TWINSCAN LAYOUT

TT-L2-LO

PERIODIC MAINTENANCE

TABLE OF CONTENTS

Layout Objectives

- Remove and install panels
- Adjust panel locking mechanism
- Open and close electronics cabinets
- Demonstrate / practice cleaning procedures

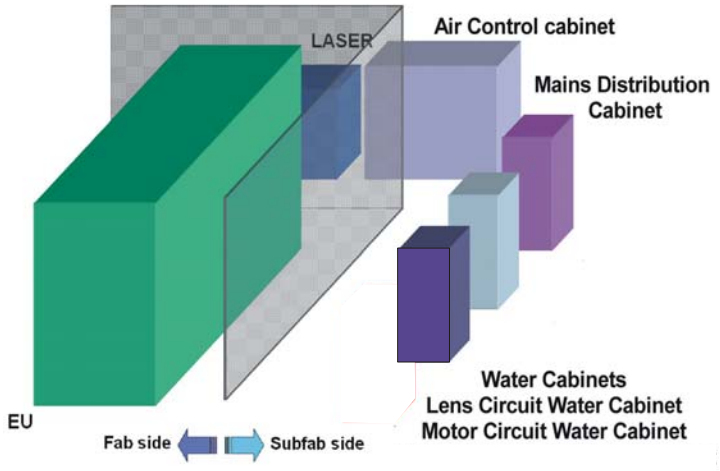
INTRODUCTION

The Layout section of this presentation gives a introduction to key components of the Electrical and Pneumatic systems

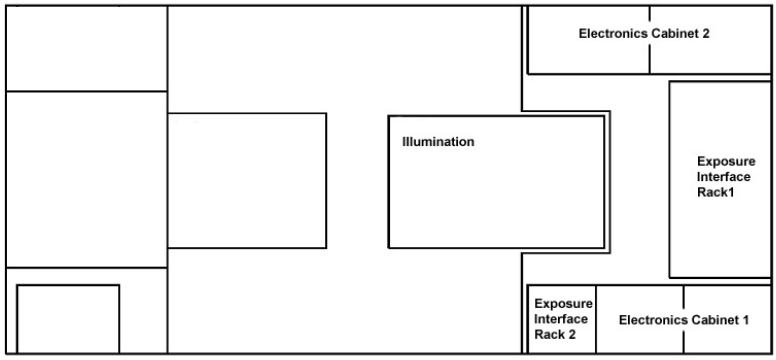
The main functions of the Electrical Layout systems are:

- to monitor, secure and distribute electrical power to all systems.
- to provide a safety structure for human and machine
- to provide a diagnostic structure
- to facilitate internal communications and the interfaces between human and machine

LAYOUT



EXPOSURE UNIT (TOP VIEW)



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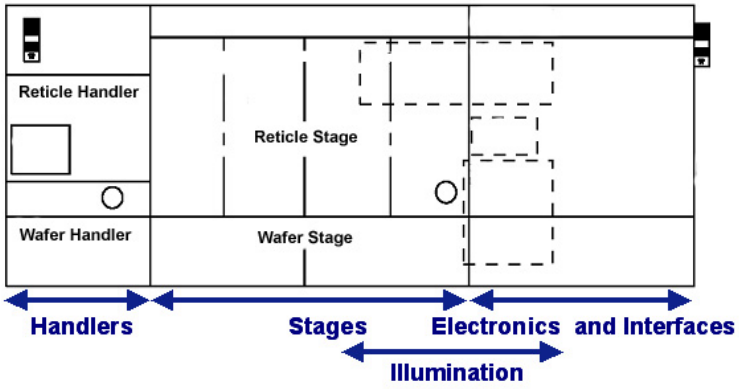
EXPOSURE UNIT (SIDE VIEW)



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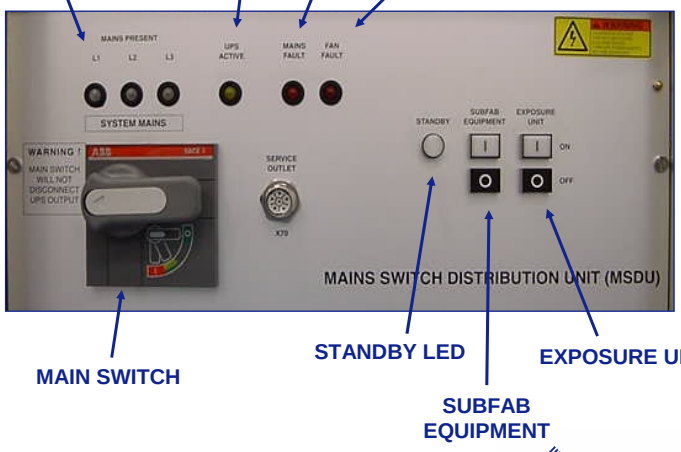
Electrical Layout- Functions

- Monitor, secure and distribute electrical power to modules
- Provide a safety structure for personnel and machine
- Provide diagnostic features
- Facilitate internal communications and interfaces between the machine and operators

MAINS DISTRIBUTION CABINET (front)

POWER CONTROL AND MONITORING



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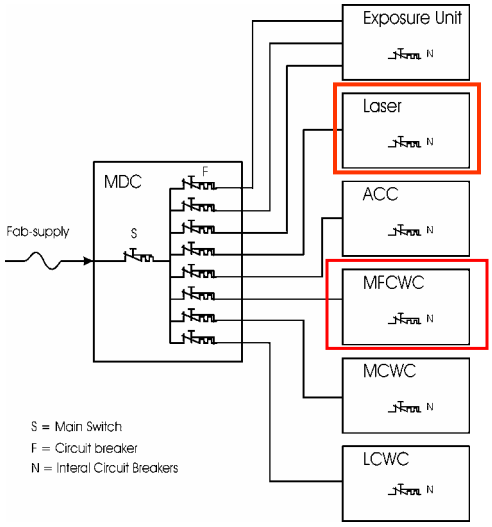
POWER DISTRIBUTION



Direct connected to Facilities on 1100B and later machines

Not installed on current Systems

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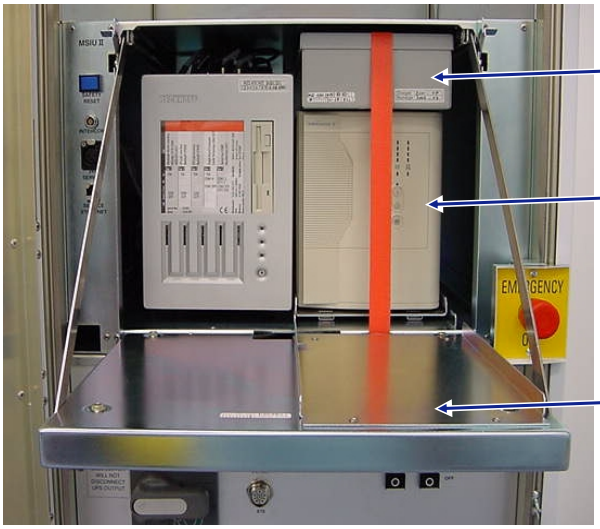
VARIOUS VOLTAGE SUPPLY from MDC

Supply	AC/DC	Applications
400V (3phases)	AC	Main power supply to TWINSCAN sub systems (1100B and on: Eximer Laser power supplied directlyby customer facilities)
230V	AC	Internal power supply, Spare outlets, Uninterruptable Power Supply
100/120/230V	AC	Service outlets
24V	DC	General purposes, Service outlets, Diagnose systems, Safety system

UNINTERRUPTABLE POWER SUPPLY



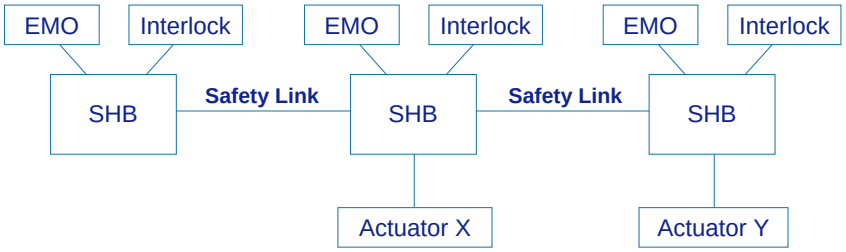
Machine Based Safety Structure (MBSS)

Safety to personnel and machine is provided by means of the Machine Based Safety Structure (MBSS). This system allows, prevents, or interrupts machine functions, based upon conditions that could lead to a hazardous situation.

