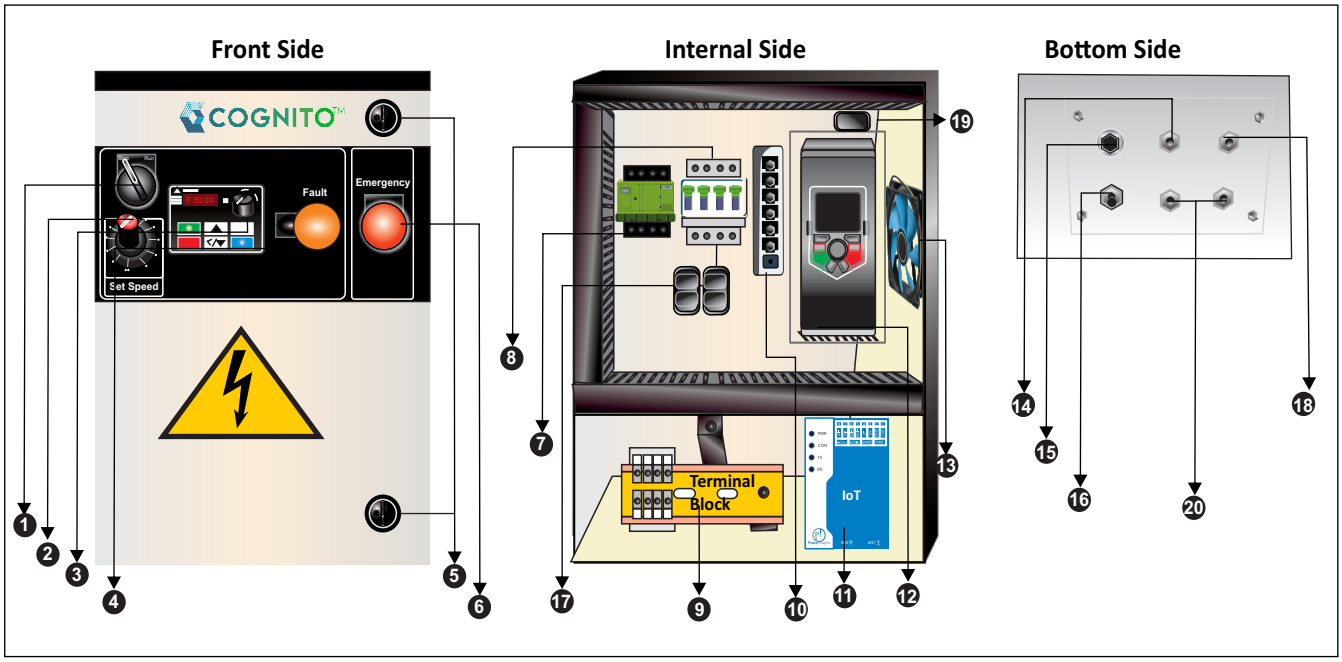
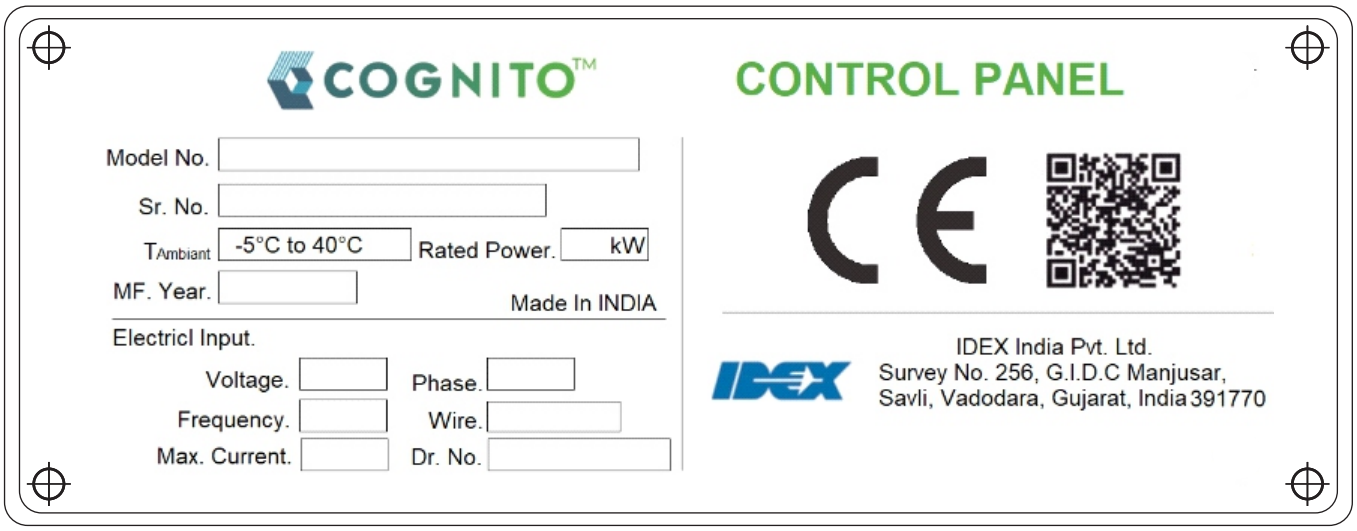


Figure - 10(c) : Control Panel Components

CONTROL PANEL COMPONENTS							
1	Pump Stop/Start Switch	6	Emergency Stop	11	Smart IoT Gateway	16	3 Phase O/P Power to Motor
2	Speed Controller	7	Incoming Power MCB	12	VFD	17	Sensor Relays
3	VFD Local Display	8	Contactor	13	Cooling Fan	18	Future Use
4	Fault Lamp	9	Terminal Block	14	Antenna Cable Entry	19	Door Safety Switch
5	Door Lock	10	SMPS	15	3 Phase I/P Power Supply to Control Panel	20	Sensor cable entries

Name Plate Details



7.0 VARIABLE FREQUENCY DRIVE (VFD)

Variable Frequency Drive is mounted inside the Control Panel. It is pre-configured with all the standard configurations required to start the pump before shipment.

Refer below the standard configuration chart for settings present in the pre-configured VFD.

Parameter	Parameter Description	Set Value	Operation
00-02	Parameter Reset-	9	Reset All Parameter to 50Hz
00-20	Frequency Command	2	External Analog Reference
00-21	Operation Command	1	External Terminals
01-12	Acceleration Time	120	Modified Setting (120)
01-13	Deacceleration Time	10	Modified Setting (10)
02-00	Operation Control	2	M1-Run & MI3-Stop (Modified Setting-1)
02-04	Multifunction IP (MI4) Command	18	Force to Stop
02-05	Multifunction IP (MI5) Command	40	Force to Stop
02-12	Multifunction IP Selection	0	24 For NC Contact Mi4 & 5 (Modified Setting-0)
02-13	Multifunction OP 1	1	Indication During Run
02-35	External Operation Control Selection After Reset & Reboot	1	Drive Run If the Run Command Remain After Reset or Reboot
06-06	Over Torque Detection Selection	4	Stop After Over Torque Detection
06-07	Over Torque Detection Level	90	For 6 Bar=90%
06-08	Over Torque Detection Time	0.1	0.1 - 60.0 Secs
07-20	Emergency Stop Selection	5	System Deceleration
09-00	Communication Address	1	Device Address
09-01	Comn. Transmission Speed	9.6	9600 kbps
09-04	Comn. Protocol	12	8, N, 1 RTU

Note :

1. VFD Parameters are pre-configured at IDEX Factory. For any changes, customization or validation, please contact IDEX.

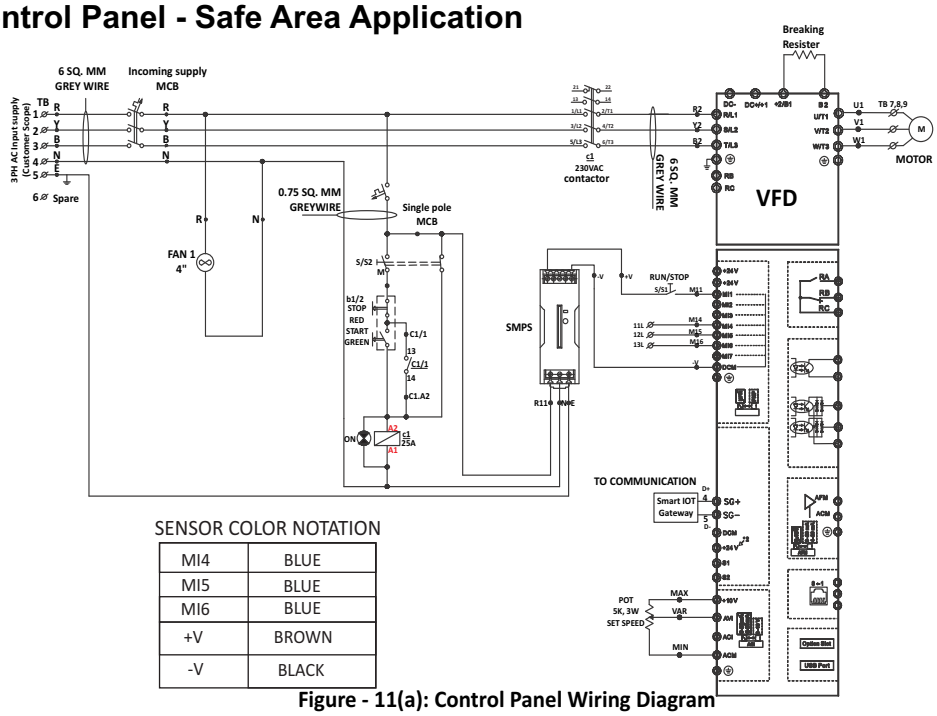
2. Above parameters are applicable for VFD part numbers as mentioned below:

PART NUMBER	VFD PARAMETERS
15600048	3hp EODD CONTROL PANEL IOT
15600022	5hp EODD CONTROL PANEL IOT
15600023	7.5hp EODD CONTROL PANEL IOT
15600024	10hp EODD CONTROL PANEL IOT

