PJ Tech

Dust Suppression

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Rev. C

Date : December 2016
Ref. number : PJ Tech Dust Suppression System O & M Instructions Manual Rev C.docx

DUST SUPPRESSION SYSTEM

OPERATING & MAINTENANCE INSTRUCTIONS MANUAL

BEFORE

AFTER

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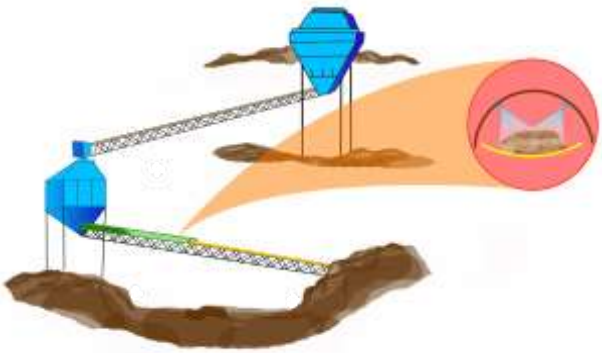
1 INTRODUCTION

1.1 Designation

Purpose of the system is to reduce process dust emissions from material handling and processing. The principle used: fine mist spayed at strategic points during dust generation production process. The spray patterns types and magnitude of moisture addition form part of a correctly designed dust suppression system. PJ Tech system operates without compressed air or chemical additives. It adds only minimal water droplets to avoid material degradation. Moisture addition can be adjusted to suit a given application even when process conditions vary, e.g. dry or rainy season.

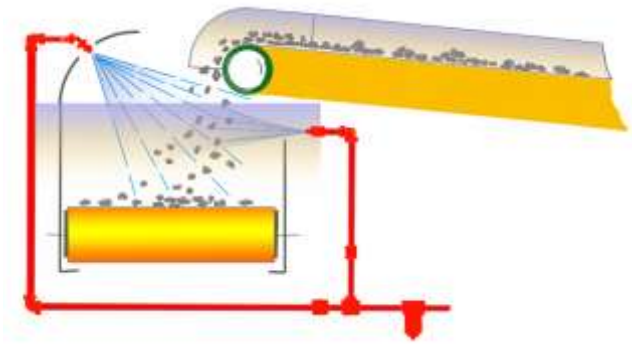


Materials handling process plant dust suppression

Nozzle ILH series

Truck loading/offloading dust suppression

Nozzle N7S series



Conveyor transfer point dust suppression

Nozzle ILH series

1.2 General

CAUTION

PJ TECH Dust Suppression systems have been developed and manufactured with care and continuous quality control. These operating instructions are intended to facilitate familiarization with the system and designated use. The manual contains important information for reliable, proper and efficient operation. Compliance with the operating instructions is of paramount importance to ensure reliability and long service life of the system and to avoid any risks. These operating instructions do not cover local regulations. The operator or installation/service personnel must ensure that such regulations are strictly adhered to.

2 SAFETY

2.1 Important

CAUTION

All personnel involved in the operation, inspections and installations of the system must be fully qualified. Personnel responsibilities, competence and supervision must be clearly defined. In addition, the operator is responsible for ensuring that contents of the operating instructions are fully understood by the responsible personnel.

CAUTION

Become familiar with the safety symbols presented in this document. These symbols will alert you to safety hazards and conditions that may result in personal injury, death, or property and equipment damage.

	WARNING: Failure to observe this warning may result in personal injury, death or equipment damage.
	WARNING: Risk of electrical shock. Failure to observe this warning may result in personal injury, death or equipment damage.
CAUTION	**CAUTION:** Failure to observe may result in equipment or property damage.

2.2 Safety Instructions for Installation, Inspection and Maintenance Work

	Before installing Dust Suppression equipment onto crushers, tipping stations, feeders, grizzly, vibrators feeders, conveyor transfers, conveyor chute, etc. turn off and lock/out energy source according to standards. Proper care should be taken when connecting or disconnecting power source.
	Work on the system must be only carried out with the electrical connections disconnected. Make sure that the electrical panel cannot be switched on accidentally. The power and signal cables should be routed so that they are not likely to be walked on or pinched by items placed upon or against it, paying particular attention to the point where it exists from the control panel.
	Do not install the electrical control panel near heat sources such as radiators or air ducts. Place the electrical control panel in a location with adequate air circulation to prevent internal heat build-up.
	The control panel is set for connection to 115Vac, 220Vac or 24Vdc. The control panel must be connected only as supplied. Refer to the Control Panel Circuit Diagram for details (section 10.1, page 24 to 27).
	When connected to a power source, un-insulated, dangerous voltage is present within the control panel's enclosure which may constitute a risk of electric shock (danger to life). Do not allow moisture to collect in the control panel's enclosure or near the power connections. Always close the enclosure after finish working with control panel.
	The user should not attempt to service the Dust Suppression System. All servicing should be referred to certified service personnel qualified to work on electrical equipment. If equipment will be installed in an enclosed area, gas level or dust content must be tested before using a cutting torch or welding. Using a cutting torch or welding in an area with gas or dust may cause an explosion.
	Always wear eye protection and necessary PPE while working on dust suppression system.

3 COMMISSIONING INTO OPERATION

Depending on site specific system design, various control panels are being used (Single Large and Dual). For the purpose of commissioning and simplicity, Single Control Panel has been used in this section. **Please refer to Figure 1, page 9, unless otherwise stated.** If system installed by PJ Tech, all below tasks form part of commissioning procedure done by PJ Tech team.

	Disconnect the hose (Figure 8, item 1, page 17) from the nozzles and secure them for unforeseen or excessive movements. Ensure that personnel and equipment are not in the way of the water outlets.
	Open the water feed hand valve (left side of control panel, by the filter) and ensure no leaks are present.
	Ensure circuit breaker located in the top part of the control panel is switched on and external power supply is switched on. Turn the electrical power ON by turning the selector switch to LOCAL position (item 4). The yellow indication lamp is switched ON (item 3).
	Press the green START pushbutton (item2), the green indication lamp is ON (item5). The system is in operation.
	Ensure an adequate flushing of the pipes.
	Stop system by pressing STOP pushbutton (item6). Connect the tubes to the nozzles and start again.
	Adjust water pressure. Turn the pressure regulator knob clockwise (right side of control panel) to increase the pressure, and anticlockwise to decrease the pressure until an adequate spray pattern is achieved.
	Turn the selector switch to REMOTE (item4). In this mode, the system will be activated by remote signal (usually PLC digital output) refer to the Control Panel Circuit Diagram in section 10.1 of this document, page 24 to 27).
	WARNING - KSB-Movitec vertical pressure booster in line pumps. **Safety instructions for installation, inspection and maintenance work refer to KSB Manual supplied with the System**
	WARNING – KSB-Movitec operating instructions contain important information that must be followed during installation, operation and maintenance. The installer, all qualified personnel and operators are required, without exceptions, to have read and understand operating instructions. It must remain available at the machine/installation at all times.

4 MAINTENANCE INSTRUCTIONS

4.1 Malfunctions

Refer to section 4.2 Troubleshooting. Contact **PJ TECH** service department if the problem persists or if the system is under guarantee.

The entire system should be serviced by competent personnel at least once every two months or after not being in use for some time.