MAIN COMPONENTS

- EMergency Off button
- (D)UV Interlock
- Safety handling box
- Smoke detector
- Water leak detector
- Machine Status Lamp

SAFETY LINK LAYOUT

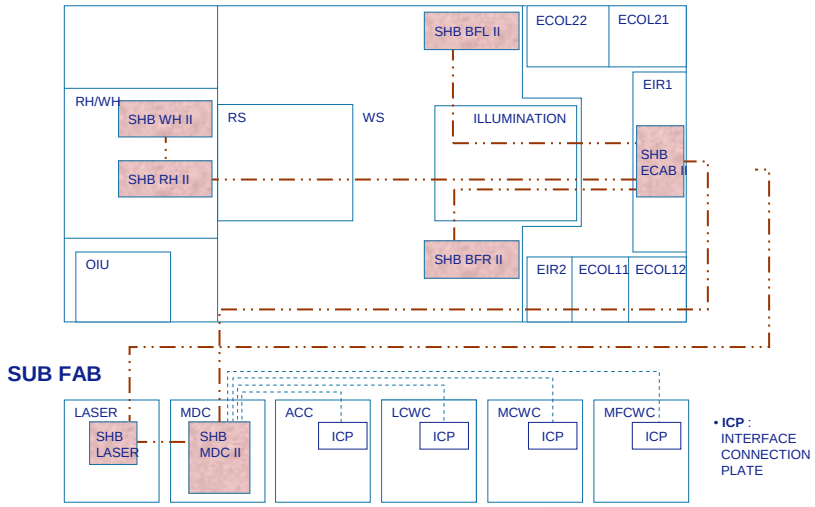


SAFETY HANDLING BOX (SHB)

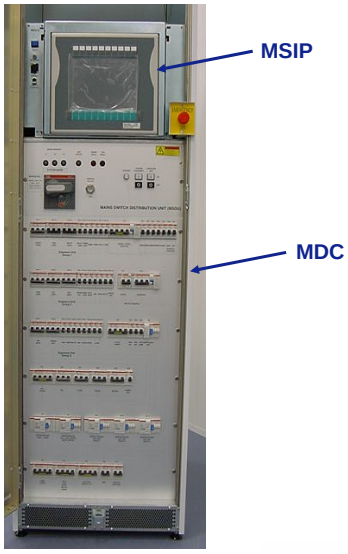
- Collect data on statuses of EMO and Interlocks
- Connect the EMO and Interlocks to the safety links
- Control actuators (power relays and safety shutters)
- Communicate status of EMO and Interlocks with the Diagnostic System

SAFETY HANDLING BOX (SHB)

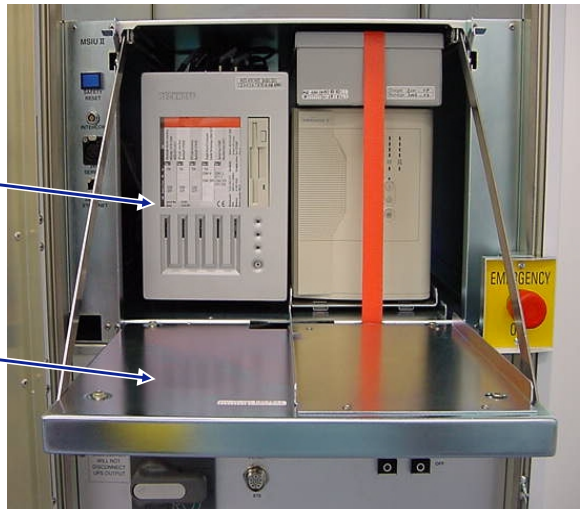
EXPOSURE UNIT



SERVICE INTERFACE PANEL



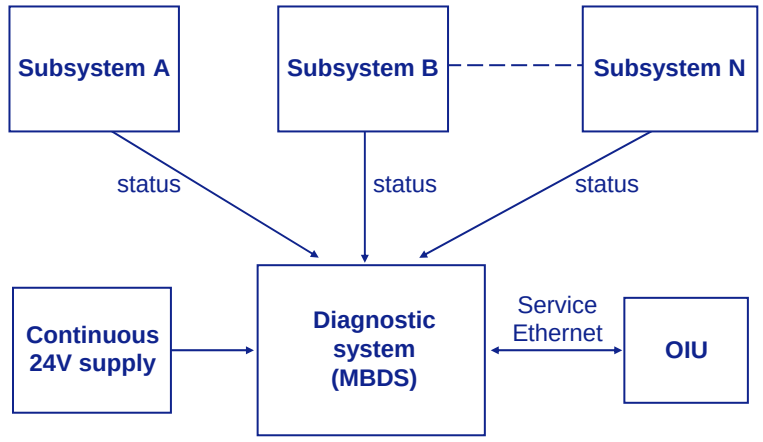
LOCATION OF IPC



MACHINE BASED DIAGNOSTIC SYSTEM

- Monitor all safety-related interlocks, EMO and other emergency related detectors.
- Monitor machine based functions that could not be allocated to a standard function or subsystem of the machine.
- Aid for system installation, for the above mentioned monitoring functions.
- Display the status to the user on 2 identical control panels.
- Logging of alarms.

LAYOUT OF DIAGNOSE STRUCTURE



MACHINE STATUS LAMP (factory default)

	RED	ORANGE	GREEN	BLUE
Exception ALARM	STEADY	OFF	OFF	DONT_CARE
Exception SYSTEM ERROR	STEADY	OFF	OFF	DONT_CARE
Exception PROCESS ERROR	STEADY	OFF	OFF	DONT_CARE
Exception USER ERROR	OFF	STEADY	OFF	DONT_CARE
Exception MATERIAL ERROR	OFF	STEADY	OFF	DONT_CARE
Exception ENVIRONMENT ERROR	OFF	STEADY	OFF	DONT_CARE
Exception lamp WARNING	DONT_CARE	DONT_CARE	BLINK	DONT_CARE
Exception normal WARNING	DONT_CARE	DONT_CARE	DONT_CARE	DONT_CARE
System state IDLE	DONT_CARE	DONT_CARE	DONT_CARE	DONT_CARE
System state SETUP	DONT_CARE	DONT_CARE	DONT_CARE	DONT_CARE
System state READY TO START	DONT_CARE	DONT_CARE	DONT_CARE	DONT_CARE
System state EXECUTING	DONT_CARE	DONT_CARE	STEADY	DONT_CARE
System state FINISHED	DONT_CARE	DONT_CARE	OFF	DONT_CARE
System state PAUSE	DONT_CARE	DONT_CARE	DONT_CARE	DONT_CARE
System state MAINTENANCE	DONT_CARE	DONT_CARE	DONT_CARE	STEADY
System state TEST	DONT_CARE	DONT_CARE	STEADY	DONT_CARE
LAMPS OFF	DONT_CARE	DONT_CARE	DONT_CARE	DONT_CARE

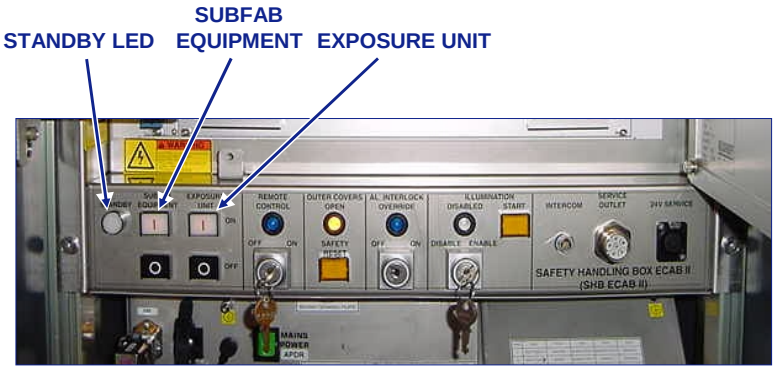
SMOKE SENSOR

- Electronic Cabinets
- Mains Distribution Cabinet
- Laser (optional)
- Air Control Cabinet (optional)
- Metro Frame Circuit Water Cabinet (optional)
- Lens Circuit Water Cabinet (optional)
- Motor Circuit Water Cabinet (optional)
- Wafer Handler (optional)