8.0 WIRING DIAGRAM

8.1 Control Panel

8.1.1 Control Panel - Safe Area Application



SENSOR COLOR NOTATION

MI4	BLUE
MI5	BLUE
MI6	BLUE
+V	BROWN
-V	BLACK

Figure - 11(a): Control Panel Wiring Diagram

Cable Termination Details

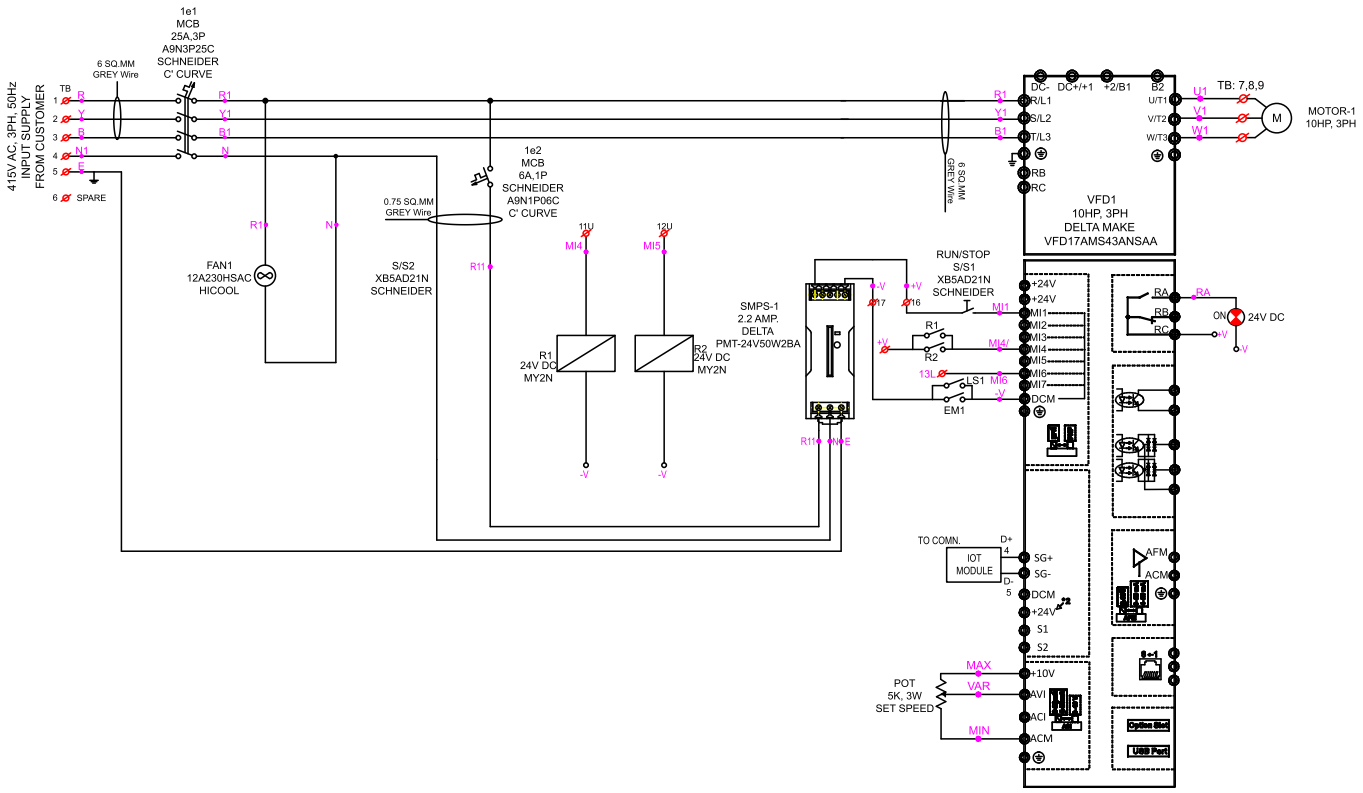
Control Panel incoming Power Supply, Input from leak detection sensors, Drive control Output and Modbus communication (2 wire, RS-485) are terminated in the Control Panel, as shown in Figure - 12

TERMINAL DETAIL											TRIPLE TERMINAL				
TB COLOUR	R	Y	B	BK	GR	GY	R	Y	B	GR	MI4	MI5	MI6		
TB NUMBER	1	2	3	4	5	6	7	8	9	10	-V	-V	-V	14	15
FERRULE	R	Y	B	N	E		U1	V1	W1	E	+V	+V	+V	D+	D-
DESCRIPTION	415V AC, 3PH					SPARE	TO MOTOR M1				11	12	13	SMART IoT GATEWAY	
	415V AC, 3 PH INPUT SUPPLY						U1 V1 W1 M1 MOTOR HP, 3PH				LEFT DIAPHRAGM LEAK SENSOR CONNECTOR	RIGHT DIAPHRAGM LEAK SENSOR CONNECTOR	FUTURE USE	FOR RS 485 COMN.	

Figure - 12(a): **Cable Termination Detail**

Control Panel Incoming Power Supply
Terminal 1 to 4 : 3 - phase Input Power Supply to the Control Panel Terminal 5 : Earthing
Drive Control Output
Terminal 7 to 10 : 3 - phase VFD Control Output to the motor (to drive the pump)

8.1.2 Control Panel - CE Certified



Cable Termination Details

Control Panel incoming Power Supply, Input from leak detection sensors, Drive control Output and Modbus communication (2 wire, RS-485) are terminated in the Control Panel, as shown in Figure - 12

TERMINAL DETAIL											TRIPLE TERMINAL					
TB COLOUR	R	Y	B	BK	GR	GY	R	Y	B	GR	MI4	MI5	MI6			
TB NUMBER	1	2	3	4	5	6	7	8	9	10	-V	-V	-V	-V	14	15
FERRULE	R	Y	B	N	E		U1	V1	W1	E	+V	+V	+V	+V	D+	D-
DESCRIPTION	415V AC, 3PH					SPARE	TO MOTOR M1				11	12	13		SMART IoT GATEWAY	
	415V AC, 3 PH INPUT SUPPLY						U1 V1 W1 M1 MOTOR HP, 3PH				LEFT DIAPHRAGM LEAK SENSOR CONNECTOR	RIGHT DIAPHRAGM LEAK SENSOR CONNECTOR	SWITCH AMPLIFIER DOUBLE DECAR 2-TB		FOR RS 485 COMN.	

Figure - 12(b): **Cable Termination Detail**

Control Panel Incoming Power Supply
Terminal 1 to 4 : 3 - phase Input Power Supply to the Control Panel Terminal 5 : Earthing
Drive Control Output
Terminal 7 to 10 : 3 - phase VFD Control Output to the motor (to drive the pump)

8.2 Leak Detection Sensor Assembly

8.2.1 **Leak Detection Sensor Assembly**: Safe Area Application

1. There are 2 leak detectors (one for left diaphragm and another for right diaphragm) which come with 5 meters of cable

2. Leak detection sensors are supplied with the female connecters which will be then connected to the male connectors provided on the gland plate of the Control Panel

3. Refer Figure - 13 for connecting leak sensors to the panel

Note: Internal wiring between leak detection sensors and the terminal block are pre-wired at the factory before shipment. Leak detection sensors -1 and sensor-2 are connected to the terminal 11 and 12 respectively as shown in Figure – 12