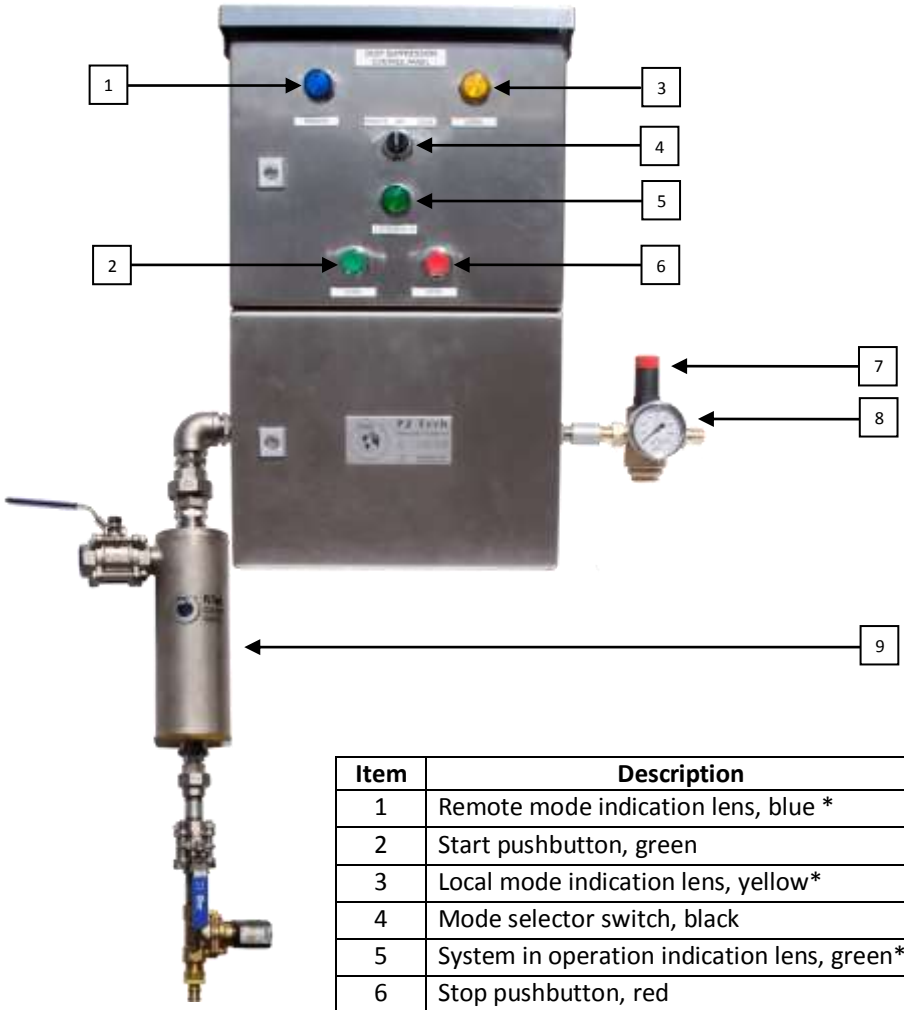
4.2 Troubleshooting

Please refer to Figure 1, page 9, unless otherwise stated.

System not operating		Check if the electric power is switched on; check the selector switch position (Remote or Local). If in Local Mode, the yellow lamp should be switched on. When system is in operation the green lamp should be switched on.
		Check if panel water feed valves are open.
		Check if pressure booster pump is operating.
		Contact your electrical supervisor.
		Check for pipe leaks / breakages.
		All malfunctioning parts replace with original **PJ TECH** equipment.
		Contact PJ Tech service department 011 704 7088 or dust@pjtech.co.za
Insufficient mist		Check the water pressure and adjust pressure regulator clockwise to increase the pressure and anticlockwise to decrease the pressure until an adequate spray pattern is achieved.
		Open the solenoid valve at the bottom of the filter and flush the dirt (refer to the Control Panel Circuit Diagram in section 10.1 and the manual of electronic timing device). Filter flush can be initiated by turning power to control panel off and then back on (circuit breaker inside top part of the control panel). Ensure that the hand isolating valve is open.
Insufficient mist		Close hand isolating valve/s; open filter cover and check filter elements for dirt. Clean if required.
		Check nozzles for blockages.
Mist too intense		Decrease water pressure via pressure regulator - clockwise to increase the pressure and anticlockwise to decrease the pressure until an adequate spray pattern is achieved.

5 CONTROL PANELS

5.1 Single Control Panel Assembly

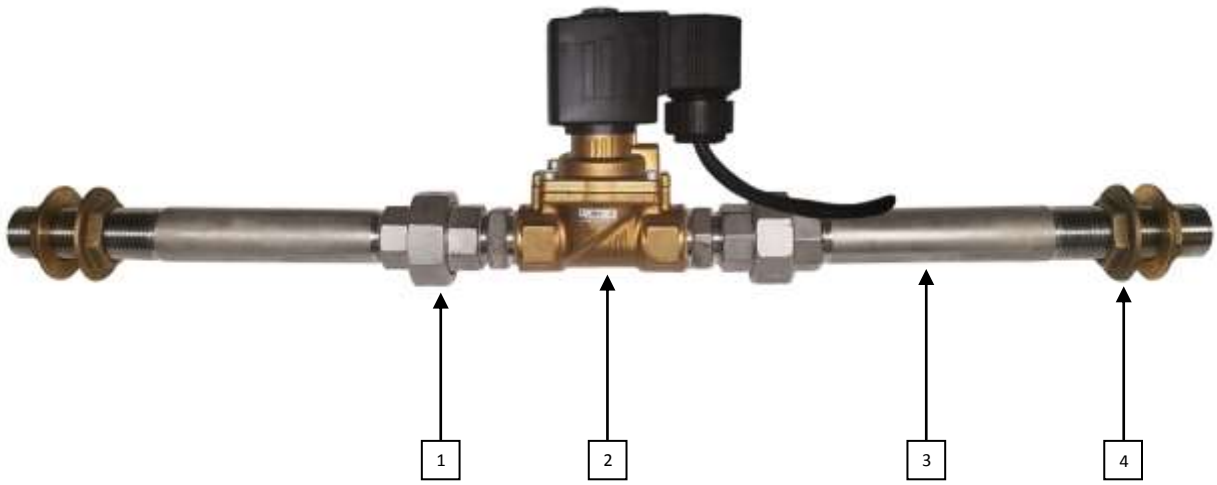


Item	Description	Part No
1	Remote mode indication lens, blue *	PJG-C-CHI-90224
2	Start pushbutton, green	PJG-C-CHI-90022
3	Local mode indication lens, yellow*	PJG-C-CHI-90223
4	Mode selector switch, black	PJG-C-CHI-90073
5	System in operation indication lens, green*	PJG-C-CHI-90222
6	Stop pushbutton, red	PJG-C-CHI-90021
7	Pressure regulator, ½", range 1.5 to 12bar	PJG-C-DUP-D06FHB-15mm
8	Pressure Gauge 65mm Glycerin Filled, ¼" Rear Entry, 16bar	PJG-C-DUP-OTHERLOC207
9	Water Filtering Station, Improved Type 1", 316 S/S, c/w 100 micron strainer and full bore S/S 1" and ½" ball valves, ½" solenoid drain valve	PDS-FA/1/100

* Each of the above colour lens buttons share the same parts, which make up the rest of each component:

Light, Direct Voltage	*PJG-C-CHI-90255*
Globe, 110V	*PJG-C-CHI-91948*
Globe, 220V	*PJG-C-CHI-91949*

Figure 1 – Single Control Panel Assembly



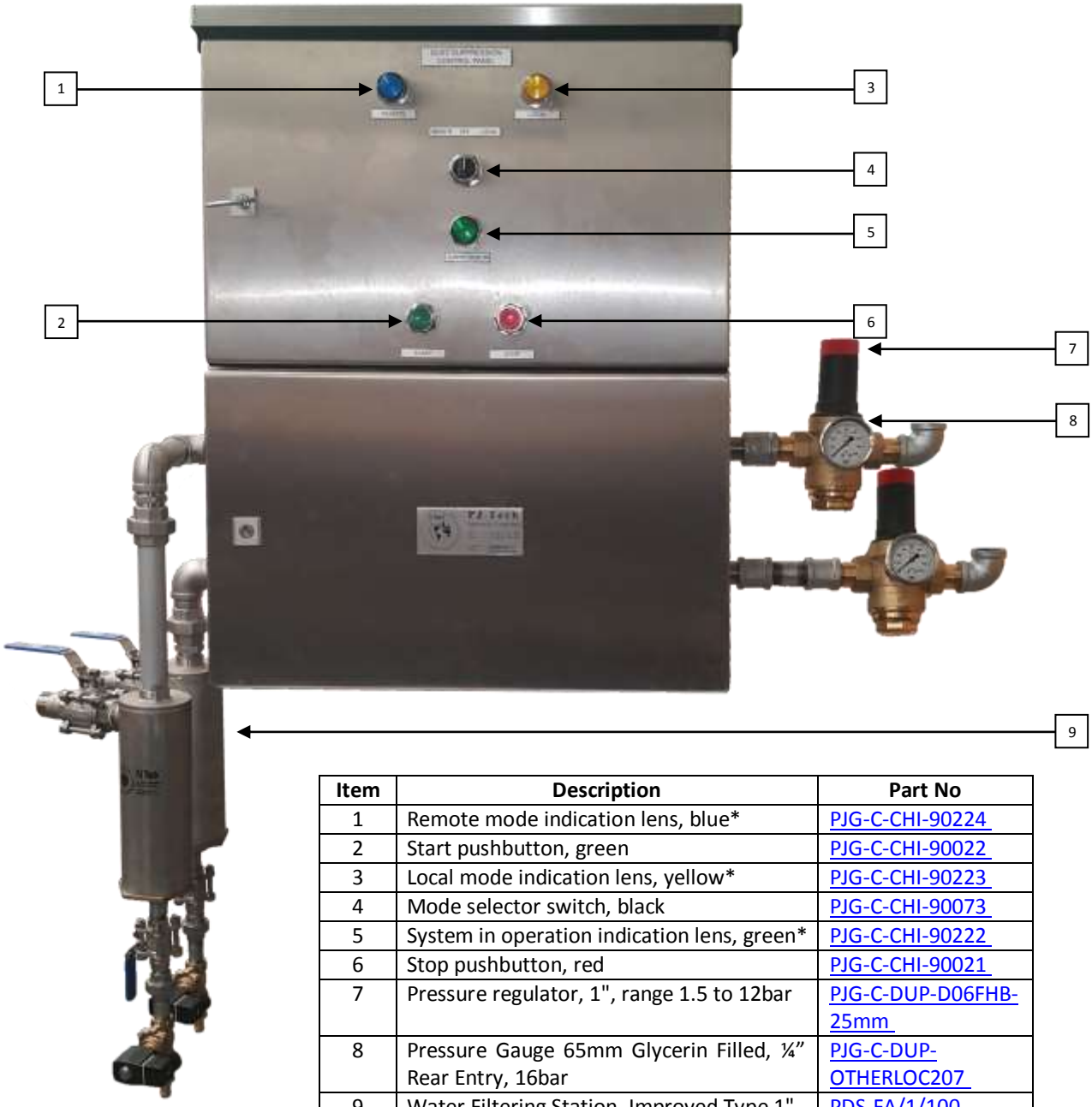
Item	Description	Part No
1	1" Cone Union, S/S 316	PJG-C-BRA-1CUSS
2	Solenoid valve, ½", 2/2-way, 16bar, brass, c/w 110V coil *	PJG-C-BUR-240991
3	380mm control panel, ½" XV piping, pipe set as per drawing M-DS-M-011	PJG-C-GLU-M-DS-M-011 /1
4	Back nut ½", brass	PJG-C-HYC-BN05