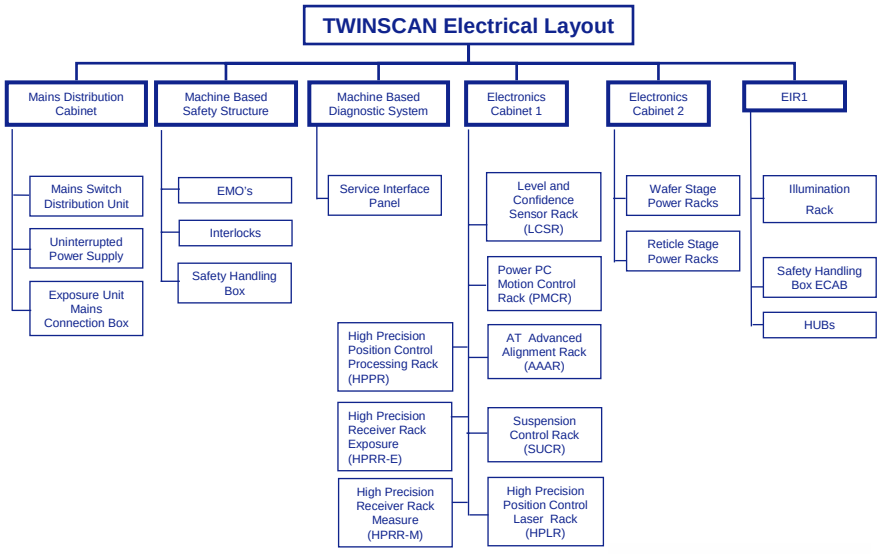
WATER LEAK DETECTOR

- Air Control Cabinet
- Lens Circuit Water Cabinet
- Motor Circuit Water Cabinet
- Metro Frame Circuit Water Cabinet
- LASER (optional)

POWER CONTROL (SHB-ECAB II)



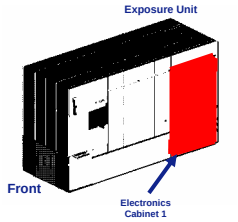
TWINSCAN Electrical Layout

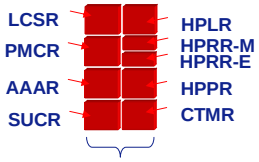


Electronic Cabinet 1

TWINSCAN Electrical Layout

- Mains Distribution Cabinet
  - Mains Switch Distribution Unit
  - Uninterrupted Power Supply
  - Exposure Unit Mains Connection Box
- Machine Based Safety Structure
  - EMO's
  - Interlocks
  - Safety Handling Box
- Machine Based Diagnostic System
  - Service Interface Panel
- Electronics Cabinet 1
  - Level and Confidence Sensor Rack (LCSR)
  - Power PC Motion Control Rack (PMCR)
  - AT Advanced Alignment Rack (AAAR)
  - Suspension Control Rack (SUCR)
  - High Precision Position Control Laser Rack (HPLR)
  - High Precision Position Control Processing Rack (HPPR)
  - High Precision Receiver Rack Exposure (HPRR-E)
  - High Precision Receiver Rack Measure (HPRR-M)
- Electronics Cabinet 2
  - Wafer Stage Power Racks
  - Reticle Stage Power Racks
- EIR1
  - Illumination Rack
  - Safety Handling Box ECAB
  - HUBs





Electronics Cabinet 1

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Electronic Rack 2

TWINSCAN Electrical Layout

- Mains Distribution Cabinet
  - Mains Switch Distribution Unit
  - Uninterrupted Power Supply
  - Exposure Unit Mains Connection Box
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  - EMO's
  - Interlocks
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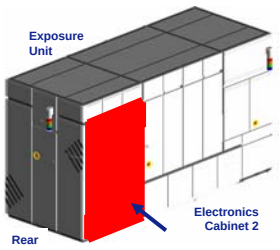

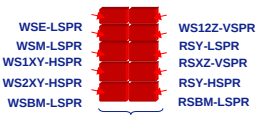

Electronics Cabinet 2

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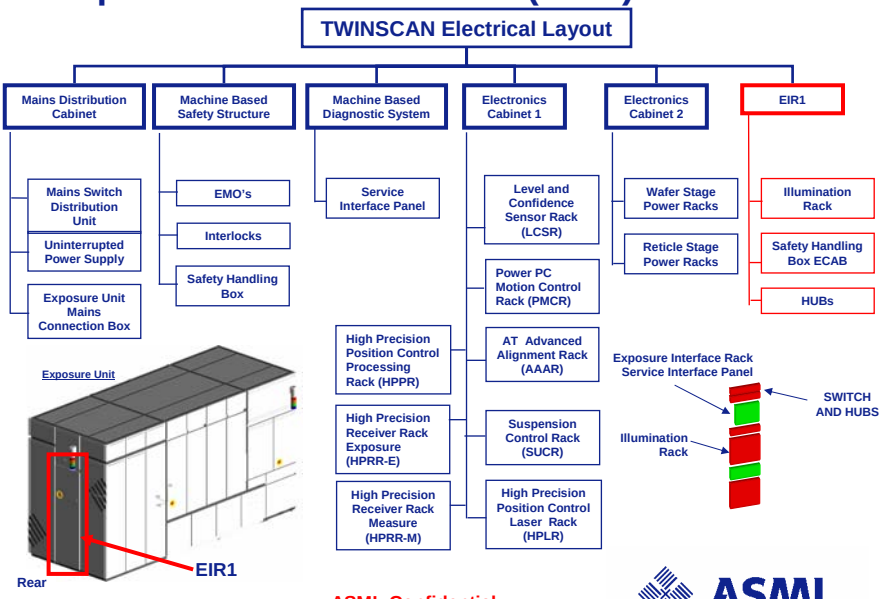
Exposure Interface Rack 1 (EIR1)



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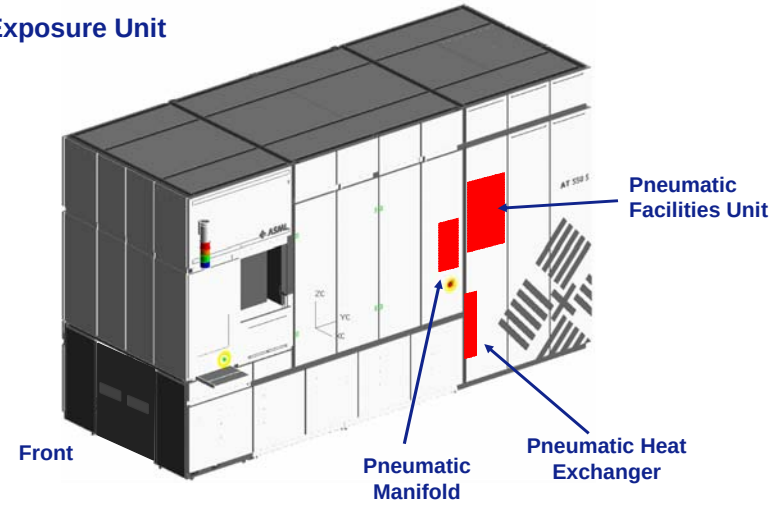
Pneumatic Facilities Unit & Manifold



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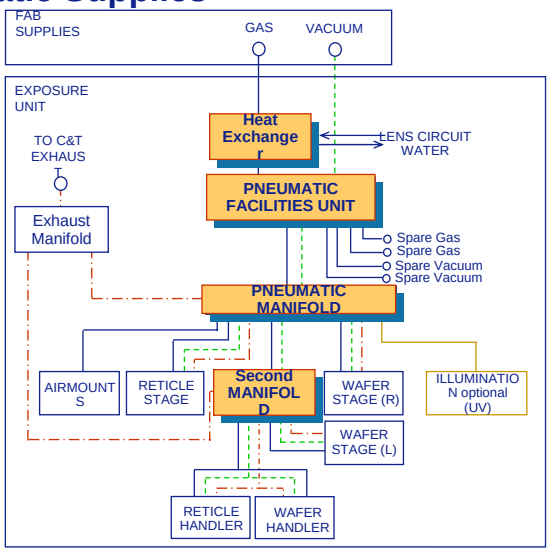
Pneumatic Supplies