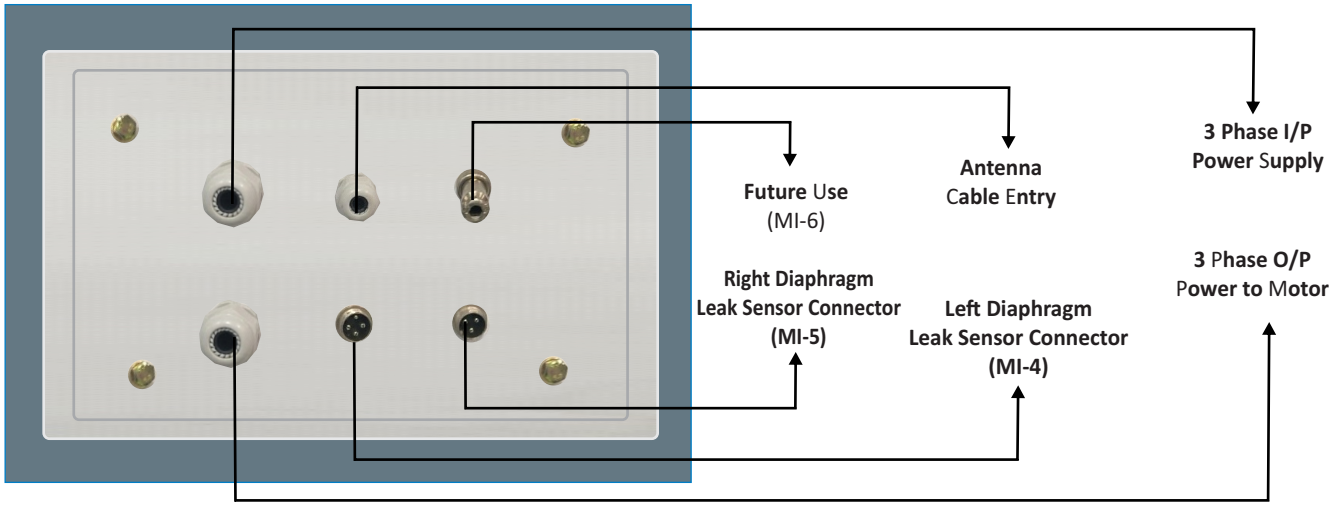


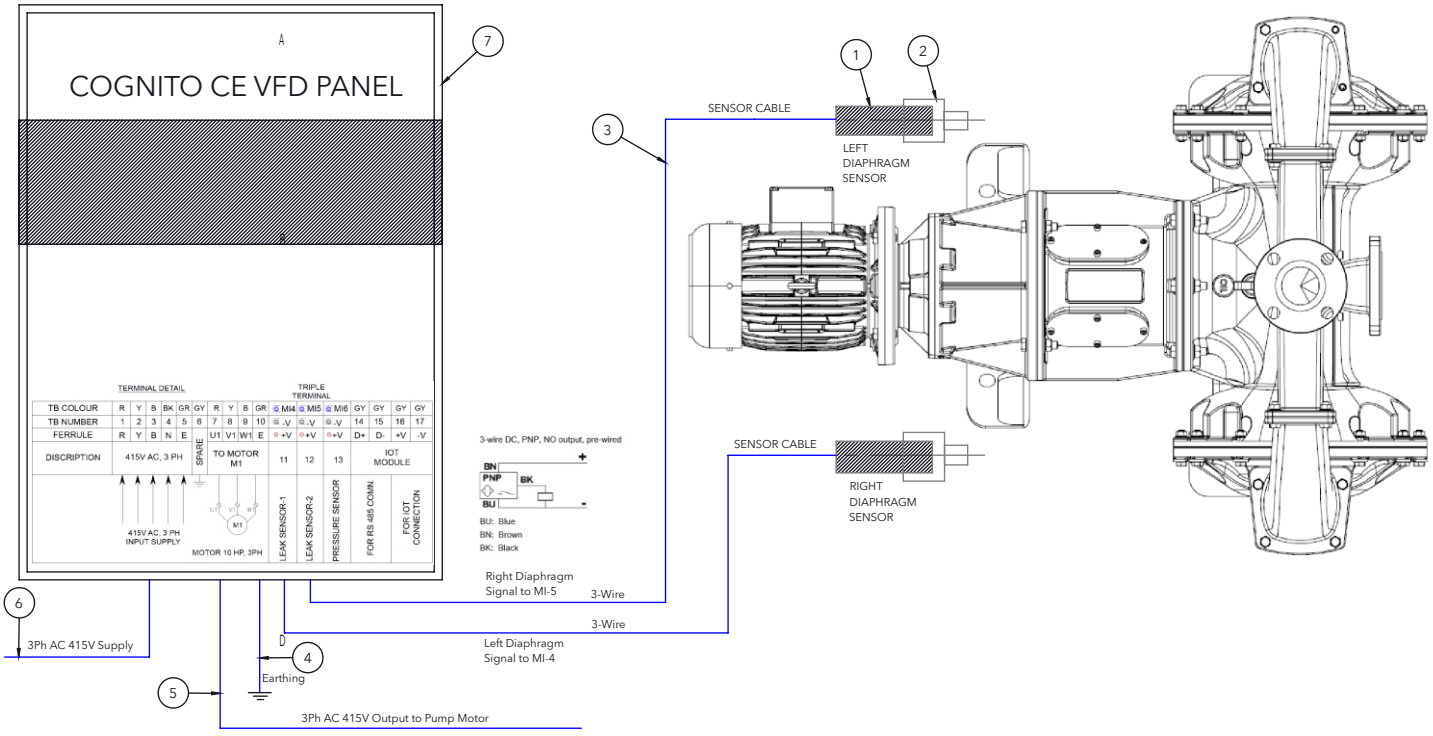
Figure - 13

8.2.2 Leak Detection Sensor Assembly - CE Certified

1. There are 2 leak detection sensors that are used per pump which come with Sealed type specified cable length.

2. Both Leak detection sensors need to connect with in VFD Panel MI4 MI5 3-wire terminal.

3. All connections Should be wired as shown by the schematic below by a qualified and certified electrician according to any local and national electric codes.

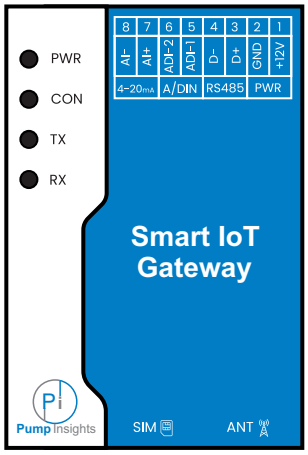


BOM			
BALOON NO.	**DESCRIPTION**	**SIZE & MOC**	**QTY.**
1	CAPACITIVE SENSOR CE	M12 X 1	2
2	CONNECTOR	1/2'' BSP TO M12 X 1 / 1/4'' BSP TO M12 X 1	2
3	SENSOR CABLE (SEALED)	3-WIRE, 24V DC	-
4	EARTHING CABLE, WITH LUG	1-CORE 4-MM2, 1100V	-
5	PANEL OUTPUT CABLE	4-CORE 4MM2, 1100V ARMOURED CABLE	-
6	POWER SUPPLY CABLE	4-CORE 4MM2, 1100V ARMOURED CABLE	-
7	COGNITO VFD PANEL	10HP, 7.5HP, 5HP, 3HP,2HP, 1.5HP	1

8.3 Smart IoT Gateway

When installed with Cognito EODD Pump, enables remote monitoring & alert system to optimize your pump performance to achieve Operational Excellence. It keeps you up to date on maintenance needs. There will be seamless integration between Cognito EODD pump and Pump INSIGHTS Web based application through Smart IoT Gateway to get real-time updates (via sms & email)

- Smart IoT Gateway is pre-configured at our factory before shipment.
- Pin - 1 & Pin - 2 as shown in Figure - 14 is used to power up the Smart IoT Gateway. Pin - 1 connects to +ve and Pin - 2 connects to -ve terminal of the power supply.
- Pin - 3 & Pin - 4 is for Modbus communication, which is connected to VFD to read the data. Pin - 3 connects to D+ and pin - 4 connects to D- on the terminal block of the Control Panel
- Screw antenna which is supplied along with the Control Panel is to be mounted on the threaded connection marked as " ANT" on the Smart IoT Gateway. Antenna should be mounted outside the panel for better network strength.
- To check / insert the SIM card, Press yellow button "Marked as SIM" on the bottom side of the Smart IoT Gateway which will eject the SIM card tray.



LED	NAME	DESCRIPTION	
GREEN	POWER	Light when Power on the device	
		LED Status	Connection State
		Flashing (ON for 100ms & OFF for 100ms)	SIM Card not found
		Flashing (ON for 500ms & OFF for 500ms)	Searching for GSM Network
RED	GSM	Flashing (ON for 0.1s & OFF for2.9s) Once at every 3 sec	GSM Network Registered
		Flashing twice at every 3 sec	GPRS IP Connected
		Flashing 5 times	GPRS IP Sending data
		LED OFF	GSM Fault
GREEN	COM TX	Blink on data transmission in RS485 port	
YELLOW	COM RX	Blink on data reception in RS485 port	

SMART IoT GATEWAY PIN CONNECTIONS		
PIN 1	+12V	Power Supply
PIN 2	GND	
PIN 3	D+	RS485
PIN 4	D-	
PIN 5	ADI-1	A/DIN
PIN 6	ADI-2	
PIN 7	AI+	4-20mA
PIN 8	AI-	

Figure - 14

8.4 Modbus Communication Diagram to connect Multiple Control Panel (VFD)

Control Panels from multiple pumps can be connected to a single Smart IoT Gateway for communication. You can connect Modbus output from 5 different control panels to a single Smart IOT Gateway.

The total communication wire cable length between Smart IoT Gateway and the last Control Panel (VFD) should be less than 500m.

Refer Figure - 15 to connect Modbus output from multiple Control Panels (VFD) to a single Smart IOT Gateway.

Note: D+ & D- are the terminal blocks for making the connection

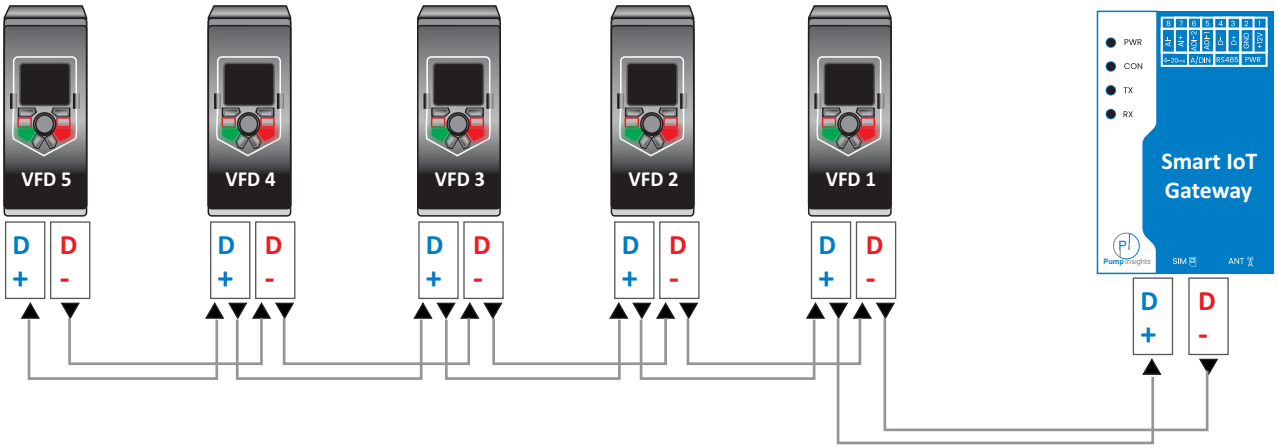
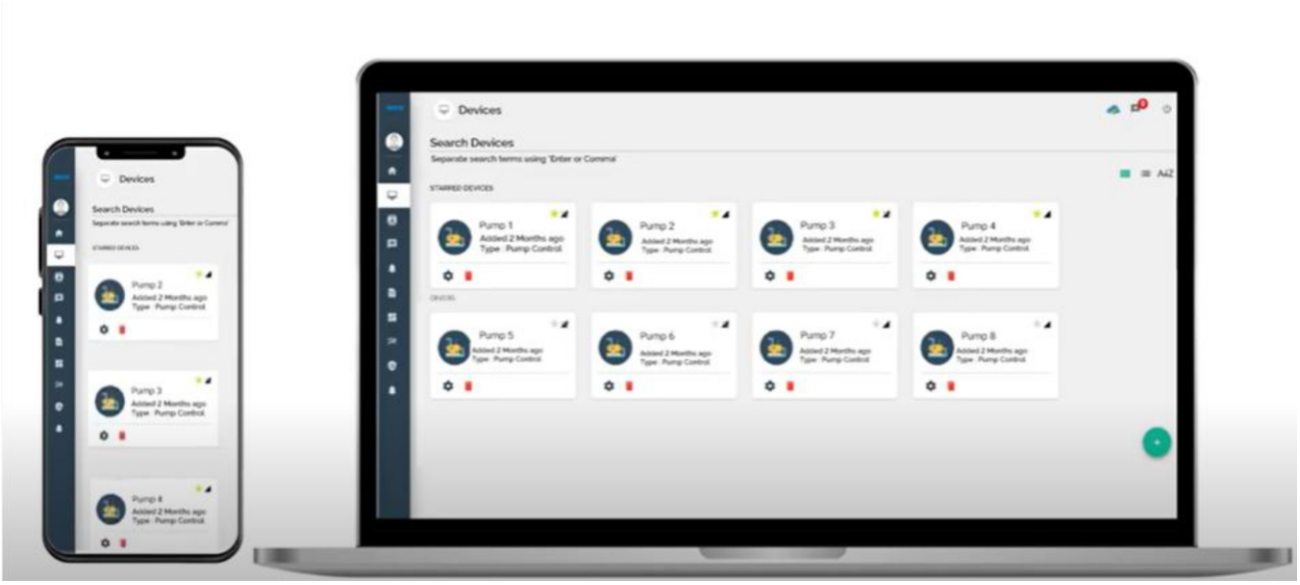


Figure - 15: Modbus Communication Diagram for multiple Control Panels

9.0 PUMP INSIGHTS APPLICATION

PUMP INSIGHTS, a web based application, is developed for monitoring of all IDEX INDIA pump solutions and is a part of IDEX INDIA IOT solution, **COGNITOsmartINSIGHTS**



Pump Insights helps you to connect, monitor and analyse your pump remotely and enables you to make better and faster decision to optimize your pump performance and improve overall process efficiency. It provides real-time updates for all your installed pumps helping you remotely monitor critical application.