* Solenoid valve 1/2" can be separated into individual parts if damage can be accessed to a specific location:

A: Coil for solenoid valve (220V, ½") PJG-C-BUR-179765
B: Coil for solenoid valve (110V, ½") PJG-C-BUR-179764
C: Coil for Solenoid Valve (24Vdc, ½") PJG-C-BUR-179762

Figure 2 – Single Control Panel - Solenoid Valve Assembly (inside bottom half of the control panel)

5.2 Large Control Panel Assembly



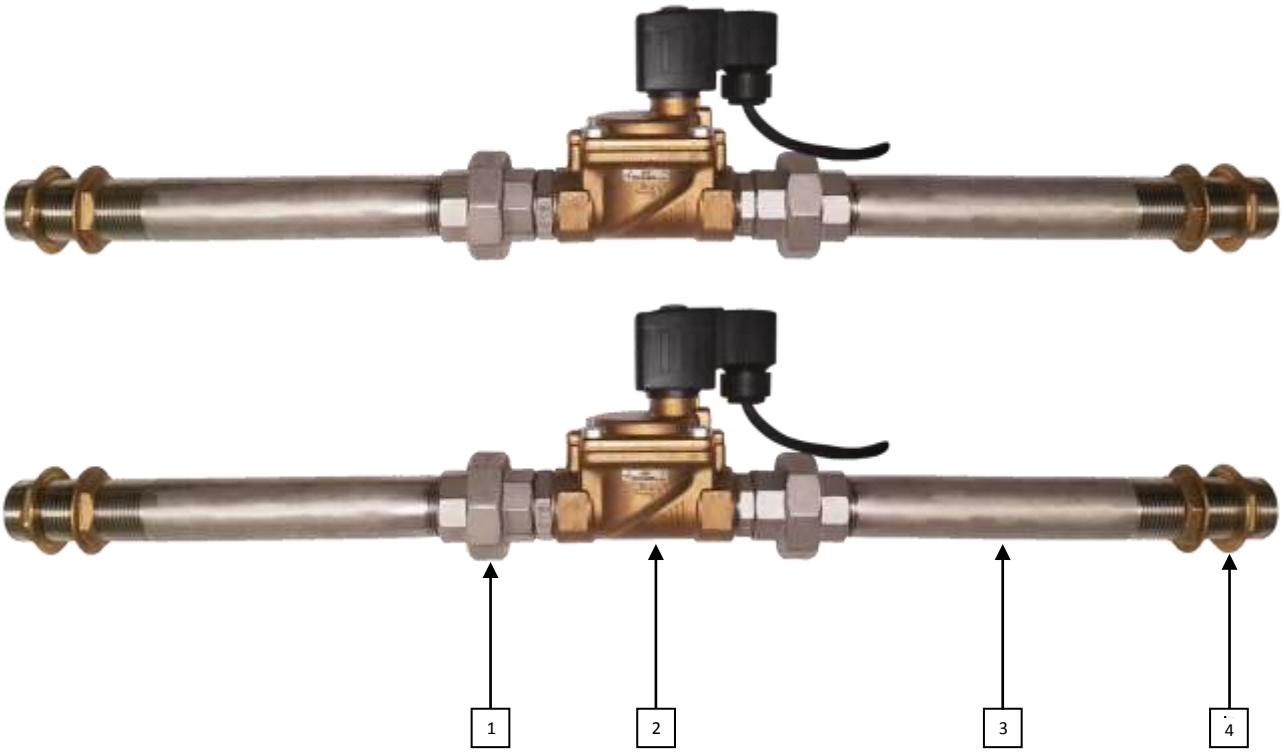
Item	Description	Part No
1	Remote mode indication lens, blue*	PJG-C-CHI-90224
2	Start pushbutton, green	PJG-C-CHI-90022
3	Local mode indication lens, yellow*	PJG-C-CHI-90223
4	Mode selector switch, black	PJG-C-CHI-90073
5	System in operation indication lens, green*	PJG-C-CHI-90222
6	Stop pushbutton, red	PJG-C-CHI-90021
7	Pressure regulator, 1", range 1.5 to 12bar	PJG-C-DUP-D06FHB-25mm
8	Pressure Gauge 65mm Glycerin Filled, ¼" Rear Entry, 16bar	PJG-C-DUP-OTHERLOC207
9	Water Filtering Station, Improved Type 1", 316 S/S, c/w 100 micron strainer and full bore S/S 1" and ½" ball valves, ½" solenoid drain valve	PDS-FA/1/100

*

Each of the above colour buttons share the same parts, which make up the rest of each component:

Light, Direct Voltage	*PJG-C-CHI-90255*
Globe, 110V	*PJG-C-CHI-91948*
Globe, 220V	*PJG-C-CHI-91949*

Figure 3 – Large Control Panel Assembly



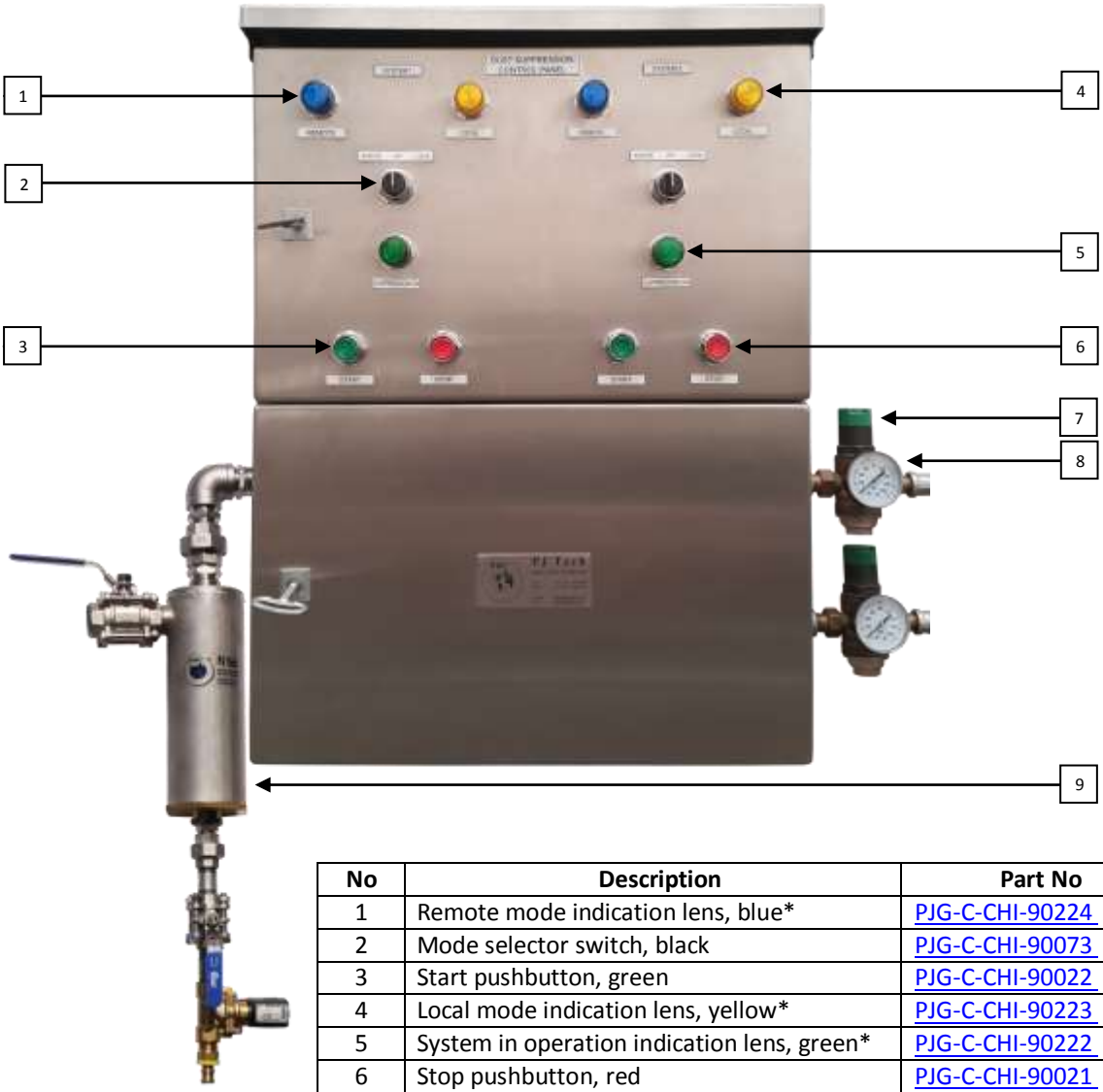
Item	Description	Part No
1	1" cone union, S/S 316	PJG-C-BRA-1CUSS
2	Solenoid valve, 1", 2/2 way, 16bar, brass, c/w 220V coil *	PJG-C-BUR-221858
3	600mm control panel, 1" XV piping, pipe set as per drawing M-DS-M-014	PJG-C-GLU-M-DS-M-014 /2
4	Back nut 1", brass	PJG-C-HYC-BN1