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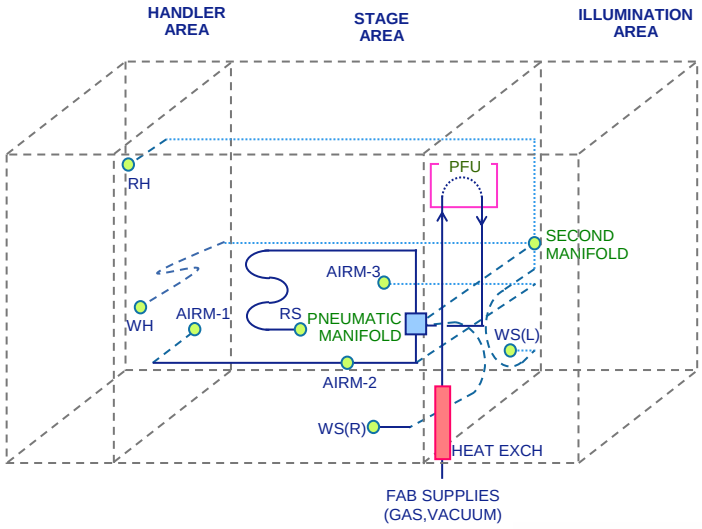
Pneumatics Routing



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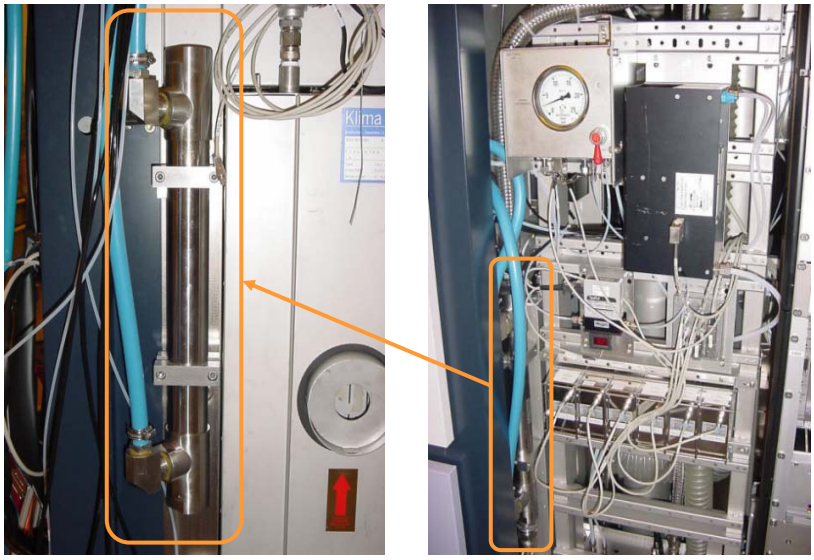
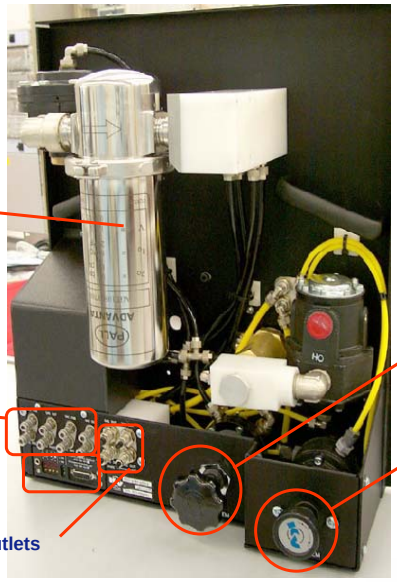
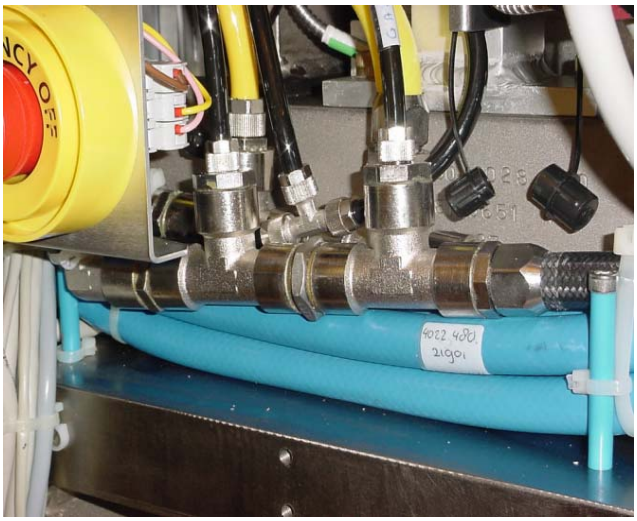
Pneumatic Heat Exchanger



PFU (Pneumatic Facilities Unit)



Second Manifold



Contamination and Temperature Control

Contamination &Temperature Control Objectives

- Adhere to applicable safety procedures
- Set CT software control to OFF
- Set CT software control to ON and initialize CT system
- Measure LCW Ultra Pure Water flows in the modules
- Start and shutdown TWINSCAN software
- Set the TWINSCAN to OFF
- Set the TWINSCAN to ON quickly
- Check CT system stability
- Refill the water cabinets with Ultra Pure Water
- Replace Circuit Water filters

Contamination & Temperature Control Objectives (continued)

- Check UPW and PCW flow
- Check UPW return pressure
- Replace Air Control Cabinet controller battery
- Prepare for setup and initialize the CT system
- Remove and install the Water Cabinet PCW filter
- Remove and install Pneumatic Facilities Unit particle filter
- Measure PFU Facilities Unit gas pressure and vacuum
- Remove and install the Clean Air supply filters

INTRODUCTION

- Temperature accuracy and stability are maintained by:
  - constant supply of temperature controlled clean air
  - constant supply of temperature controlled water
  - exhaust of heated air
- The contamination levels are controlled by:
  - constant supply of clean air
  - exhaust of air where heat and particles are created
  - internal purging of lens and illumination
  - purging of circuit water baths

INTRODUCTION (cont.)

- For Temperature Control:
  - WATER SYSTEMS
  - AIR SYSTEMS (Clean Air Supply)
- For Contamination Control:
  - AIR SYSTEMS (Air Exhaust and Particle Extraction)
  - PURGING SYSTEMS

WATER SYSTEM

- Three separate water circuits are supplied with temperature controlled water by two C&T water cabinets:
  - Lens Circuit Water Cabinet (LCWC)
  - Motor Circuit Water Cabinet (MCWC)

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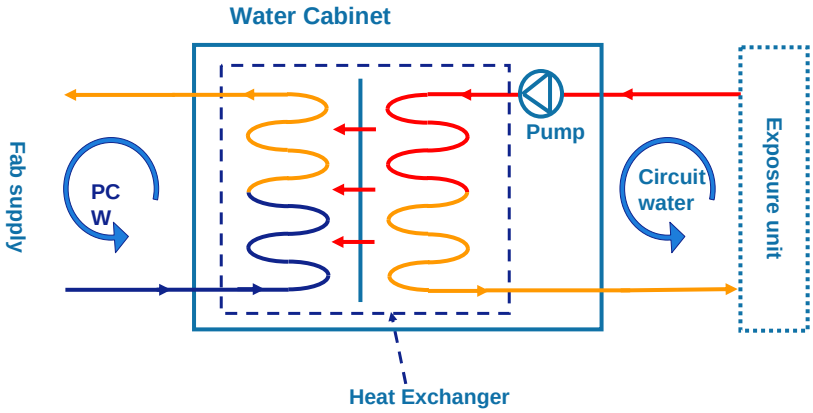
PRINCIPAL OF WATER CABINETS



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WHY PCW AND CIRCUIT WATER?