It can be accessed from anywhere at http://pi.cognitosmartinsights.ai

Pump Insights kit include,

- Smart IoT Gateway
- Indian Operator SIM card (Installed in Smart Gateway)
- Subscription to Pump Insights application

For enabling Pump Insights application, contact IDEX India Pvt. Ltd.

10.0 INSTALLATION & START-UP GUIDELINES

10.1 Pump Components

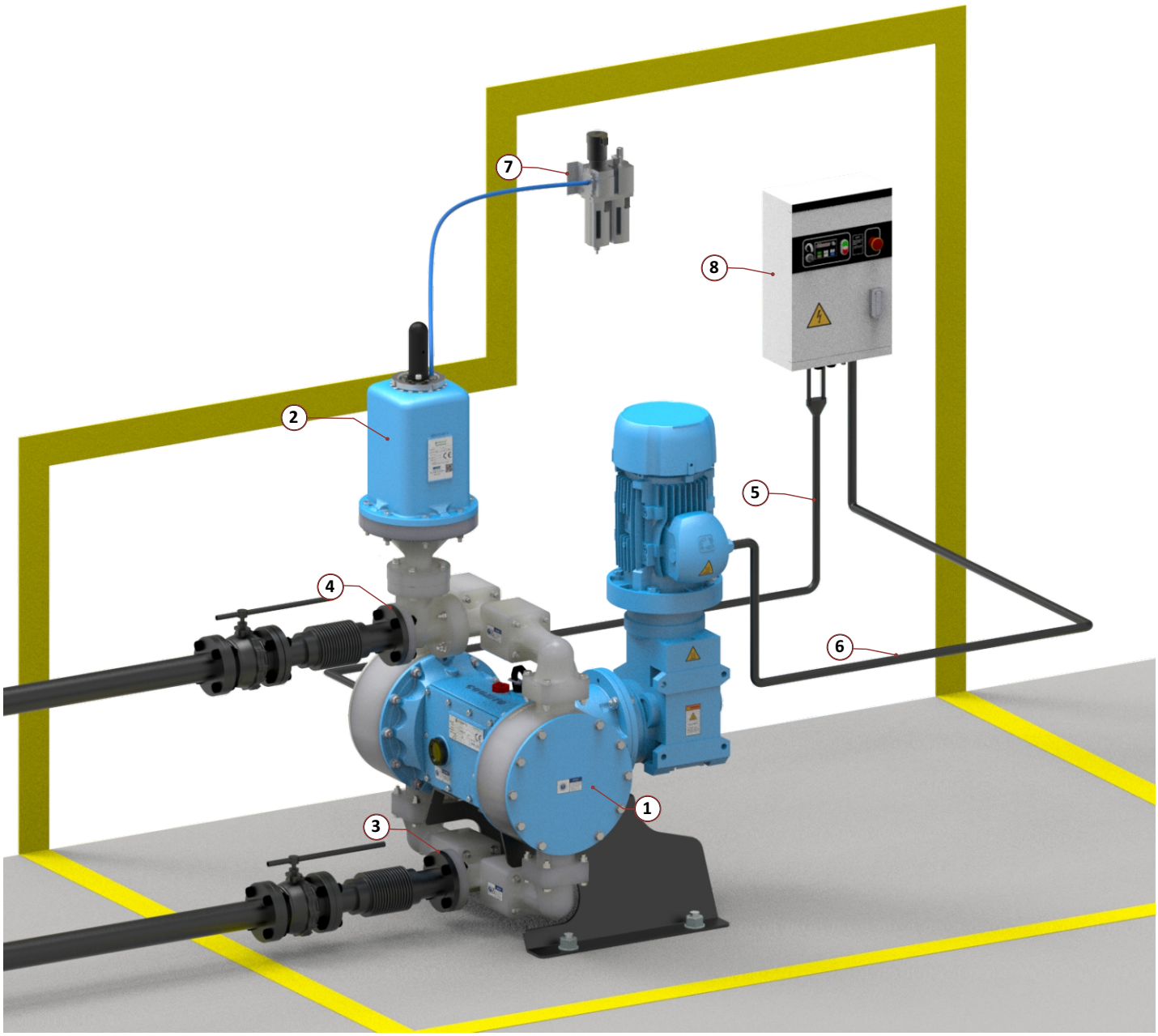


Figure - 16: Pump Components

SERIAL	DETAILS	SERIAL	DETAILS
01	Pump	05	Leak Detection Sensor Cable
02	Dampener (optional)	06	Motor Wire
03	Suction Flange	07	Filter and Regulator
04	Discharge Flange	08	Control Panel

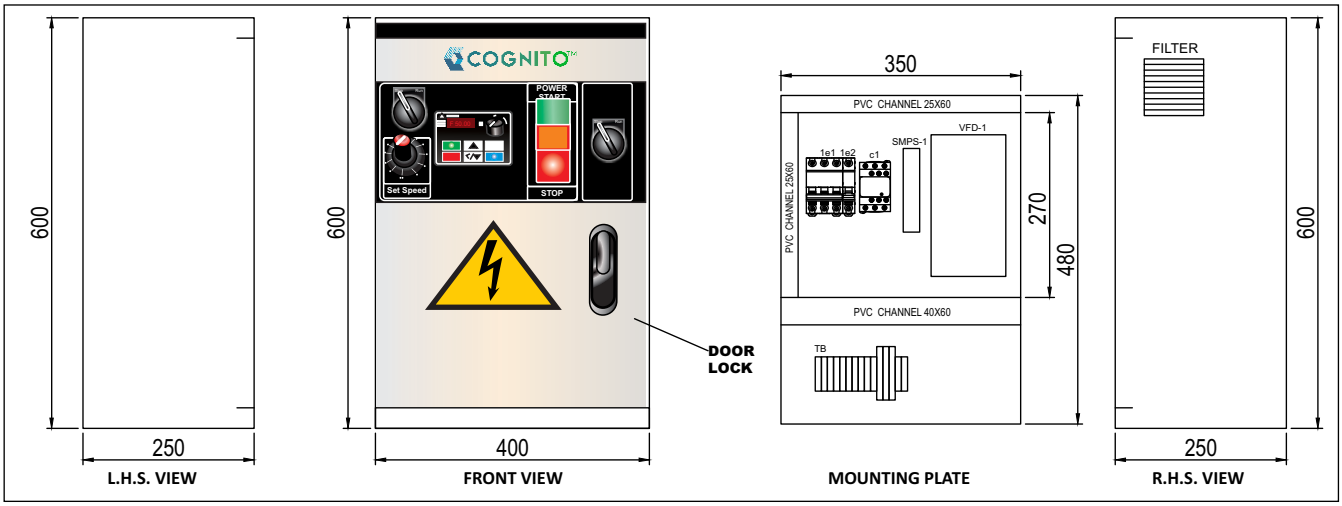
10.2 Installation Guidelines

10.2(a) Cognito EODD Pump

- Locate the pump as close as to the product being pumped if possible.
- Make sure to have levelled foundation floor.
- Drill the holes for Anchor fasteners.
- Clean & install the anchor fastener bolts on the previously drilled holes.
- Position the pump and align the holes on pump to the holes made on the floor.
- Fasten the anchor fastener nuts and secure the pump.
- Connect the suction port (Inlet) & discharge port (Outlet) with the expansion rubber bellows
- Fix the Control Panel on the wall as per Control Panel installation guideline
- Avoid any tight bends or drastic reduction in the pipeline
- Connect the sensor wires from the pump to the corresponding port on the Control Panel. (Refer **Figure - 12**, Cable Termination details of Control Panel
- Connect the motor wire to the Control Panel, as per wiring diagram. (Refer **Figure - 12**, Cable Termination details of Control Panel.
- Connect Pneumatic Air Supply to Filter & Regulator unit of Dampener.
- Connect the main Power Supply to the Control Panel. Do not start pump, yet ! Go through the Pre-start Procedure and check list mentioned in the manual, before starting the pump.
- Inspect for any sign of leakages, If found, tighten the fittings and fasteners as per the recommended torque. If leakage still persists, contact IDEX. Torque details are mentioned after startup procedure.
- It is recommended to install a pressure gauge and pressure relief valve

10.2(b) Control Panel Mounting Guideline

Consider the dimension of EODD control panel 400W x 600H x 250D as a reference to mount the control panel either on the wall or on the supporting structure.



- Use 10 mm holes available on the back side of the panel to mount either on the wall or on the supporting structure. Mounting clamps will be provided to fix the panel.
- Weight of the Control Panel is approx. 25 kg. So, ensure to choose wall or supporting structure to hold the weight of the Control Panel while mounting
- Wall or supporting structure should be free from the vibrations and ensure proper ventilation for the panel.
- It is advised to install panel at 1.5 m above the surface for easy maintenance.
- Drill 10 mm hole either on the wall or on the supporting structure to install the panel. Use 10 mm bolt with stud to fix the panel and ensure proper alignment.
- While carrying above steps, ensure power is switched-off and no live electrical cable passes nearby the wall or supporting structure.
- Once panel is mounted, ensure proper clearance, and make sure it is aligned properly & sturdily.

10.2(c) Smart IoT Gateway

Smart IoT Gateway is installed inside the Control Panel. Real time pump data is sent to the Pump Insights Application through this Smart IoT Gateway.