* Solenoid valve 1" can be separated into individual parts if damage can be accessed to a specific location:

A: Coil for solenoid valve (220V, 1") PJG-C-BUR-179765
B: Coil for solenoid valve (110V, 1") PJG-C-BUR-179764
C: Coil for Solenoid Valve (24Vdc, 1") PJG-C-BUR-179762

Figure 4 – Large Control Panel – Dual Solenoid Valve Assembly (inside bottom half of the control panel)

5.3 Dual Control Panel Assembly



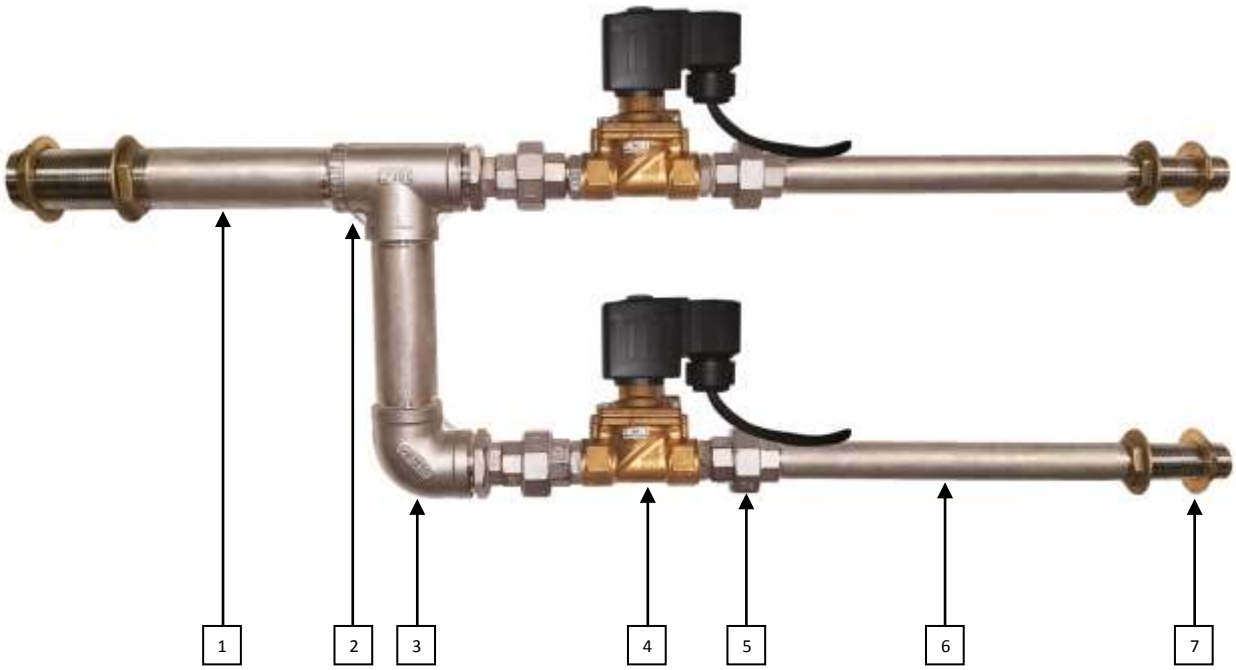
No	Description	Part No
1	Remote mode indication lens, blue*	PJG-C-CHI-90224
2	Mode selector switch, black	PJG-C-CHI-90073
3	Start pushbutton, green	PJG-C-CHI-90022
4	Local mode indication lens, yellow*	PJG-C-CHI-90223
5	System in operation indication lens, green*	PJG-C-CHI-90222
6	Stop pushbutton, red	PJG-C-CHI-90021
* 7	Pressure regulator, 1/2", range 1.5 to 12bar	PJG-C-DUP-D06FHB-15mm
8	Pressure Gauge 65mm Glycerin Filled, 1”4 Rear Entry, 16bar	PJG-C-DUP-OTHERLOC207
9	Water Filtering Station, Improved Type 1", 316 S/S, c/w 100 micron strainer and full bore S/S 1" and ½” ball valves, ½” solenoid drain valve	PDS-FA/1/100

*

Each of the above colour buttons share the same parts, which make up the rest of each component:

Light, Direct Voltage	*PJG-C-CHI-90255*
Globe, 110V	*PJG-C-CHI-91948*
Globe, 220V	*PJG-C-CHI-91949*

Figure 5 – Dual Control Panel Assembly



Item	Description	Part No
1	Dual control panel, pipe set as per drawing M-DS-M-064	PJG-C-GLU-M-DS-M-064 /3
2	T-piece, 1", S/S 316	PJG-C-BRA-TP25SS316
3	Elbow, 1", S/S 316	PJG-C-BRA-EL25SS316
4	Solenoid valve, ½", 2/2-way, 16bar, brass, c/w 110V coil *	PJG-C-BUR-240991
5	1/2" Cone Union, stainless steel 316	PJG-C-BRA-1/2CUSS
6	Dual control panel, pipe set as per drawing M-DS-M-064	PJG-C-GLU-M-DS-M-064 /1
7	Back nut ½", brass	PJG-C-HYC-BN05

* Solenoid valve 1/2" can be separated into individual parts if damage can be accessed to a specific location:

A: Coil for solenoid valve (220V, ½") PJG-C-BUR-179765
B: Coil for solenoid valve (110V, ½") PJG-C-BUR-179764
C: Coil for Solenoid Valve (24Vdc, ½") PJG-C-BUR-179762

Figure 6 – Dual Control Panel – Dual Solenoid Valve Assembly (inside bottom half of the control panel)

6 FILTERS

6.1 Air/Water Inline Wedge Wire S/S - Medium to High Pressure Filters

6.1.1 Design features

Our Air/Water inline filters are designed for effective strainer performance with minimal maintenance. They remove solid contaminants from pipelines to protect equipment from excessive wear/blockage. Maximum pressure rating - 40bar. Strainers are sized from 10µ to 1000µ. Inlet/outlet connection 1" BSP (female). Bottom isolation hand ball valve provides an easy method for manual strainer flush. For automatic drain a solenoid valve is fitted and then the strainer is regularly and automatically flushed. The frequency of the auto drain is regulated by the settings on the electronic timing device located in the top section of the control panel.

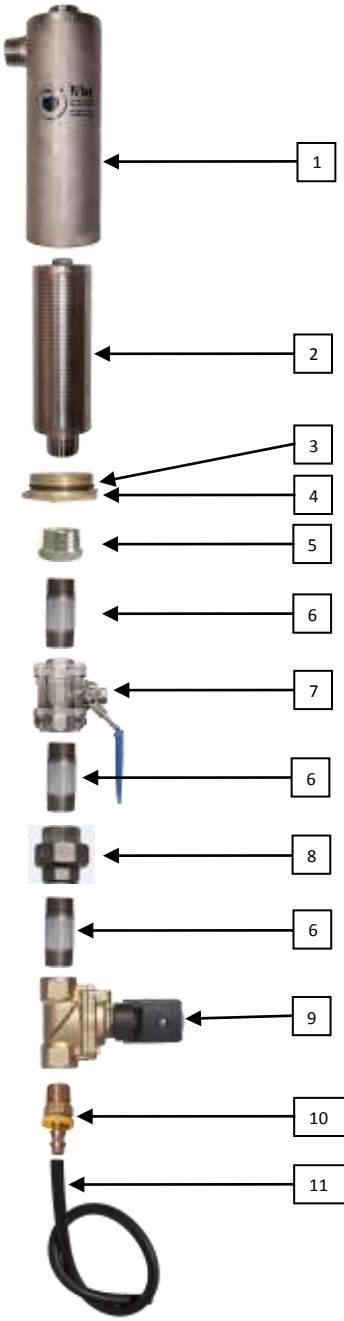
6.1.2 Construction material

Standard material of construction - 316 S/S.