- Process Cooling Water
  - circulated and conditioned by fab facilities
  - provides the cooling capacity to the water cabinet
- Circuit water
  - circulated and conditioned by water cabinet
  - water specifications are very strict (Ultra Pure Water) to safeguard performance and condition of Exposure Unit

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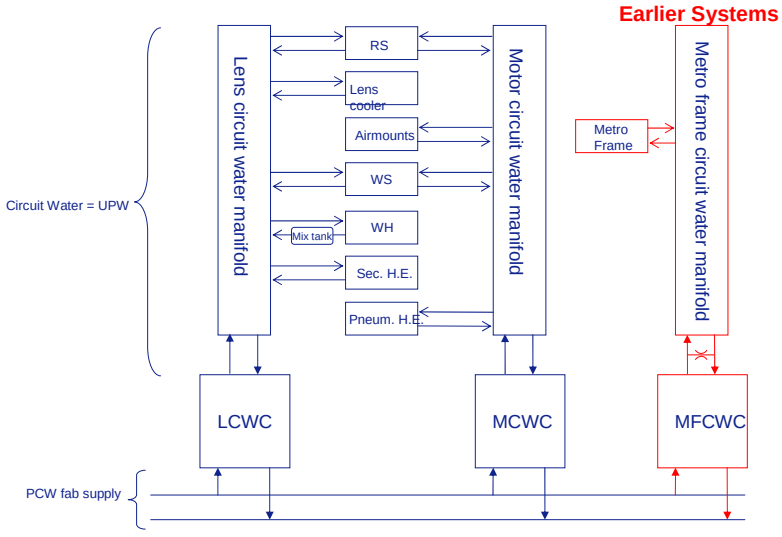
LAYOUT OF WATER SYSTEM



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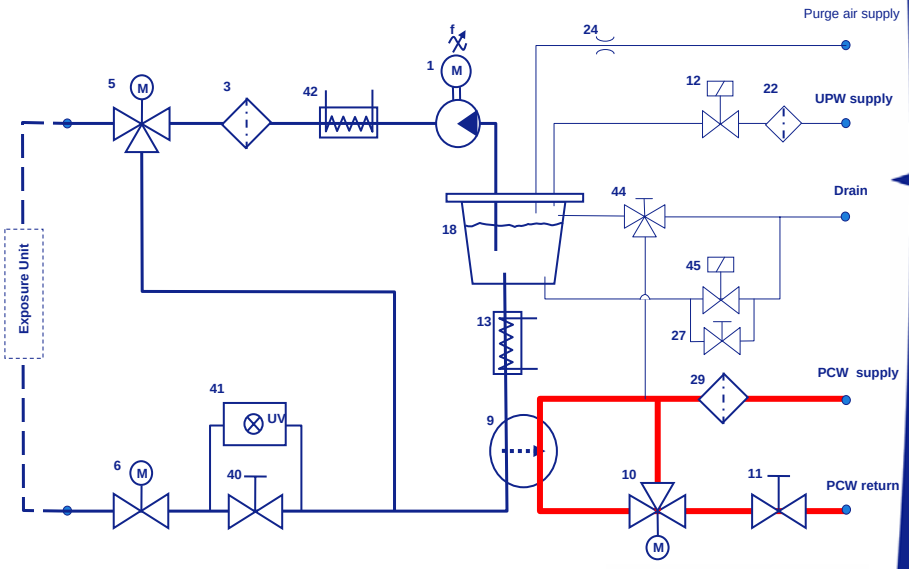
PCW ROUTING



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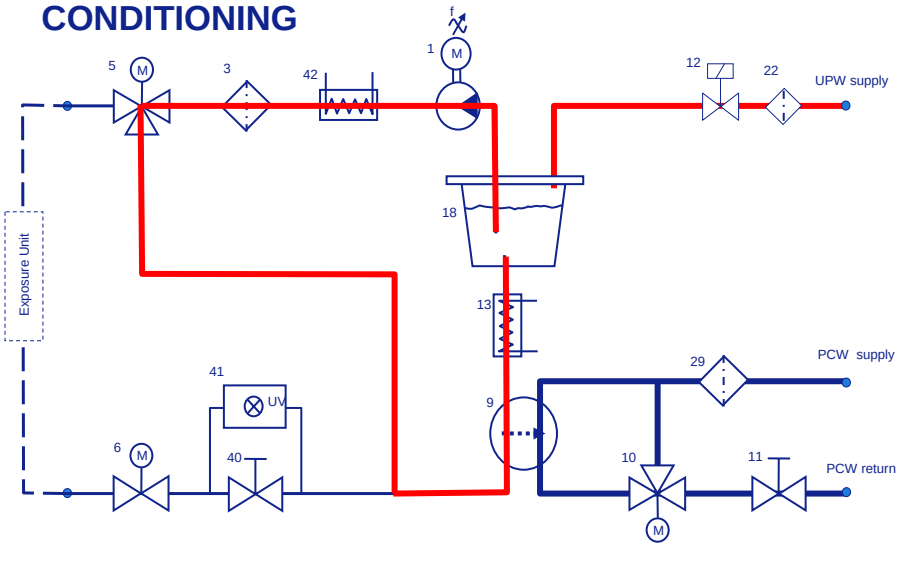
CIRCUIT WATER ROUTING, FILL AND PRE-CONDITIONING



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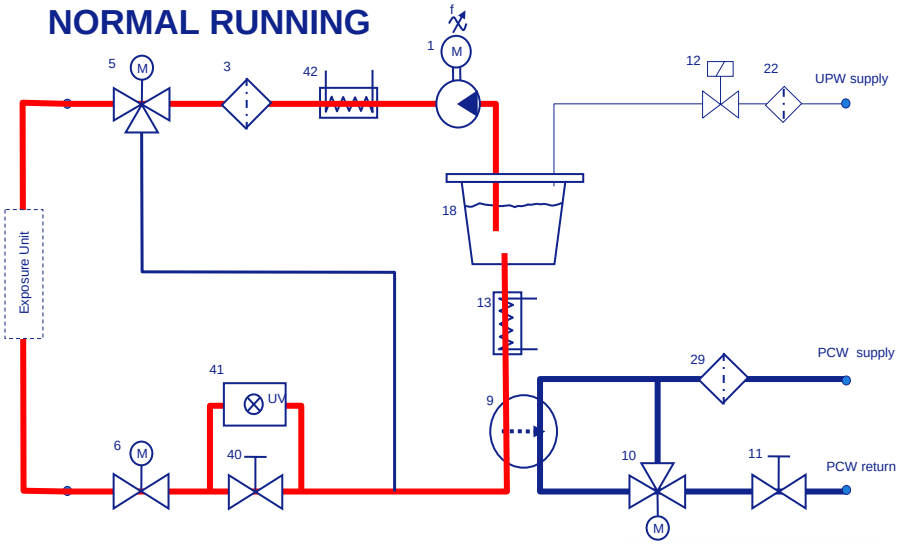
CIRCUIT WATER ROUTING, FILL EU AND NORMAL RUNNING



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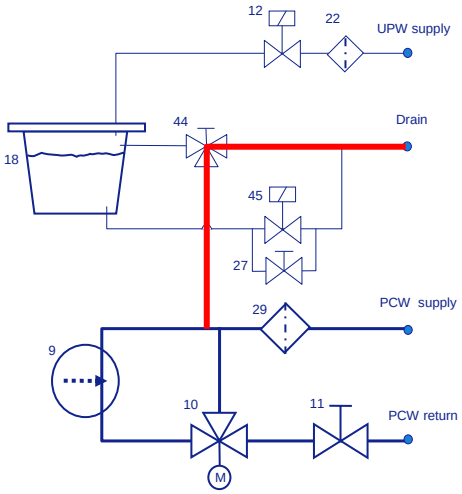
PCW DRAINING