10.3 Pre-Requisite before Starting Pump Operation

- Ensure 3-phase Power Supply provided to the Control Panel is from reliable source and it matches voltage and frequency of VFD drive and motor
- All cables inside the Control Panel should be connected with proper lugging. Ensure all cables are gently fastened and cable glands are firmly tightened
- Ensure all foundation bolts are firmly tightened
- Ensure Panel is fixed properly using support and verify connections as per wiring diagram before starting the pump (refer **Figure - 12**, Cable Termination details of Control Panel.)
- Ensure proper grounding of the motor
- Check & ensure if the speed control knob is in the minimum position
- Rotary switch in Control Panel is available to RUN the pump either in AUTO / MANUAL mode. If switch is in the MANUAL mode, manual START is required to start the Pump. If switch is in AUTO mode, as soon as the control panel power is switched on, Pump starts. So, ensure switch should be in MANUAL mode before starting the pump operation
- Ensure pump suction valve and discharge valve is fully open before starting the pump and required air is lined up to the dampener

10.4 Pump Operation using Control Panel (Startup Procedure)

- Ensure pre-requisite to be fulfilled before starting the pump
- Switch ON MCB located inside the Control Panel (refer **Figure - 10**, Control Panel Components)
- Power on the VFD by pressing Green button (refer **Figure - 10**, Control Panel Components)
- After turning ON VFD, rotary switch rotates from STOP to RUN for starting the pump
- Set the desired frequency in the Control Panel using speed control knob as per application requirement
- Ensure Pump Discharge Pressure must be less then rated pressure
- After getting the START command from the Control Panel, pump starts operating based on the frequency threshold set from speed control knob and acceleration time

Note:

1. Motor is protected with basic safety interlock like over voltage , over torque, over current etc.
2. Tripping error code is displayed on VFD local display for easy understanding.
   For detail troubleshooting, please contact IDEX
3. Above recommendation on Installation & operation is applicable for Cognito EODD Pump including Control Panel & other components supplied by IDEX. For non standard pump configuration, contact IDEX

10.5 Torque Details for Non-Metallic Pump

COGNITO EODD 25 MM (1")			
RESPECTIVE PART BOLTS	**SIZE**	**TORQUE**	**UNIT**
Back-chamber Bolt	M10	30	NM
Diaphragm Rod With Carriage	M20	BUTT	—
BUNA Diaphragm Assembly	M10	25	NM
Santoprene Diaphragm Assembly	M10	25	NM
Santoprene+PTFE Diaphragm Assembly	M16	30	NM
Diaphragm Assly. With Diaphragm Rod	M16	BUTT	—
Wet-chamber Outer Bolts	M8	30	NM
Manifold & Elbow Outer Bolts	M8	15	NM

COGNITO EODD 38 MM (1.5")			
RESPECTIVE PART BOLTS	**SIZE**	**TORQUE**	**UNIT**
Back-chamber Bolt	M12	40	NM
Diaphragm Rod With Carriage	M20	BUTT	—
Santoprene Diaphragm Assembly	M10	30	NM
Santoprene+PTFE Diaphragm Assembly	M10	40	NM
Diaphragm Assly. With Diaphragm Rod	M16	BUTT	—
Wet-chamber Outer Bolts	M10	45	NM
Manifold & Elbow Outer Bolts	M12	50	NM

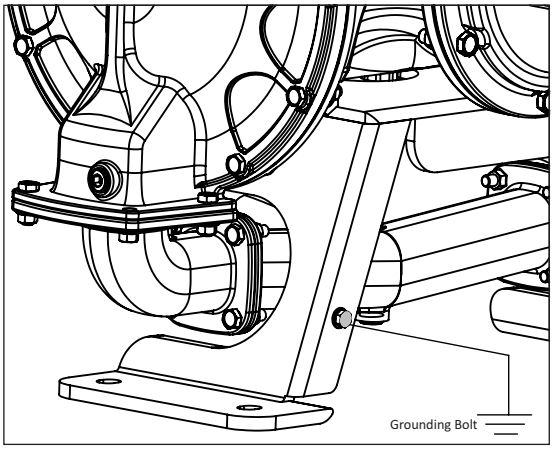
COGNITO EODD 38 MM (2")			
RESPECTIVE PART BOLTS	**SIZE**	**TORQUE**	**UNIT**
Back-chamber Bolt	M20	50	NM
Diaphragm Rod With Carriage	M24	BUTT	—
Santoprene Diaphragm Assembly	M12	40	NM
Santoprene+PTFE Diaphragm Assembly	M12	50	NM
Diaphragm Assly. With Diaphragm Rod	M20	BUTT	—
Wet-chamber Outer Bolts	M12	45	NM
Manifold & Elbow Outer Bolts	M16	50	NM

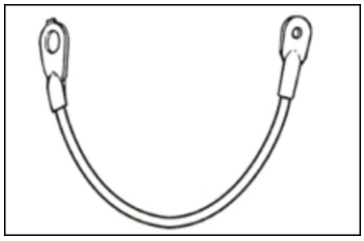
COGNITO EODD 38 MM (3")			
RESPECTIVE PART BOLTS	**SIZE**	**TORQUE**	**UNIT**
Back-chamber Bolt	M20	50	NM
Diaphragm Rod With Carriage	M30	BUTT	—
Santoprene Diaphragm Assembly	M12	50	NM
Santoprene+PTFE Diaphragm Assembly	M12	60	NM
Diaphragm Assly. With Diaphragm Rod	M24	BUTT	—
Wet-chamber Outer Bolts	M12	70	NM
Manifold & Elbow Outer Bolts	M16	50	NM

10.6 Grounding & Pump Earthing

10.6.1 Pump Earthing

1. All pumps have a ground screw installed in pump support bracket.
2. Protective paint is applied to prevent rust
3. Size of grounding screw is M8
4. Connect one end of the grounding wire to ground screw and other end of the grounding wire to suitable earth ground.
5. Keep grounding wire connection distance as short as possible
6. The cross section of grounding wire must be at least 4 mm^2
7. Make sure earthing cable connection should be properly tightened with cable lug
8. Check the local electrical code for detailed grounding instruction & the type of equipment required.





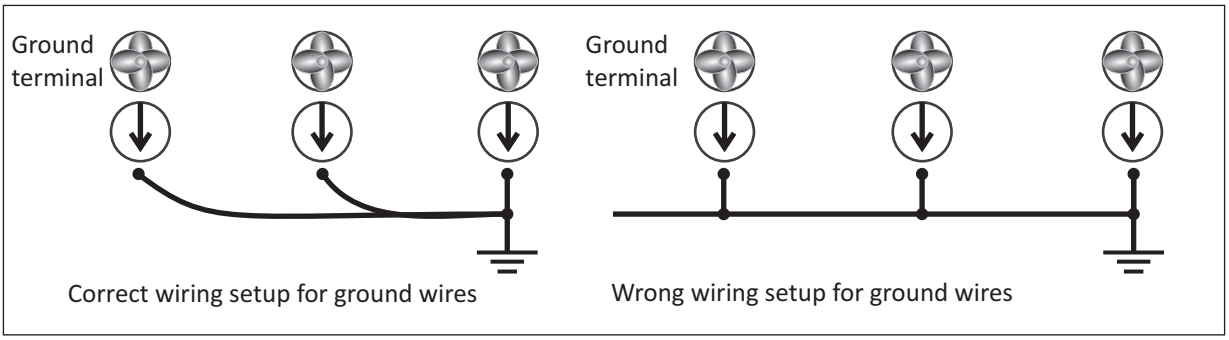
10.6.2. Motor Grounding

⚠ WARNING

1. It is compulsory to earth the motor. Earthing must be performed in accordance with current regulations (protection of workers).
2. Motors have a ground screw inside the terminal box. Use it to ground the motor
3. The cross section of grounding wire must be at least 2.5 mm^2

10.6.3. VFD Grounding

1. Ground the variable frequency drive through a proper connection to a power source.
2. The diameter of the grounding cables must comply with the local safety regulations
3. Use a dedicated ground wire for input power, motor power, and control wiring.
4. Connect shielded cable to the motor drive's ground to meet safety regulations.
5. Minimum cable cross-section for the ground wires: 10 mm^2 (7 AWG).
6. Follow the motor manufacturer wiring requirement
7. When installing multiple drives, connect each drive to ground. Below images show correct way & wrong way of connections



11.0 TROUBLESHOOTING

11.1 Pump Troubleshooting Guide

Trouble	Possible Cause	Remedy
Pump not starting	No power	Check & Correct Input power in all phases
	Disconnected wires	Check the wiring as per wiring schematic
	Diaphragm rupture	Check for error light of diaphragm failure, replace diaphragm
	Motor failure	Check the display for error code
Low flow	Incorrect rpm	Check and correct the rpm
	Incorrect opening of suction & discharge valve	Check & open valve as per our recommended opening
	Pump jammed with media	Clean & flush all pumping media path
	Stuck ball valves	Clean & flush valve
	Improper input power	Check for input power as per specs (Hz & voltage)
	Abnormal slurry or very high viscosity	Check viscosity
High flow	Incorrect rpm	Check and correct the rpm
	Improper input power	Check for input power as per specs (Hz & voltage)
	Low viscosity of pumping media	Check viscosity
No flow	No power	Check power supply in all phase & correct it
	Valve closed	Check the valves
	No pumping media in sump	Check & fill sump
	Stuck ball valves	Clean & flush valve
	Diaphragm rupture	Check for error light of diaphragm failure, replace diaphragm
	Broken spider coupling	Check and replace spider coupling
	Motor failure	Check the display for error code
	Pump jammed with media	Clean & flush all pumping media path
Tripping	Incorrect line voltage	Check and correct line voltage
	Diaphragm rupture	Check for error light of diaphragm failure, replace diaphragm
	Overheating of motor	Check rated duty of motor cycle
		Check cooling fan damage
		Check incorrect line voltage
		Check stuck gearbox
Noise	Inadequate Air pressure	Check for dampener setting
	Loose bolts	Check for loose bolt and tighten them
	Coupling wear	Check for spider wear
	Incorrect line voltage	Check for line voltage
Panel not starting	No power	Check power supply in all phase & correct it
	Disconnected wires	Check the wiring as per wiring schematic
VFD not staring	Diaphragm rupture	Check for error light of diaphragm failure, replace diaphragm
	Motor failure	Check the display for error code

11.2 VFD Troubleshooting Guide

Below are some of the common troubleshooting codes for VFD's.

For detailed troubleshooting please contact IDEX.