6.1.3 Common applications

- Air filtration.
- Liquid filtration.

6.1.4 Filter Assembly



Item	Description	Part No
1	Filter body, S/S	PDS-FA-FB2
2	Wedge wire strainer (usually 100 µ), S/S	SCR-SC5155
3	O-ring	REL-OR160X50NBR
4	Strainer retainer, brass	PJDS-FA-CC3
5	Reducer	
6	Nipple ½", S/S	PJG-C-BRA-NIPPBARR15MMS/S
7	Ball valve ½", full bore, S/S	PJG-C-BRA-1/2BV/SS/FF
8	Union	
9	Solenoid valve ½", brass	PJG-C-BUR-240991
10	Hose push lock ½" to ½'" push-on, brass	PJG-C-HYC-30182-0808B
11	Hose, industrial black push-lock ½", brass	PJG-INST-HYD-831-04

Figure 7 - Filter Assembly

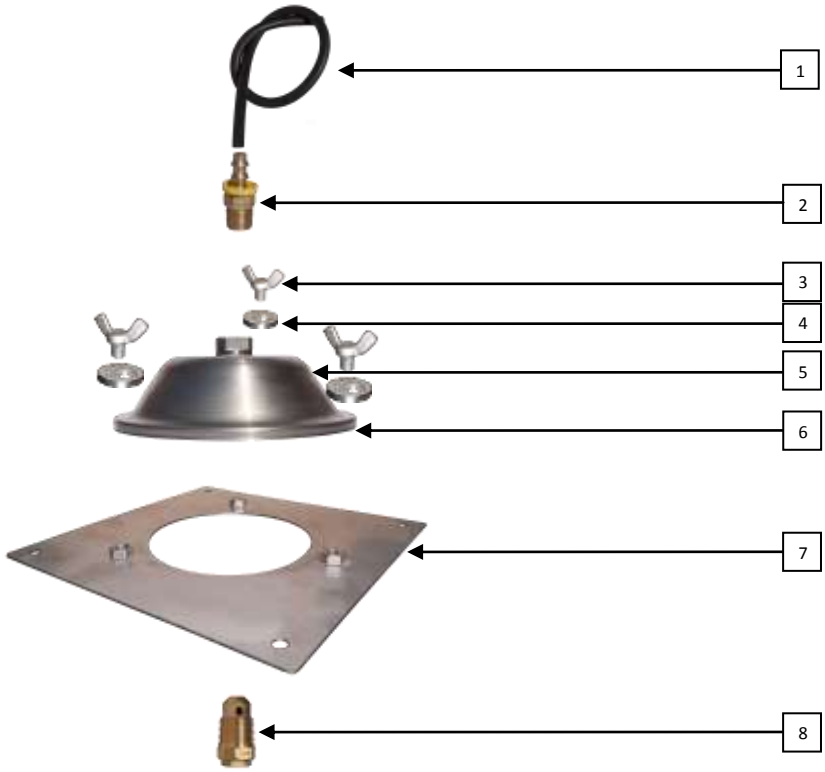
6.2 Air/Water Filters Maintenance

Insufficient or no mist		Depending on the Air/Water quality and the duration of being in operation the filter needs to be striped and the strainer clean up or replaced.
		All malfunctioning parts replace with original **PJ TECH** spare parts.

7 SPRAY ASSEMBLIES

7.1 Dome Spray Assembly

7.1.1 Components

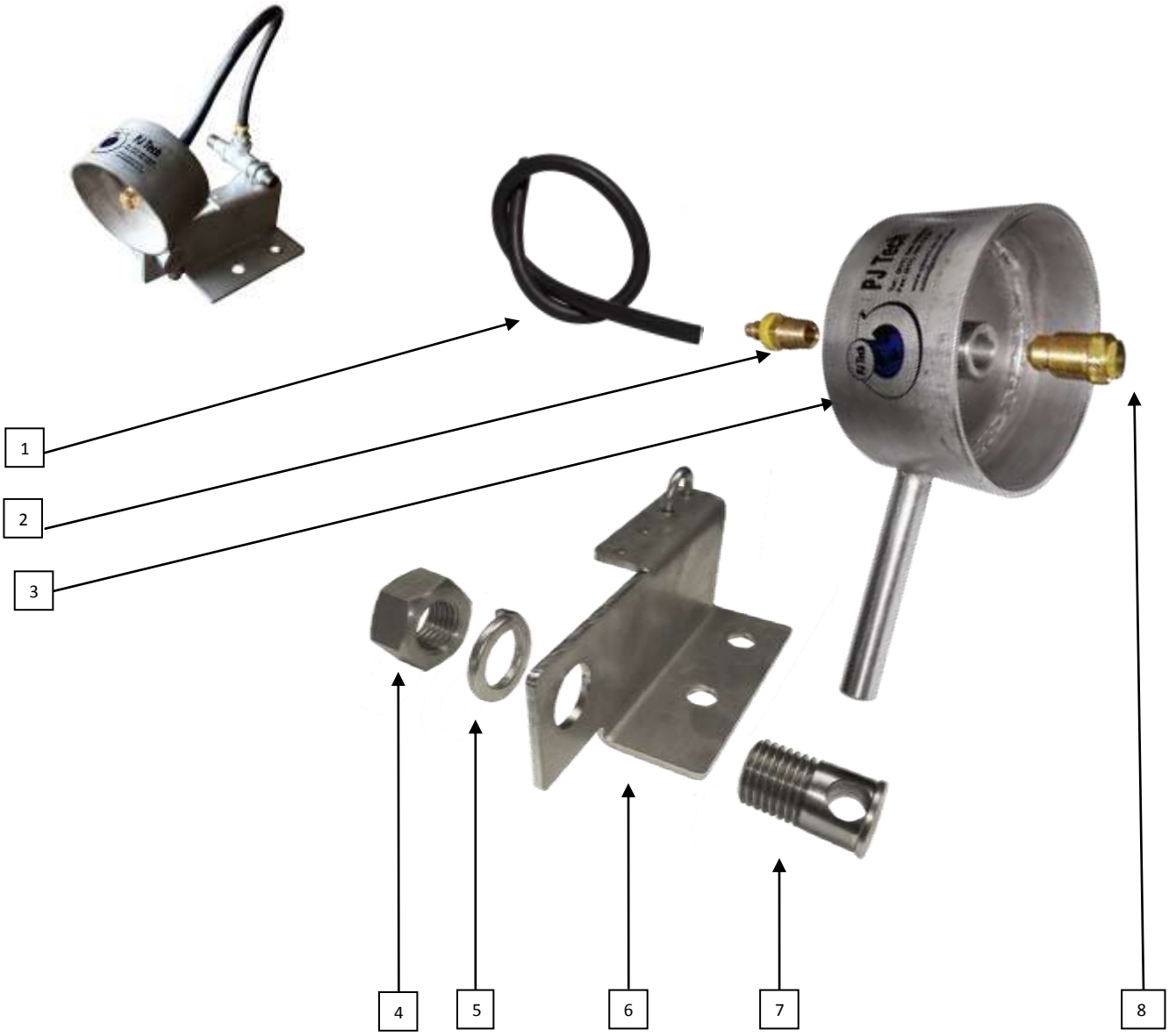


Item	Description	Part No
1	1/4" hose push-lock black	PJT-S/8014BLK
2	Nipple ¼", brass	PJG-C-HYC-30182-0404B
3	Dome mounting butterfly bolt, S/S	PJG-C-M12WNSS
4	Dome mounting washer, S/S	PDS-C-KAR-DOM/SPA
5	Dome, S/S with Nozzle adaptor, S/S (welded to dome)	PDS-SA-D/H/2.5
6	Dome O-Ring, 10mmx190OD	PDS-C-DOM/O-RING
7	Square plate with nuts	PDS-SA-KAR-DOM/PLAT
8	Nozzle ILH series	PDS-SA-BXE-3/8BSPT/ILH2

Figure 8 - Dome Spray Assembly

7.2 Reflector Spray Assembly

7.2.1 Components



Item	Description	Part No
1	Hose ¼" push lock	PJT-S/8014BLK
2	Nipple ¼", brass	PJG-C-HYC-30182-0404B
3	Reflector, S/S	PDS-SA-R/H/2.5L
4	Reflector mounting nut, S/S	PJG-C-BOL-M30NSS304
5	Reflector mounting spring washer, S/S	PJG-C-BOL-M30SSSW
6	Reflector mounting plate, S/S	PDS-SA-KAR-REFL/BR
7	Reflector mounting bolt, S/S	PJG-C-GLU-M-DS-M-022
8	Nozzle ILH series	PDS-SA-BXE-3/8BSPT/ILH3

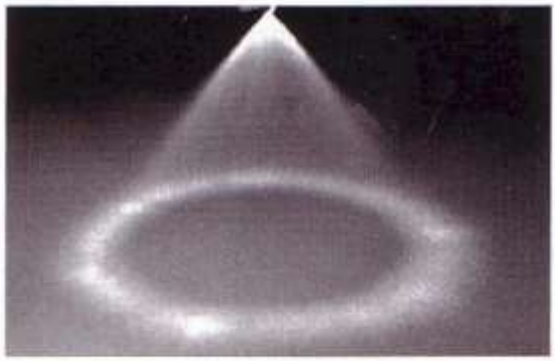
Figure 9 - Reflector Spray Assembly

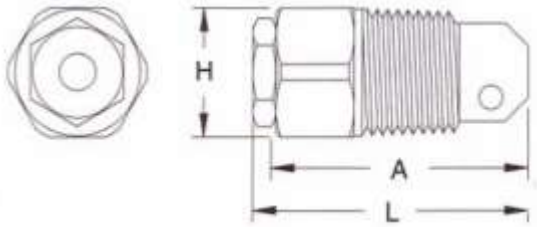
8 NOZZLES

8.1 IMPORTANT! NOZZLE REPLACEMENT

DUE TO WEAR, ALL BRASS NOZZLES MUST BE REPLACED AT LEAST ONCE EVERY 12 MONTHS.