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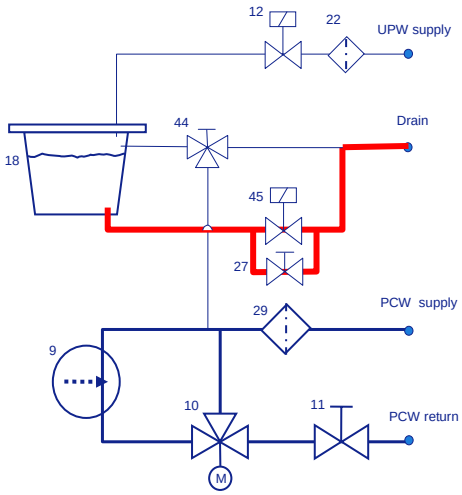
CIRCUIT WATER DRAINING



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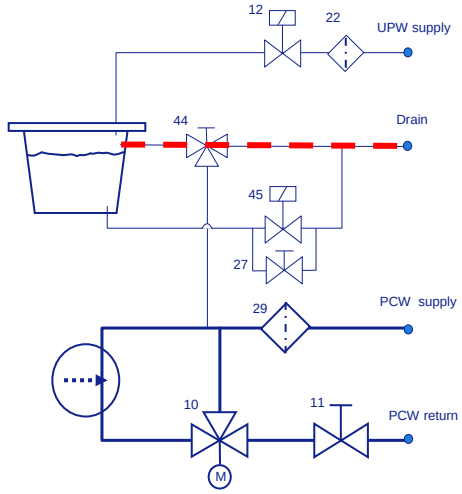
CIRCUIT WATER OVERFLOW



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MAIN COMPONENTS

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WATER CABINET (REAR VIEW)

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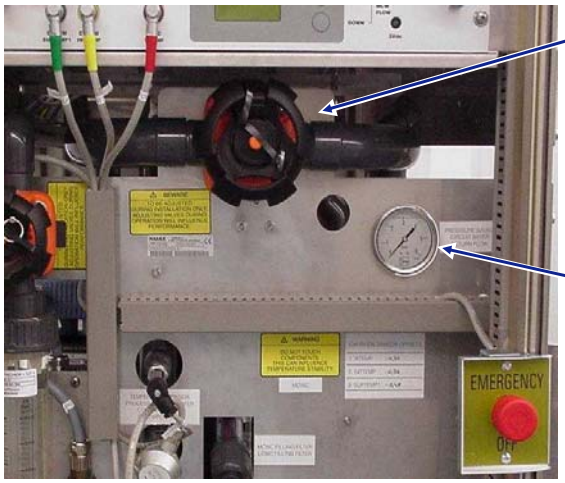
WATER CABINET RIGHT VIEW

CIRCUIT WATER FILTER

SET VALVE & RETURN PRESSURE INDICATOR



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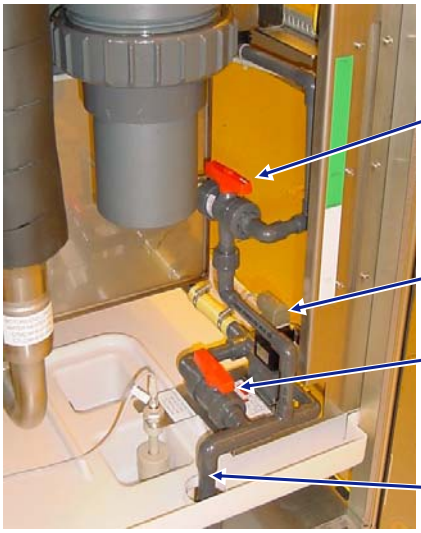
DRAIN VALVES



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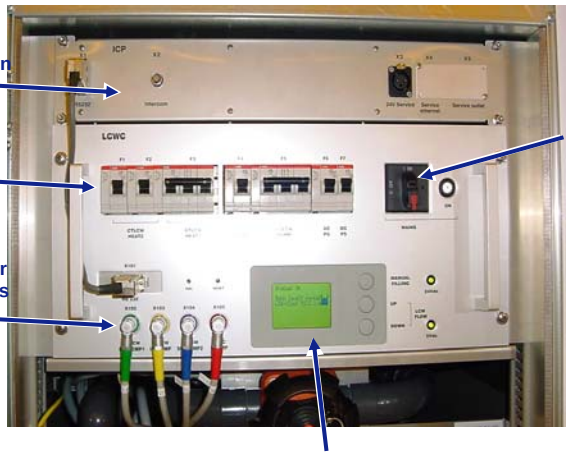
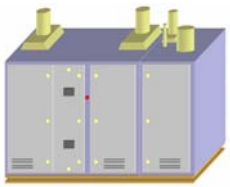
WATER CABINET CONTROLLER



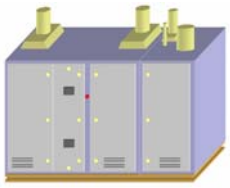
AIR SYSTEM



The Air System Provides the Following Functions:

- control and stabilize the temperature of all internal components.
- prevent contamination from entering the inner compartments by creating overpressure.
- exhaust heated air from Exposure Unit
- extract particles from EU

AIR CONTROL CABINET



- CLEAN AIR SUPPLY
- AIR EXHAUST
- PARTICLE EXTRACTION
- ELECTRONICS
- SOFTWARE

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AIR CONTROL CABINET

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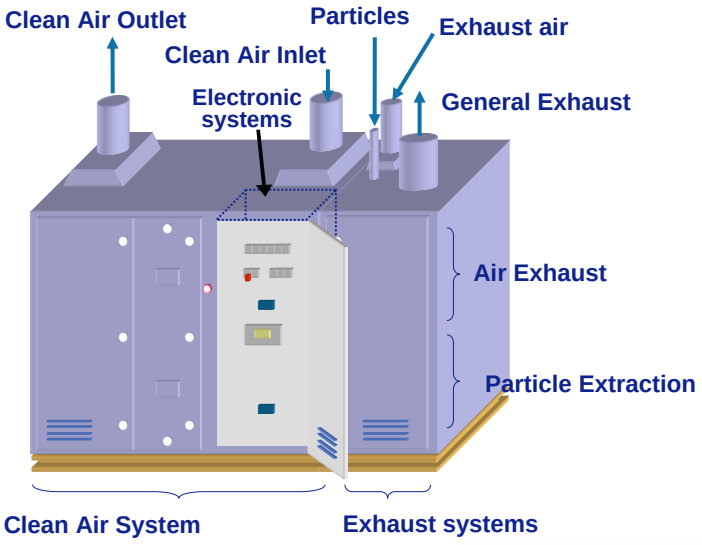
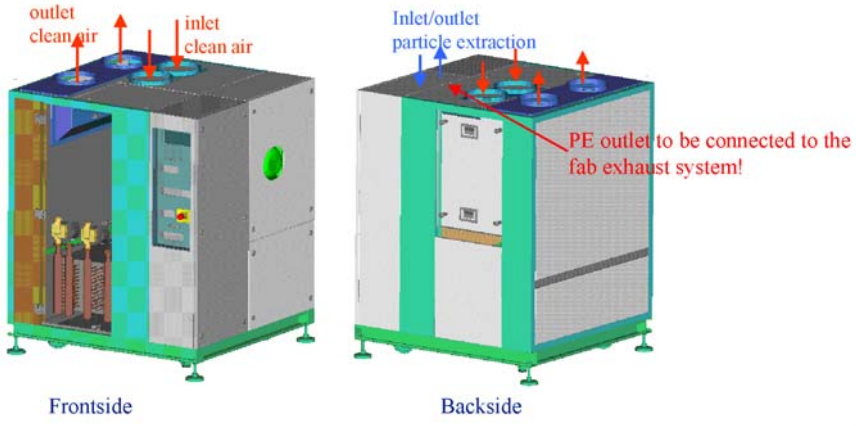
LAYOUT OF AIR CONTROL CABINET (Mark II)



LAYOUT OF AIR CONTROL CABINET (Mark III)



Separate Exhaust Pump:

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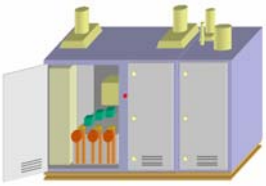
AIR CONTROL CABINET