Display code on	Warning name	Cause	Corrective action
PHL	Input phase loss warning	Phase loss of the input power	Verify the wiring of the main circuit.
		The power voltage has changed	If the power of main circuit works well, check if the main circuit is not broken. Cycle the power after verifying the power is normal. If PHL still occurs, return to the factory for repair.
		Loose wiring terminal of input power	Tighten the terminal screws.
		Check if the input cable of three-phase power is broken	Make sure the wiring is correct. Replace the broken part of the cable
		Unbalanced three-phase of the input power	Check the status of three-phase power.
OVS	Over voltage at stop	Power voltage is too high	Check if the input voltage is within the rated AC motor drive input voltage range, and check for possible voltage spikes
		Incorrect wiring of brake resistor or brake unit	Check the wiring of the brake resistor or braking unit.
		Malfunction caused by interference	Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference
		Motor ground fault	The ground short circuit current charges the capacitor in the main circuit through the power. Check if there is ground fault on the motor cable, wiring box and its internal terminals. Troubleshoot the ground fault.
UG	Under current	Broken motor cable	Exclude the connection issue of the motor and its load.
		Low load	Check the loading status. Make sure the loading matches the motor capacity
		Improper setting for the low current protection	Set the proper current setting
ot1 or ot2	Over torque-1 & 2 warning	Incorrect parameter setting	Parameter setting done properly
		The load is too large	Decrease the loading. Replace with motor with larger capacity.
		Accel./ Decel. time and working cycle is too short	Increase/decrease acceleration & deceleration based on the application requirement.
		The motor capacity is too small	Replace with a motor with larger capacity.
		Overload during low-speed operation	Decrease the loading during low-speed operation. Increase the motor capacity.
		The torque compensation is too large	Adjust the torque compensation value until the output current decreases & the motor does not stall.

VFD Troubleshooting Guide (Cont.)

Display code on	Warning name	Cause	Corrective action
PLDA	Data error during PLC operation	During PLC operation, the external Modbus has written/read incorrect data to internal PLC program	Check if the upper unit transmit the correct command
OCS	Over-current at stop	Malfunction caused by interference	Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference
		Hardware failure	Check if other error codes such as cd1–cd3 occur after cycling the power. If yes, return to the factory for repair
OVA	Over-voltage during acceleration	Acceleration is too slow (e.g. hen lifting load decreases acceleration time)	Decrease the acceleration time Use a braking unit or DC bus Replace the drive with a larger capacity model.
		The setting for stall prevention level is smaller than no-load current	The setting for the stall prevention level should be larger than no-load current
		Power voltage is too high	Check if the input voltage is within the rated AC motor drive input voltage range, and check for possible voltage spikes.
		ON/OFF switch action of phase-in capacitor in the same power system	If the phase-in capacitor or active power supply unit acts in the same power system, the input voltage may surge abnormally in a short time. In this case, install an AC reactor.
		Regenerative voltage of motor inertia	Use over-voltage stall prevention function Use auto-acceleration and auto-deceleration setting, Use a braking unit or DC bus
		Acceleration time is too short	Check if the over-voltage warning occurs after acceleration stops. When the warning occurs, do the following: 1. Increase the acceleration time 2. Set over-voltage stall prevention 3. Increase the setting value for S-curve acceleration arrival time 2
		Motor ground fault	The ground short circuit current charges the capacitor in the main circuit through the power. Check if there is ground fault on the motor cable, wiring box and its internal terminals. Troubleshoot the ground fault.
		Incorrect wiring of brake resistor or brake unit	Check the wiring of the brake resistor and braking unit.
		Malfunction caused by interference	Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.

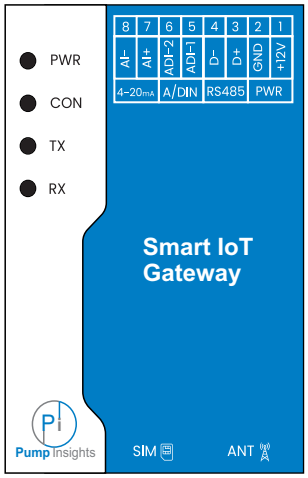
VFD Troubleshooting Guide (Cont.)

Display code on	Warning name	Cause	Corrective action
OVD	Over-voltage during deceleration	Deceleration time is too short, causing too large regenerative energy of the load	1. Increase the setting value (deceleration time) 2. Connect the brake resistor, braking unit or DC bus on the drive. 3. Reduce the brake frequency. 4. Replace the drive with a larger capacity model. 5. Use S-curve acceleration/ deceleration. 6. Use over-voltage stall prevention. 7. Use auto-acceleration and auto-deceleration. 8. Adjust the braking level.
		The setting for stall prevention level is smaller than no-load current	The setting for the stall prevention level should be larger than no-load current
		Power voltage is too high	Check if the input voltage is within the rated AC motor drive input voltage range, and check for possible voltage spikes
		ON/OFF switch action of phase-in capacitor in the same power system	If the phase-in capacitor or active power supply unit acts in the same power system, the input voltage may surge abnormally in a short time. In this case, install an AC reactor
		Motor ground fault	The ground short circuit current charges the capacitor in the main circuit through the power. Check if there is ground fault on the motor cable, wiring box and its internal terminals. Troubleshoot the ground fault.
		Incorrect wiring of brake resistor or brake unit	Check the wiring of the brake resistor or braking unit.
		Malfunction caused by interference	Verify the wiring of the control circuit and the wiring/grounding of the main circuit to prevent interference.
OL	Overload	The load is too large	Reduce the load
		Accel./Decel. time or the working cycle are too short	Increase the setting value
		The capacity of the drive is too small	Replace the drive with a larger capacity model.
		Overload during low-speed operation	Reduce the load during low-speed operation. Increase the drive capacity. Decrease the carrier frequency
		Torque compensation is too large	Adjust the torque compensation until the output current reduces and the motor does not stall.
		Check if the setting for stall prevention is correct.	Set the stall prevention to the proper value.
		Output phase loss	Check the status of three-phase motor. Check if the cable is broken or the screws are loose
		Improper parameter settings for the speed tracking function (including restart after momentary power loss and restart after fault)	Correct the parameter settings for speed tracking. 1. Start the speed tracking function. 2. Adjust the maximum current for speed tracking.

11.3 Control Panel Troubleshooting Guide

Trouble	Possible Cause	Remedy
Control panel not power ON	Check incoming supply	Check the incoming source using multime ter and its voltage as per ratings
	MCB inside control panel in off condition or faulty	Incoming MCB make ON or if tripped re peatedly then replaced the MCB
	Incorrect wiring	Check wiring as per drawing
	Disconnected wires	Ensure no one cable is in disconnected condition from panel as well as incoming source.
	TB faulty	Replaced the TB
	Incoming 3 phase connection	Check 3 phase supply connection inside control panel.
	Check error code on display	Based on error code take corrective action
VFD not working	Drive faulty	Replace the drive
	Drive ratings not proper	Check drive ratings wrt. Incoming power supply
	Improper input power	Check for input power as per specs (Hz & voltage)
Data not updated on IOT platform	Gateway in off condition	Check gateway power supply and its power LED indication
	Gateway CON LED indication not proper	Gateway CON LED is on and flashing twice at every 3 sec frequency
	SIM card not available on SIM slot	SIM card should be available on SIM slot with valid subscription
	Gateway configuration not proper	Gateway configuration wrt to VFD drive address
	Program not available on VFD	Contact IDEX for detail troubleshooting
	Communication cable termina tion not proper	Cable should terminate in D+ and D- as mention termination diagram
Faulty leak indication	Termination not proper	Check terminals are properly attached with control panel and inside connector cable should be intact properly, ensure corrosion not available on terminal
	Leak sensor faulty	Replace the sensor
	Sensor malfunction	Replace the sensor
	Water ingress inside terminal joint	Verify the channel using simulator.
Tripping	Drive internal component failure	Contact IDEX for detail troubleshooting
	Tripping on safety interlock	Check on VFD local display error code and act accordingly.
	Leak sensor malfunction	Replace the sensor
	High control panel temperature	Check VFD cooling fan damage
No speed control	Faulty knob	Check knob movement not free
		Wiring cable detached from speed control knob.
		Check for burning marks on knob
	Channel faulty	Verify the channel using simulator.

11.4 Smart IoT Gateway Troubleshooting Guide

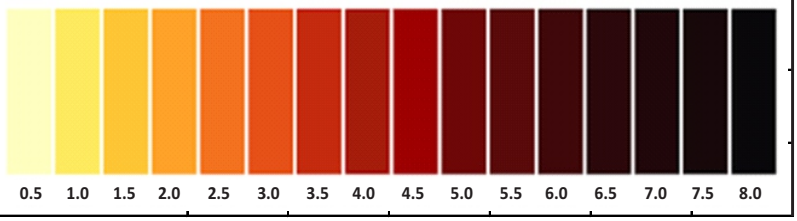


LED	NAME	DESCRIPTION	
GREEN	POWER	Light when Power on the device	
		LED Status	Connection State
		Flashing (ON for 100ms & OFF for 100ms)	SIM Card not found
		Flashing (ON for 500ms & OFF for 500ms)	Searching for GSM Network
RED	GSM	Flashing (ON for 0.1s & OFF for2.9s) Once at every 3 sec	GSM Network Registered
		Flashing twice at every 3 sec	GPRS IP Connected
		Flashing 5 times	GPRS IP Sending data
		LED OFF	GSM Fault
GREEN	COM TX	Blink on data transmission in RS485 port	
YELLOW	COM RX	Blink on data reception in RS485 port	

12.0 PREVENTIVE MAINTENANCE GUIDELINES

Sr.no	Maintenance Item	Frequency	Indication
1	Diaphragms	As needed	Pump will be shut down by the VFD due to fluid detection by leak detection sensors installed in each of the Diaphragm.
2	Balls	As needed	Replace balls if you notice erratic pump behavior, excessive pulsation, reduction in flow; visual inspection
3	Seats	As needed	Visual inspection
4	Oil change - Pump mechanism	3 months	Scheduled / visual inspection - monitor oil level through sight glass fitted in pump
5	Oil change - Gear Box	Every 2000 hours or 6 months	Scheduled / visual inspection per manufacturer's recommendation
6	Rod seals & Wiper seals	Once in 2 years / As needed	Scheduled / leakage / any failure
7	Rotary shaft seals	Once in 3 years / As needed	Scheduled / leakage from coupling housing
8	Bolt torque checks of outer chambers	3 months / As needed	Scheduled / visual inspection
9	Control panel Air filter dusting	3 month / As needed	Scheduled / visual inspection

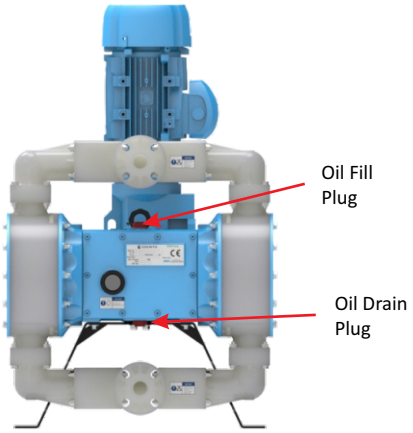
COGNITO EODD Pumps are factory filled with long-life Synthetic lubricant, ISO VG 320 Synthetic. There is need for periodically lubricant change according to loading condition