8.2 ILH series in-line hollow cone nozzles





- **Design features**
  ILH series in-line hollow-cone spray nozzles produce a very evenly distributed hollow-cone spray which emerges through the centre axis of the nozzle body. At lower pressures, these nozzles produce medium sized, uniform droplets. Finer droplets are produced at higher pressures. ILH series nozzles have large maximum free passage diameters to reduce the possibility of clogging. Interchangeable nozzle caps allow for maximum flexibility and are easily removed for cleaning or inspection. The recessed mounting characteristics of this nozzle result in minimum protrusion for the liquid supply header or fitting.

- **Construction material**
  Standard materials of construction for ILH series nozzles are brass and 303 or 316 S/S.

- **Common applications**
  - Dust Suppression
  - Humidification

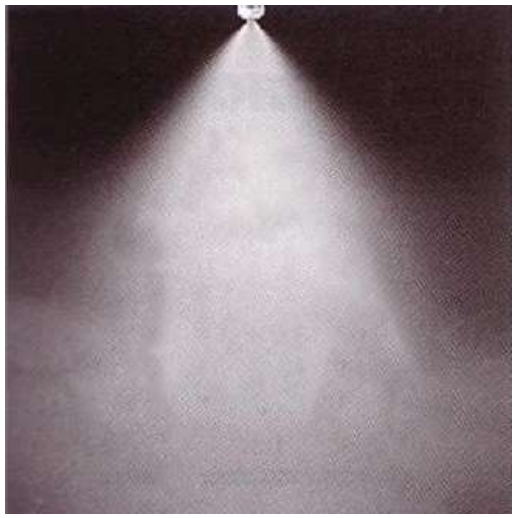
- **Dimensions data**

MODEL NUMBER	Dim. A	Dim L	Dim H
$^{1}/_{8}$ILH	30.5	33	19
$^{1}/_{4}$ILH	33	38.1	25.4
$^{3}/_{8}$ILH	38.1	45.7	30.5
$^{1}/_{2}$ILH	61	66	50.8

- **Performance data & ordering info**
  Spray angle is standard 75 degrees at 3 bar.

MODEL NUMBER	PIPE SIZE BSPT	MAXIMUM FREE PASSAGE (mm)	4 bar	6 bar	8 bar	Part No
B3/8ILH2	3/8	1.98	1.82	2.23	2.58	PDS-SA-BXE-3/8BSPT/ILH2
B3/8ILH3	3/8	2.39	2.73	3.3	3.9	PDS-SA-BXE-3/8BSPT/ILH3
B3/8ILH5	3/8	2.77	4.6	5.6	6.4	PDS-SA-BXE-3/8BSPT/ILH5
B3/8ILH8	3/8	3.96	7.3	8.9	10.3	PDS-SA-BXE-3/8BSPT/ILH8
B3/8ILH10	3/8	2.95	9.1	11.2	12.9	PDS-SA-BXE-3/8BSPT/ILH10
B3/8ILH14	3/8	3.96	12.8	15.6	18.0	PDS-SA-BXE-3/8BSPT/ILH14

8.3 Multi-nozzle - M7S series assembly



- **Design features.**
  The M7S series cluster nozzle uses an array of seven (7) GS style full-cone spray nozzle caps mounted on a cluster nozzle body to produce a full-cone spray.
  Multiple full-cone spray nozzle caps produce a relatively small droplet size for large flow rates Nozzle caps are easily removed for cleaning or nozzle change-out. Each nozzle cap contains a patented vane insert with larger flow passages than other styles and is therefore less susceptible to clogging. Insert vanes are easy to remove and replace if required.

- **Construction material.**
  Standard cluster nozzle body and cap materials are brass, 303 and 316 S/S.

- **Common applications**.
  - Dust Suppression at intense dust generating points, e.g. tipping bays
  - Humidification

- **Performance data & ordering info**

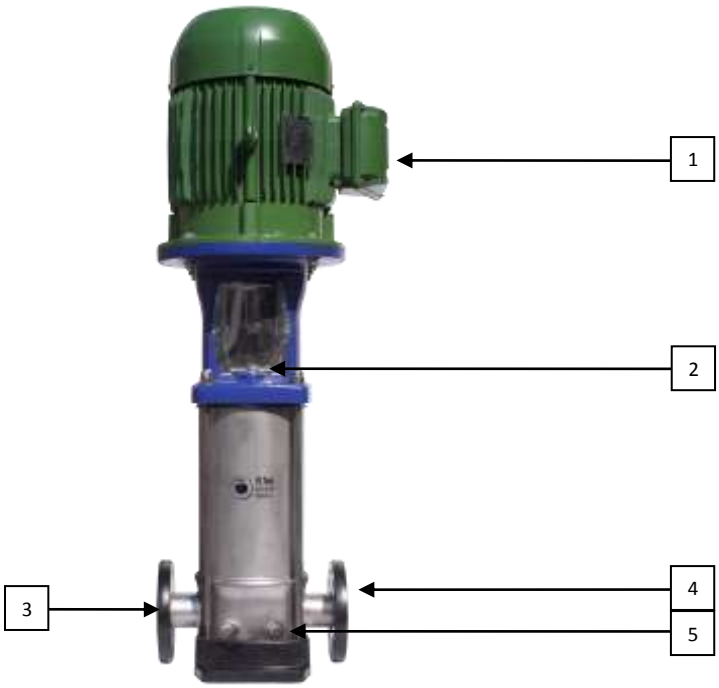
MODEL NUMBER	PIPE SIZE BSPT FEMALE	NOZZLE CAP MODEL #	CAPACITIES (L/min) AT VARIOUS PRESSURES (bar)						
			1.5 bar	3 bar	4 bar	5 bar	6 bar	8 bar	10 bar
B$^{3}/_{4}$M7S1	R$^{3}/_{4}$	$^{1}/_{8}$GS1	3.9	5.5	6.4	7.1	7.8	9.0	10.1
B$^{3}/_{4}$M7S1.5	R$^{3}/_{4}$	$^{1}/_{8}$GS1.5	5.9	8.3	9.6	10.7	11.7	13.5	15.1
B$^{3}/_{4}$M7S2	R$^{3}/_{4}$	$^{1}/_{8}$GS2	7.8	11.1	12.8	14.3	15.6	18.0	20.2
B$^{3}/_{4}$M7S3	R$^{3}/_{4}$	$^{1}/_{8}$GS3	11.7	16.6	19.1	21.4	23.4	27.1	30.3

8.4 Nozzle maintenance

DUE TO WEAR, ALL BRASS NOZZLES MUST BE REPLACED AT LEAST ONCE EVERY 12 MONTHS.
Clean nozzles once every 6 months. Each nozzle has to be taken “off line” and cleaned by means of water or compressed air.
Inspect spray patterns, positioning and ensure proper fastening of Dome, Reflector and Multi-nozzle spray assemblies once a month.
Depending on the water quality, the average life span (in operation) of the brass nozzles is approximately 12 months. After that period all nozzles should be replaced. 316 stainless steel nozzles should be replaced every 3 to 5 years.
All malfunctioning parts replace with original **PJ TECH** equipment.

9 PRESSURE BOOSTER PUMP

9.1 Movitec in-line Vertical Multistage Stage Pump Assembly



Item	Description
1	Terminal box
2	Fill plug/air relief
3	Pump inlet
4	Pump outlet
5	Drain plugs

Figure 10 - Pump Assembly

9.2 Technical Data

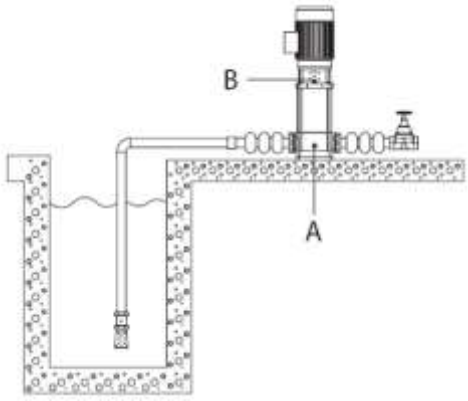
- For technical information refer to manufacturer's installation and operating manual.