- **CLEAN AIR SUPPLY**
- AIR EXHAUST
- PARTICLE EXTRACTION
- ELECTRONICS
- SOFTWARE

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MAIN COMPONENTS

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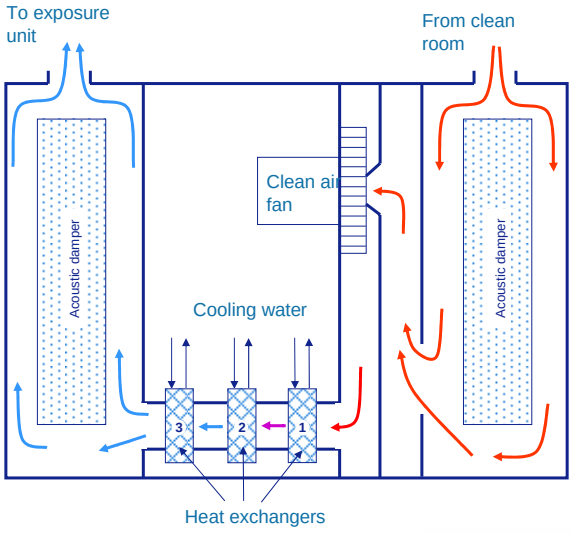
CLEAN AIR SUPPLY SYSTEM



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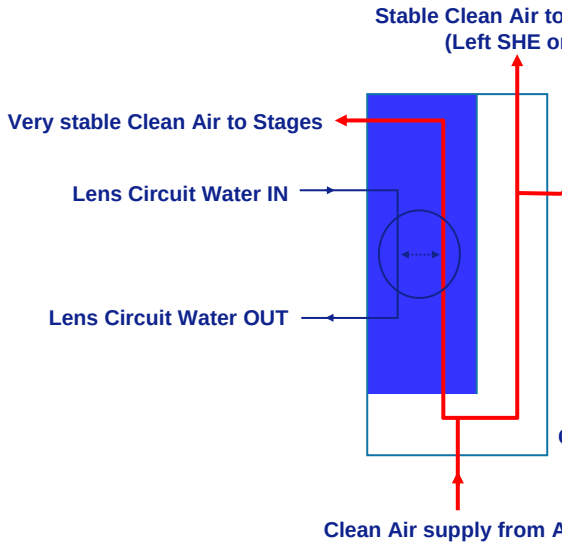
SECONDARY HEAT EXCHANGERS



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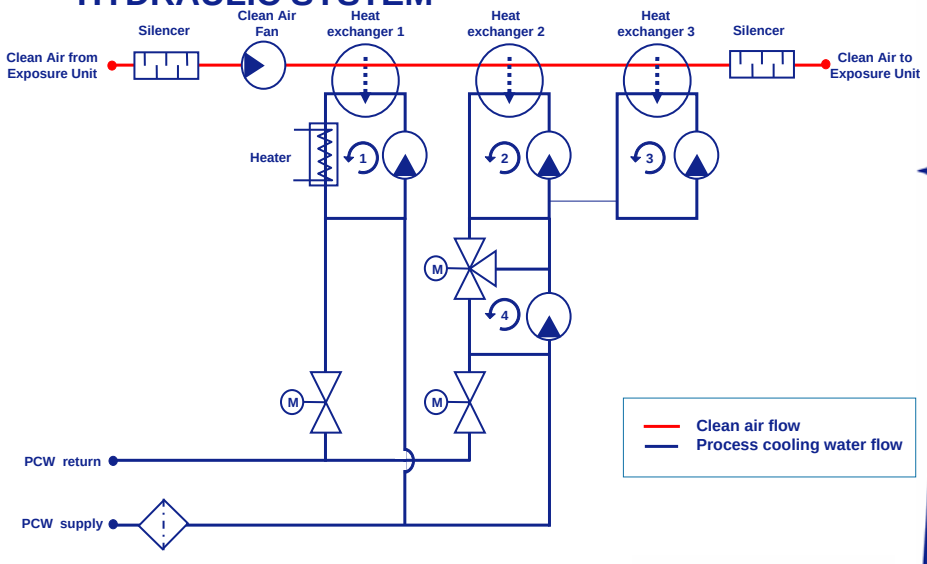
HYDRAULIC SYSTEM



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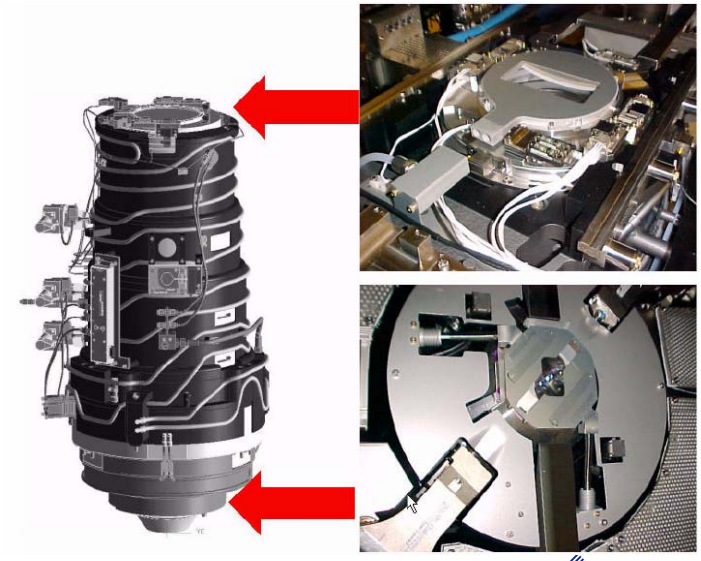
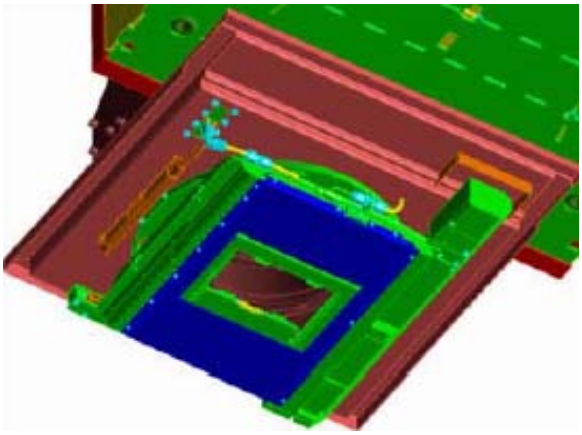
External Purge Hood

- Prevents Crystallization
- Purge Hoods at Lens Top, Lens Bottom, and ReMa
- Fan supplies ACC air to the purge hoods

Purge Hood Components on Lens



Purge Hood Unicom



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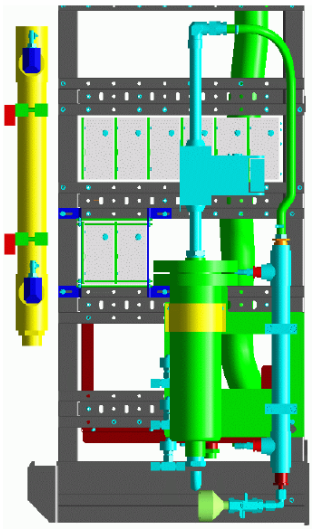
Purge Hood Components at PFU



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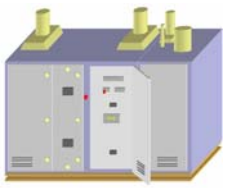
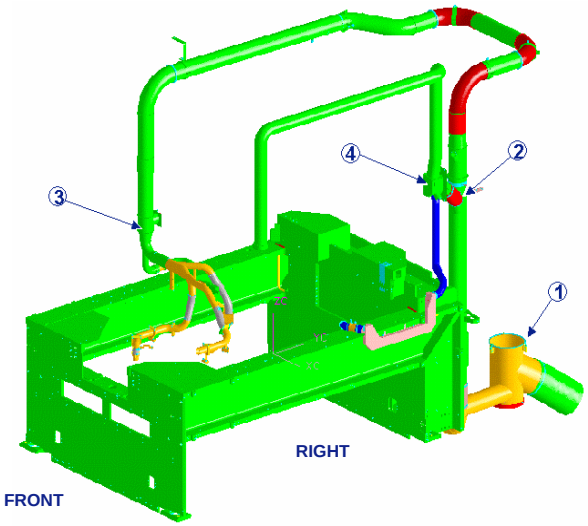
AIR CONTROL CABINET