COGNITO PUMP & GEARBOX LUBRICATION CHANGE FREQUENCY		
Loading Details	***Running Hours**	**Discoloration Code**
High Load & High Speed **Pressure : =>4.5bar, RPM => 80RPM**	1000	
Medium Load & Medium Speed **Pressure: 3-4bar, RPM: 60 - 80 RPM**	2500	
Low Load & Low to Med Speed **Pressure : <3bar, RPM : 50 - 80**	3500	

* Lubrication change frequency depending on loading condition, which ever comes earlier either number of hours or lubricant is turning blackish **colour spectrum after 6**. according to ASTM D1500 COLOUR SCALE

Oil Replacement Procedure :

- Unscrew the top Oil fill plug to avoid vacuuming during drain
- Now open the cover plate and clean it thoroughly
- Assemble the cover plate applying the grease on the gasket area
- Close the drain plug and refill the oil with recommended Oil grade & quantity
- Do not mix different grades of oil
- Do not exceed the recommended maximum level

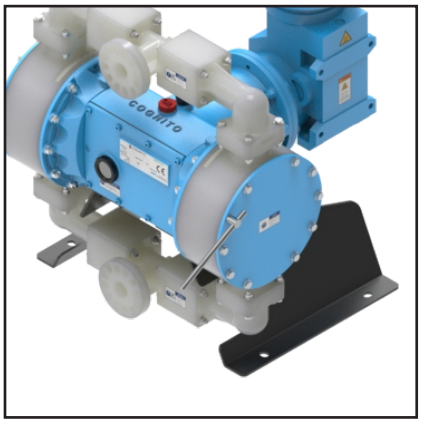


Recommended Oil Level & Oil Grade:

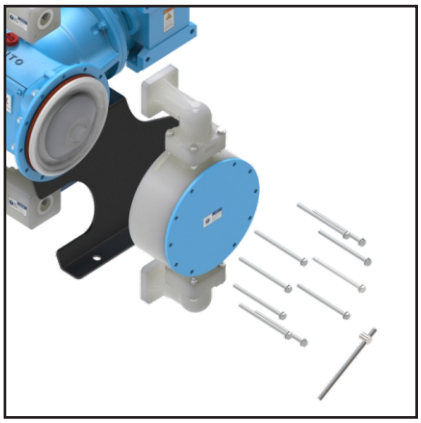
PUMP		
COGNITO Pump Size (Metallic & Non Metallic)	**Oil Qty. (Ltr.)**	**Oil Grade**
4" Metallic & 3'' Non Metallic	2.6	ISO-VG 320 Synthetic
3" Metallic & 2'' Non Metallic	1.8	
2"Metallic & 1.5'' Non Metallic	1.3	
1"/1.5"Metallic & 1'' Non Metallic	0.6	

13.0 MAINTENANCE GUIDELINES

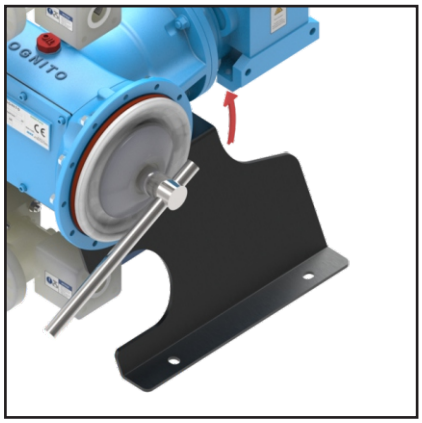
13.1 Diaphragm Replacement



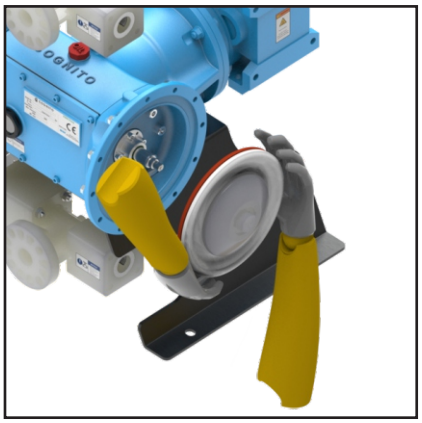
Step 1 - Isolate the pump from pumping fluid and electrical connection, also have necessary tools and spares in hand.



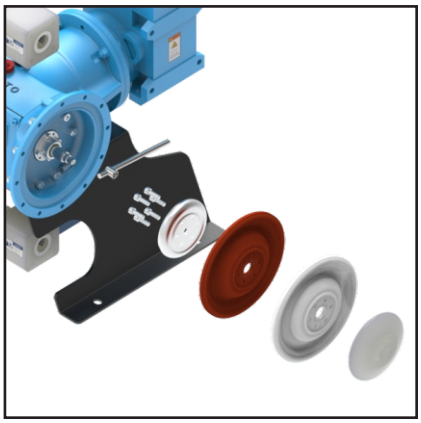
Step 2 - Unfasten the bolts and pull the wet chamber, this might also be the right time to check O-Rings on suction and discharge flange



Step 3 - Clean the holes and use the supplied tool “F-KEY” and turn the diaphragm anticlockwise to unfasten it.



Step 4 - Carefully pull the diaphragm assembly out, and keep the rear housing and shaft.



Step 5 - The diaphragm is held between two bolted plates, these bolts are accessible from the rear plate. Clean the chamber completely.



Step 6 - Replace the diaphragm and repeat steps in reserve order to assemble the pump, use star pattern to tighten the diaphragm assembly and wet chamber

Notes:

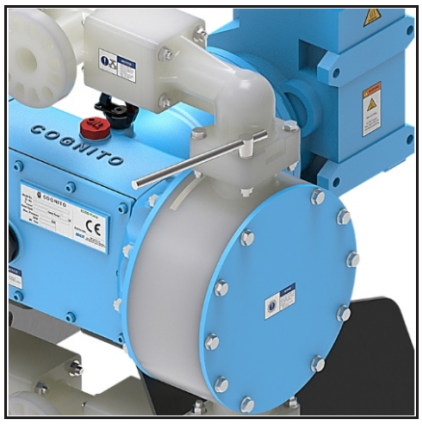
1. If the diaphragm is not in the discharge position, take it in discharge position by rotating the motor fan manually.
2. Different Torque values are required for different Diaphragm type. Refer below table for Torque details -

TORQUE VALUES FOR DIFFERENT DIAPHRAGM			
PUMP SIZE	**NITRILE**	**SANTOPRENE**	**PTFE**
1"	25NM / 221 in-lb	25NM / 221 in-lb	30NM / 266 in-lb
1.5"	-	30NM / 266 in-lb	40NM / 354 in-lb
2"	-	40NM / 354 in-lb	50NM / 443 in-lb
3"	-	50NM / 443 in-lb	60NM / 531 in-lb

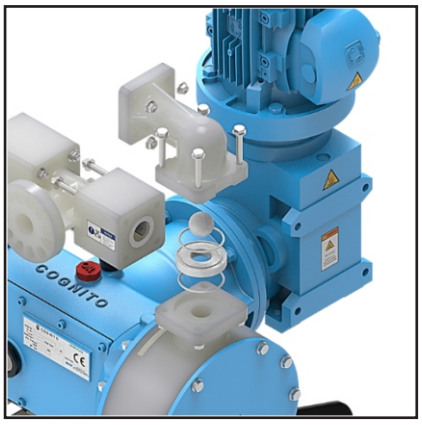
13.2 Ball & Seat Cage Replacement



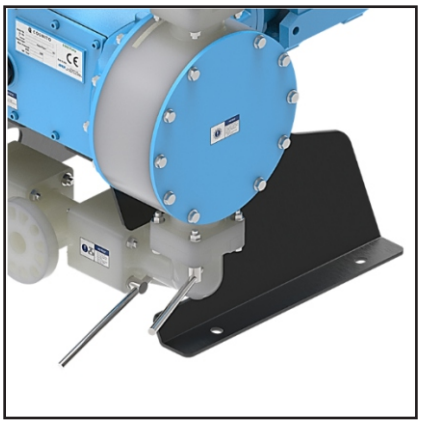
STEP 1 – UNFASTEN THE UPPER BOLTS OF THE DISCHARGE ELBOW WITH NECESSARY TOOLS.



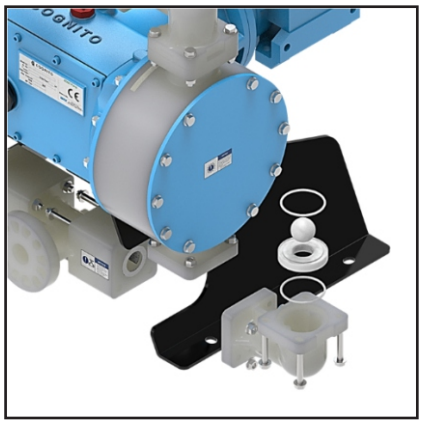
STEP 2 - UNFASTEN THE LOWER BOLTS OF THE DISCHARGE ELBOW WITH NECESSARY TOOLS.



STEP 3 – PULL OUT THE DISCHARGE ELBOW, CHECK THE VALVE AND SEAT THEN REPLACE IT.



STEP 4 - UNFASTEN THE UPPER AND LOWER BOLTS OF SUCTION ELBOW WITH NECESSARY TOOLS.



STEP 5 - PULL OUT THE SUCTION ELBOW, CHECK THE VALVE AND SEAT THEN REPLACE IT.

13.3 Seal Replacement In Centre Mechanism

- To replace the seals, disassemble the wet-chamber, elbow, diaphragm assembly in sequence.
- Now open seal housing , in which first slot is for Wiper seal & back slot is for rod seal.
- After replacing it, place this seal sleeve in the back chamber of the pump.
- Remove the worn out seals and replace with the new one using appropriate tool.
- Please check the direction of the seals, V section opening should be on the oil side.