9.3 Pump Priming

It is very important to prime the pump in case when the water pipes are emptied.

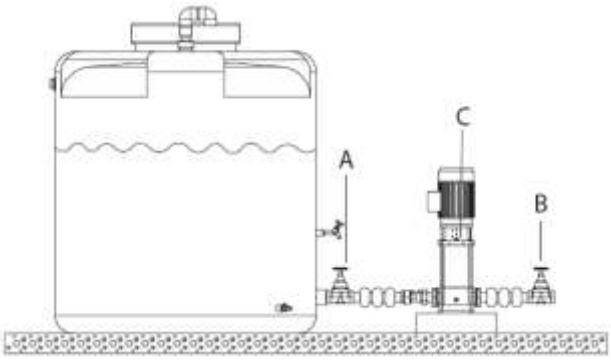
9.3.1 In an open circuit with a liquid level lower than the pump

A non-return valve must be installed at the lowest tank level point on the suction pipe.



1. Partly loosen the drain plug (A). For Movitec VE , Movitec VCF and Movitec LHS the drain plug must be fully removed.
2. Remove the fill plug (B) from the top bracket.
3. Block the entry of the drain plug on the outside of the pump foot.
4. Close the outlet shut-off valve.
5. Fill the pump housing to the maximum through the fill plug with the liquid that is to be pumped.
6. Screw the drain plug into the pump foot.
7. Insert the fill plug in the top bracket.
8. Check the rotational direction of the pump.
9. Open the outlet shut-off valve.

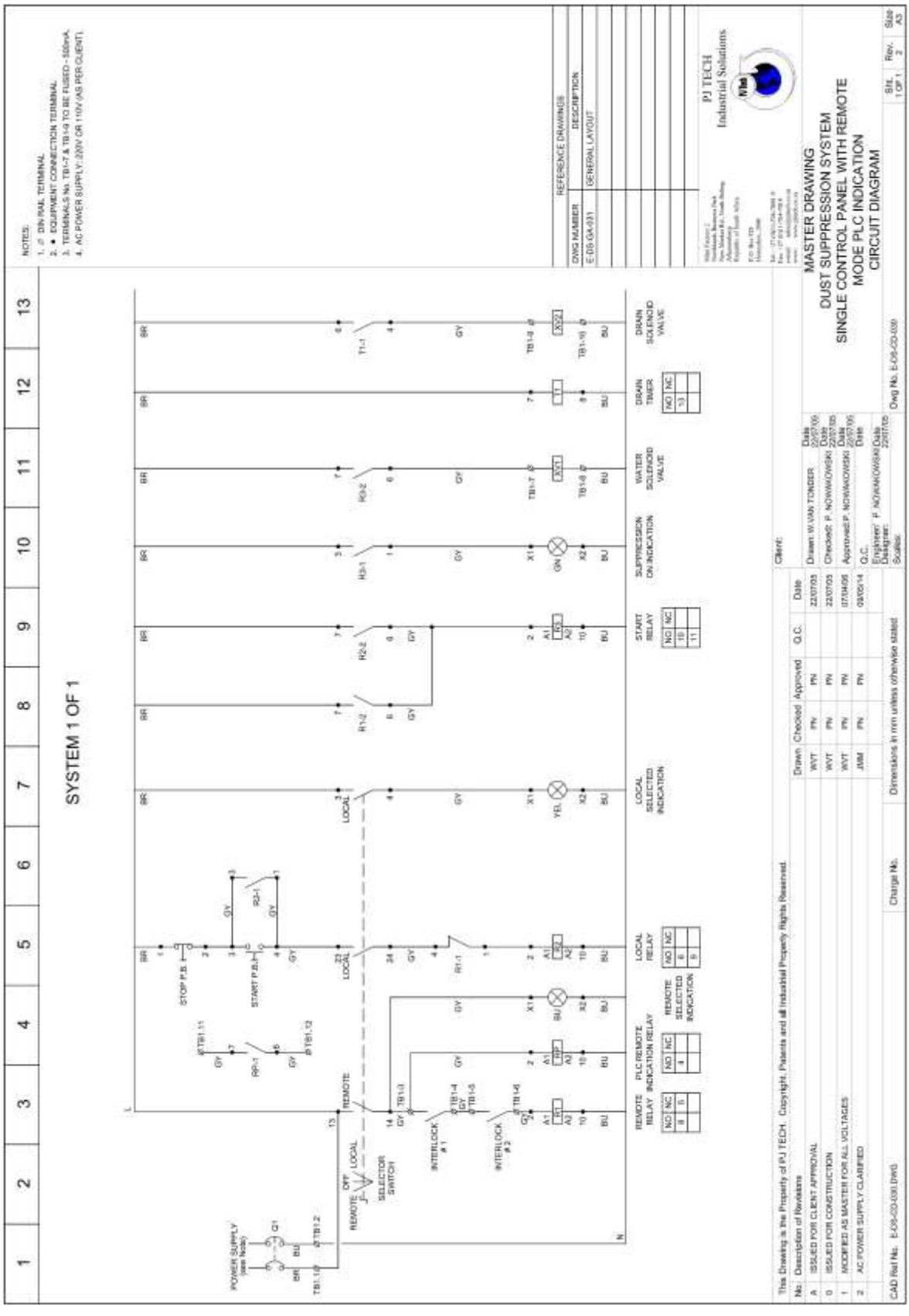
9.3.2 In an open or closed circuit with sufficient supply pressure



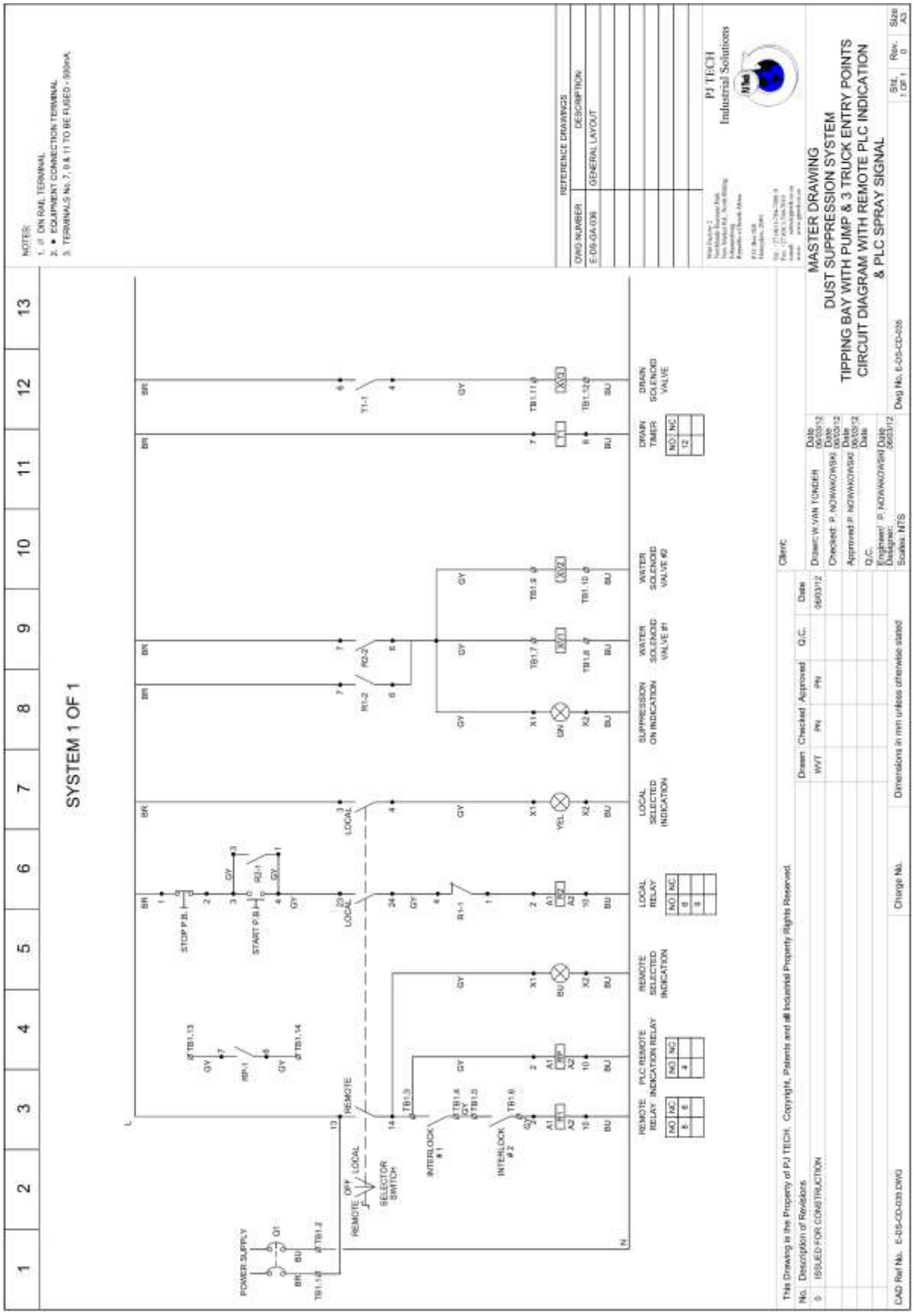
1. Close the suction shut-off valve (A) and the outlet shut-off valve (B).
2. Open the fill plug (C).
3. Gradually open the suction shut-off valve until the liquid flows from the fill plug (C).
4. Close the fill plug.
5. Fully open the suction shut-off valve.
6. Check the rotational direction of the pump.
7. Fully open the outlet shut-off valve.