- CLEAN AIR SUPPLY
- **AIR EXHAUST**
- PARTICLE EXTRACTION
- ELECTRONICS
- SOFTWARE

MAIN COMPONENTS

LAYOUT OF AIR EXHAUST



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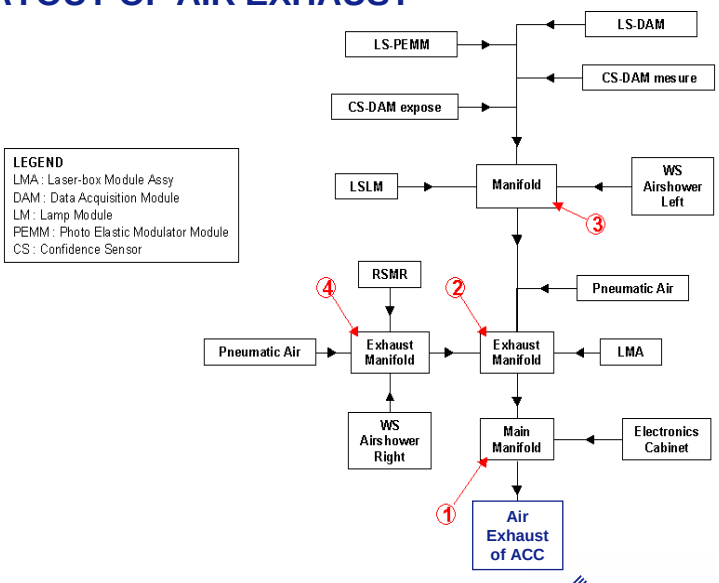
LAYOUT OF AIR EXHAUST



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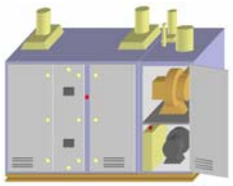
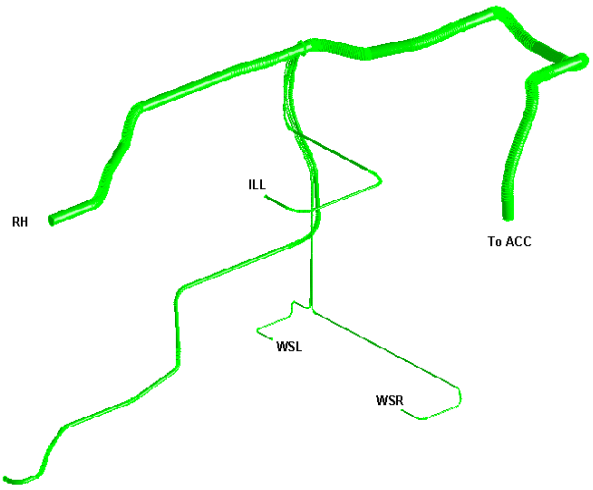
AIR CONTROL CABINET



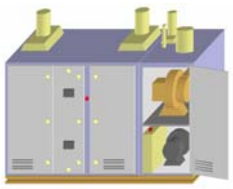
- CLEAN AIR SUPPLY
- AIR EXHAUST
- **PARTICLE EXTRACTION**
- ELECTRONICS
- SOFTWARE

MAIN COMPONENTS

LAYOUT OF PARTICLE EXTRACTION



AIR CONTROL CABINET

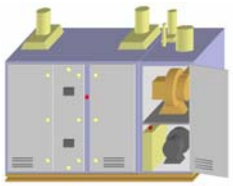


- CLEAN AIR SUPPLY
- AIR EXHAUST
- PARTICLE EXTRACTION
- **ELECTRONICS**
- SOFTWARE

ELECTRONICS (COVER ON)

ELECTRONICS (COVER OFF)

AIR CONTROL CABINET



- CLEAN AIR SUPPLY
- AIR EXHAUST
- PARTICLE EXTRACTION
- ELECTRONICS
- **SOFTWARE**

C&T SOFTWARE

- C&T software is part of the TWINSCAN software located in the OIU / SUN system.
- At startup of the TWINSCAN system, the C&T driver is sent to the C&T Misc. Rack. (CTMR)
- Once initialized, the C&T software driver 'runs' the C&T systems and communicates with TWINSCAN software and other sub system.

C&T SOFTWARE (cont.)

- To stop the CTMR controlling the C&T systems:
  - switch off the supply power of the CTMR
  - or press the reset button
  - the 'terminate' command in the command handler will only terminate the communication between the CTMR and the SUN system (C&T driver continues to control cabinets).
- To stop the CTMR controlling an individual C&T cabinet:
  - set the selective temperature control of the cabinet to 'OFF'
  - the cabinet will continue to run with its last received setpoint and control mode (until it is stopped).

SELECTIVE TEMPERATURE CONTROL

CONTROL MODES

- NOT ACTIVE
  - CT software driver does not control the cabinets; they keep on running with the last received setpoint and control mode
- RECOVERY
  - aggressive control by CT driver to bring temperatures fast to the required level
- STABILIZE
  - much less aggressive control by CT driver to reduce fluctuations to a minimum
- EXPOSURE
  - performance within specs.

Lab Activities

Level 2 Twinscan training is designed around the **Yearly Periodic Maintenance** tasks.

Lab activities include the Yearly PM tasks and, where appropriate, other tasks for proper system operation.

Specific Lab Activities are listed on the Qualification Sheets, and will be explained by your instructor.

Specific Lab Activities- Layout

SET THE MACHINE TO OFF	csel006.ins	To set the machine to off for maintenance or for shipment.
LOCK OUT FOR SERVICE	csel001.loc	To lock mains switches and circuit breakers during service.
REMOVE & INSTALL WC UPW FILLING FILTER	csct130.rep	To remove and install the WC UPW filling filter SERV.481.2819* in the Lens Circuit Water Cabinet (LCWC), the Metroframe Circuit Water Cabinet (MFCWC) and the Motor Circuit Water Cabinet (MCWC).
REMOVE & INSTALL WC PCW FILTER	csct001.rep	To remove and install the WC PCW filter SERV.481.2820* in the Lens Circuit Water Cabinet (LCWC), the Metroframe Circuit Water Cabinet (MFCWC), and the Motor Circuit Water Cabinet (MCWC). **Note 1:** The LCWC is used for this example. Use the applicable software path for the other cabinet. **Note 2:** The MFCWC is not applicable to the single systems (400S, 700S, 750S) or any of the C-specification systems.

Specific Lab Activities- Layout

REMOVE & INSTALL CIRCUIT WATER FILTER in MCWC/LCWC/MFCWC	csct003.rep	To remove and install the Circuit Water (CW) filter SERV 481 2818* in the Motor Circuit Water Cabinet (MCWC) the Lens Circuit Water Cabinet (LCWC) and the Metroframe Circuit Water Cabinet (MFCWC). **Note 1:** The MCWC is used for this example. Use the applicable software path for the other cabinet. **Note 2:** The MFCWC is not applicable for the 400S, 700S, 750S systems. **Note 3:** The MFCWC was only installed on the early machine types AT:400, AT:750, AT:850 and AT:1100
REMOVE & INSTALL ESI or DONALDSON FILTERS (location specific)	csct174.rep csct113.rep csct173.rep	To remove and install, or replace, the particle extraction filters.
REPLACE ACC CONTROLLER BATTERY	csct085.rep	To replace the Air Control Cabinet (ACC) controller battery.
REMOVE & INSTALL PNEUMATIC FACILITIES UNIT PARTICAL FILTER	cspn004.rep	To replace the filters for maintenance.

Specific Lab Activities- Layout

SET MACHINE TO ON QUICKLY	csel002.ins	To set the machine to on after maintenance.
REFILL WATER CABINETS WITH UPW	csct086.adj	To refill the Lens Circuit Water Cabinet (LCWC), the Metroframe Circuit Water Cabinet (MFCWC) and the Motor Circuit Water Cabinet (MCWC) with Ultra Pure Water (UPW).
CHECK SYSTEM STABILITY BY MEANS OF C&T CONTROL STATUS	csct051.per	Check if the system is stable by means of the C&T-status.