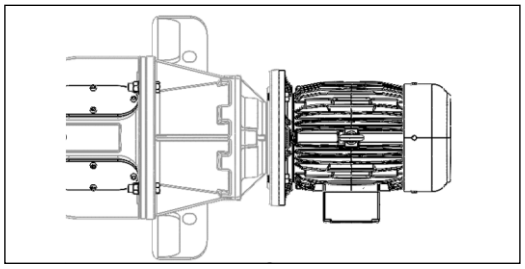
13.4. Seal Replacement for Dampener

- Remove the dust cap and disassemble stopping pin by unscrewing the top bolt.
- Take out seal housing by unscrewing 6 bolts.
- Remove the damaged seals using appropriate tool.
- Place new seals in the proper sequence.
- There are two parts of seal – O-ring and SUPPORT RING. First Need to position O-ring in grooves and then add SUPPORT ring using appropriate tool.

13.5 Diaphragm Replacement for Dampener

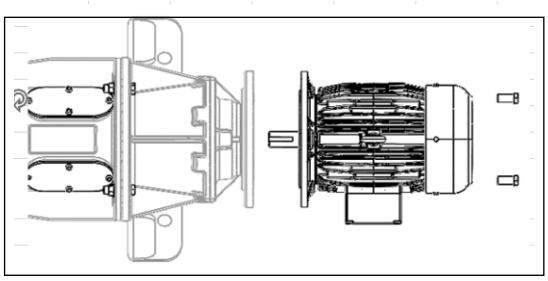
- Remove dampener from pump. Disassemble dampener by opening bolts of two halves.
- Remove the dust cap and disassemble the stopping pin by unscrewing the top bolt.
- Takeout diaphragm assembly. Unscrew the outer plate using grip and holding space provided on shaft.
- Replace damaged diaphragms. Note that air side should face up.
- Fix the outer plate with appropriate tool and using specified torque according to size.
- Reassemble diaphragm rod assembly through the sleeve by applying grease to avoid frictional damage of seals & screw the stopper pin.
- Assemble the two dampener's halves sandwiching the diaphragm using appropriate torque.

13.6 Motor Assembly & Disassembly



STEP 1:

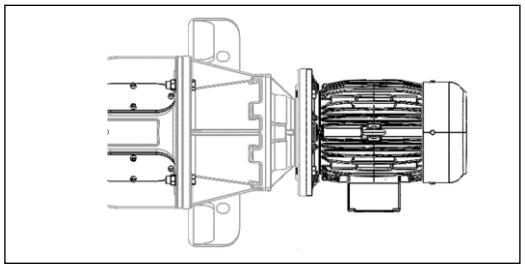
- Remove all the cable connection from motor



STEP 2:

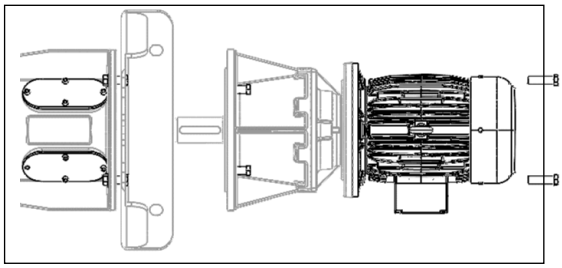
- Remove 4-bolts from motor flange
- Pull the motor out & replace with the new one by using proper lifting tools
- Push the motor in and tighten the bolts to re-assemble the motor

13.7 Gearbox Assembly & Disassembly



STEP 1:

- Remove all the cable connection from gear box



STEP 2:

- Remove 4-bolts from gear box flange
- Pull the gear box out & replace with new one by using proper lifting tools
- Push the motor in and tighten the bolts to re-assemble the motor

13.8 Maintenance of IoT Gateway

Control Panel is used for controlling the pump operation. It integrates with the pump for controlling the motor speed through variable frequency drive as per application need of an user. VFD and IoT Gateway are critical components of control panel and supplied preconfigured from the factory. Ensure panel is power off condition before any pump maintenance.

Remove any dust accumulated inside the Control Panel for proper operation of electronics in it. Ensure panel cooling fan is working. In case of pump operational issues, check wiring as per drawing, connection tightness, desired voltage availability at the respective terminals. For tripping error codes displayed on PLC display, refer troubleshooting section in IOM manual.

In case of pump data not accessible on Pump Insights application, check –

- Gateway power LED is ON (communication video)
- Gateway CON LED is showing healthy communication (communication healthy and faulty video)
- SIM Healthiness (Describe SIM replacement video)
- Communication wiring between VFD and IoT Gateway (video reference from point 1 video)
- Antenna is connected to IoT Gateway
- PLC mode on VFD local display is PLC1 (VFD display image)
- Parameter 4-50 on VFD display shows 8XXX in case of pump stop condition (VFD display image)
- Pump Insights subscription due for renewal

13.9 Disposal after Expiration of the Expected Lifetime

The metallic components like aluminium, stainless steel and carbon steel can be recycled. Plastic parts are not recyclable and must be disposed of as residual waste. The pump must be disposed of properly, according to local regulations. It should be noted that potentially dangerous fluid residues may remain in the pump and can create a hazard to the operator or the environment, therefore the pump must be thoroughly cleaned before disposal.

13.10 Residual Risks

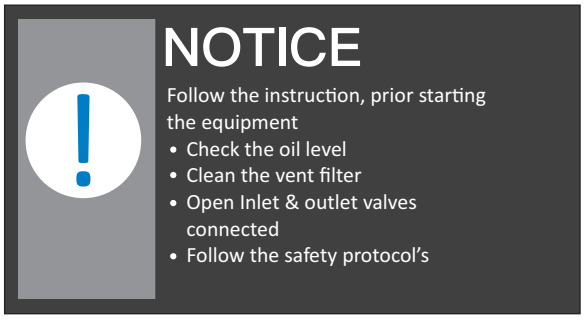
Even with proper application and observance of all points listed in this operating manual, there is still an estimable and unexpected residual risk when using the pumps. It may leak, fail due to wear, application-related causes or system-related circumstances.

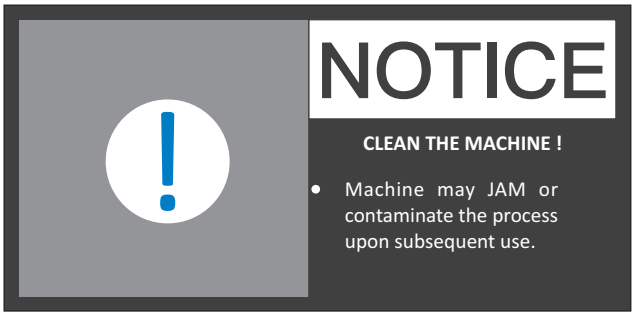
13.11 Actions in Emergency

In case of a leakage of an unknown fluid, respiratory protection should be worn and contact with the fluid should be avoided. During firefighting, no special hazards are to be expected from the pump itself. In addition, the currently handled fluid and the corresponding safety data sheet must be considered. When fluid leakage occurs, the power must be turned off, and the pressure released. During the spillage of an aggressive liquid, local and national safety rules must be followed.

13.12 Improving Pump's Longevity

- The rated speed of the motor or more will cause premature wear. We recommend running the pump at 20% less than the rated frequency (50 or 60 Hz) when using a VFD.
- Post Shutdown, the particulate matter in pumping media may get deposited inside the pump chamber. Hence the pump should be emptied off any remaining media. Failure to do so, may rupture the diaphragm and other wearable part after consecutive start-up.
- While operating the pump, do not exceed nominal working temperatures stated by the gear-motor manufacturer.
- Maintain proper lubrication at all times.







14.0 CERTIFICATION

14.1 Certification Standards & Markings

CE Machinery Directives	2006/42/EC on Machinery, Annex Vll	EN 60204-1:2018 EN ISO 12100:2010 EN 809: 1998+A1:2009/AC :2010	CE

15.0 WARRANTY DECLARATION

Cognito One Year Limited Warranty

Cognito warranty, states that its products will be free from defects in material and workmanship for a period of 12 months following date of purchase from Cognito. Cognito products which fail within the warranty period due to defects in material or workmanship will be repaired or replaced at Cognito's option.

Parts subject to wear or misuse, such as Diaphragm, check balls, valve seats, stoper cage, oil seals and other parts showing signs of misuse are not covered by this limited warranty. Also, equipment, parts and accessories not manufactured by Cognito but furnished with Cognito products are not covered by this limited warranty and purchaser must look to the original manufacturer's warranty, if any. This limited warranty is void if the Cognito product has been altered or repaired without the consent of Cognito.

All implied warranties, including any implied warranty of merchantability or fitness for a particular purpose, are expressly negated to the extent permitted by law and shall in no event extend beyond the expressed warranty period. Cognito disclaims any liability for consequential damages due to breach of any written or implied warranty on Cognito products.

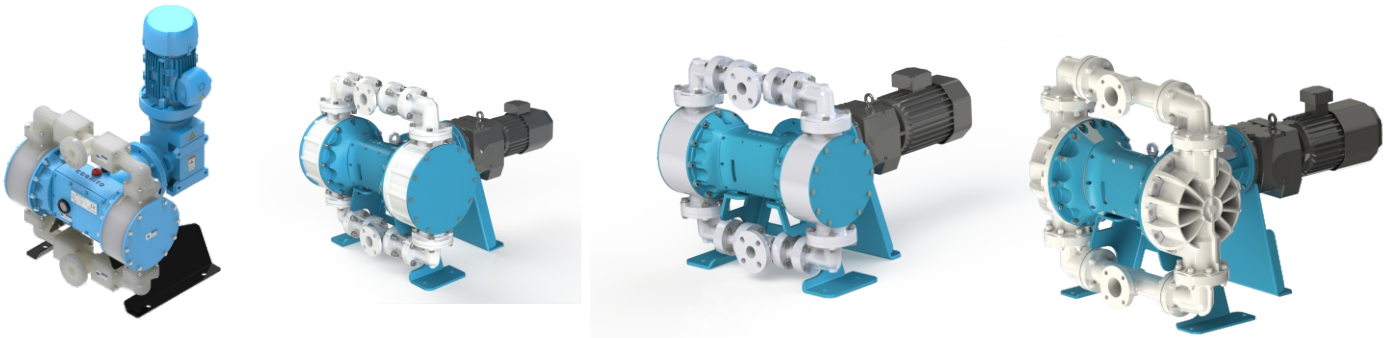
Information reacquired while you contact Factory

Before you contact the factory, note the model number and serial number of your pump. The serial number directs us to a file containing all information on material specification and test data applying to your specific pump. When ordering parts, Cognito Service Manual or Instruction Book should be consulted for the proper Part Numbers.

ALWAYS INCLUDE THE MODEL NUMBER AND SERIAL NUMBER WHEN ORDERING SPARE PARTS

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