10 DRAWINGS

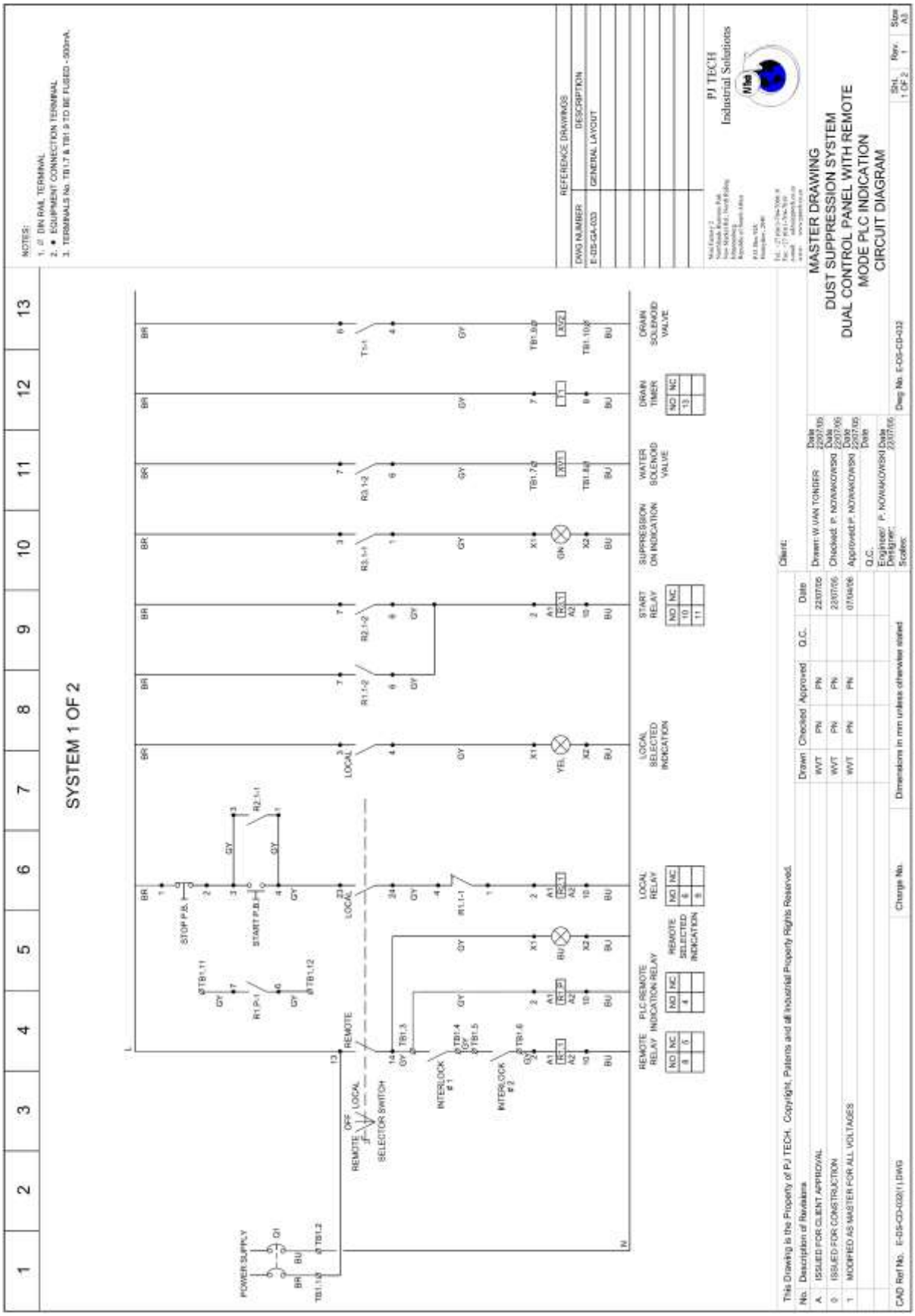
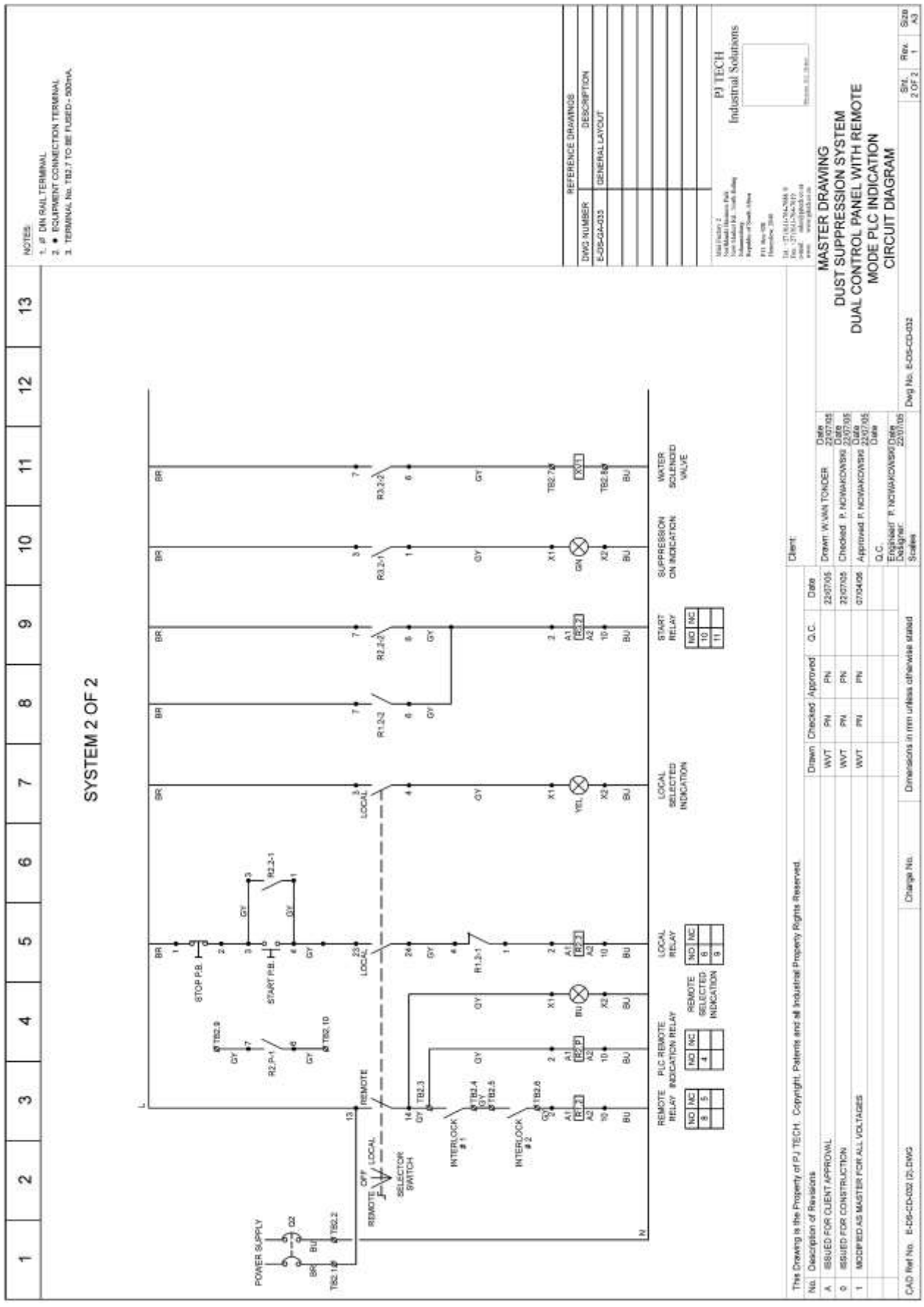
10.1 Single Control Panel - Circuit Diagram



10.2 Large Control Panel - Circuit Diagram



10.3 Dual Control Panel - Circuit Diagram 1 of 2



10.4 Dual Control Panel - Circuit Diagram 2 of 2