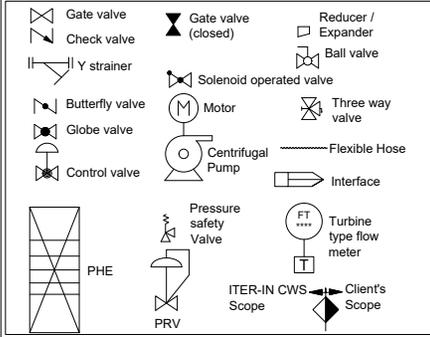


PHE- DNBCH SERVICE	PRIMARY DM Water	SECONDARY SW WATER
TEMP. IN (°C)	(44°)	(14)
TEMP. OUT (°C)	(20)	(19)
FLOW RATE	(10°) Kg/s	(22°) Kg/s

**Note:**

- Centrifugal pumps: 2 nos. (1 working + 1 standby)
- Water polishing unit: common for all CWS loops with multiple stream provided by the purchaser
- Drains have to be provided at the lowest point and vents to be provided at the highest point on cooling network.
- All the drains shall be connected to the common drain pipe to sump.
- Drain connection after isolation valves shall be of flexible hose.
- For the connection of all instruments with Pipes or equipments Refer Hook-up Drawing.
- Clients need to ensure their own bypass arrangement for the individual system with globe valve.
- All the vents line shall be of funnel type and shall be connected with common line to the common drain line to sump.
- For the hydro test completion in the absence of clients, contractor has to arrange temporary arrangement for the completion of HT and make available all the necessary items at site at their own for HT.
- Nitrogen venting should be routed to the outside of the building at appropriate height for safe disposal .
- Drain locations marking in this drawing are only indicative, final location shall be provided only after finalization of routing.
- Scope Legend  
CWS Scope Client's Scope
- \*Values may change according to finalization of design

**Table: 01**



**Table: 02**

**Process Code**  
 Ultra pure water = UP  
 Chilled water = CH  
 Soft water = SW  
 CT S/R water = CT  
 Nitrogen = N2  
 Dimineralized water = DM

**Table: 03**

**Line Identification**  
 DNXXX-XXX-XX  
 Process Code  
 Pipe Material Code (CS & SS)  
 Line Size (DN)

**Table: 04**

TG : TEMPERATURE GAUGE  
 PG : PRESSURE GAUGE  
 LG : LEVEL GAUGE  
 DO : DISSOLVE OXYGEN METER  
 CM : CONDUCTIVITY METER  
 TT : TEMPERATURE TRANSMITTER  
 PT : PRESSURE TRANSMITTER  
 LT : LEVEL TRANSMITTER  
 TI : TEMPERATURE INDICATOR  
 PI : PRESSURE INDICATOR  
 LI : LEVEL INDICATOR  
 FI : FLOW INDICATOR  
 FT : FLOW TRANSMITTER  
 GV : GATE VALVE  
 GBV : GLOBE VALVE  
 BFV : BUTTERFLY VALVE  
 NRV : NON-RETURN VALVE  
 BLV : BALANCING VALVE  
 CV : CONTROL VALVE  
 PC : PRESSURE CONTROLLER  
 LP : LOW PRESURE

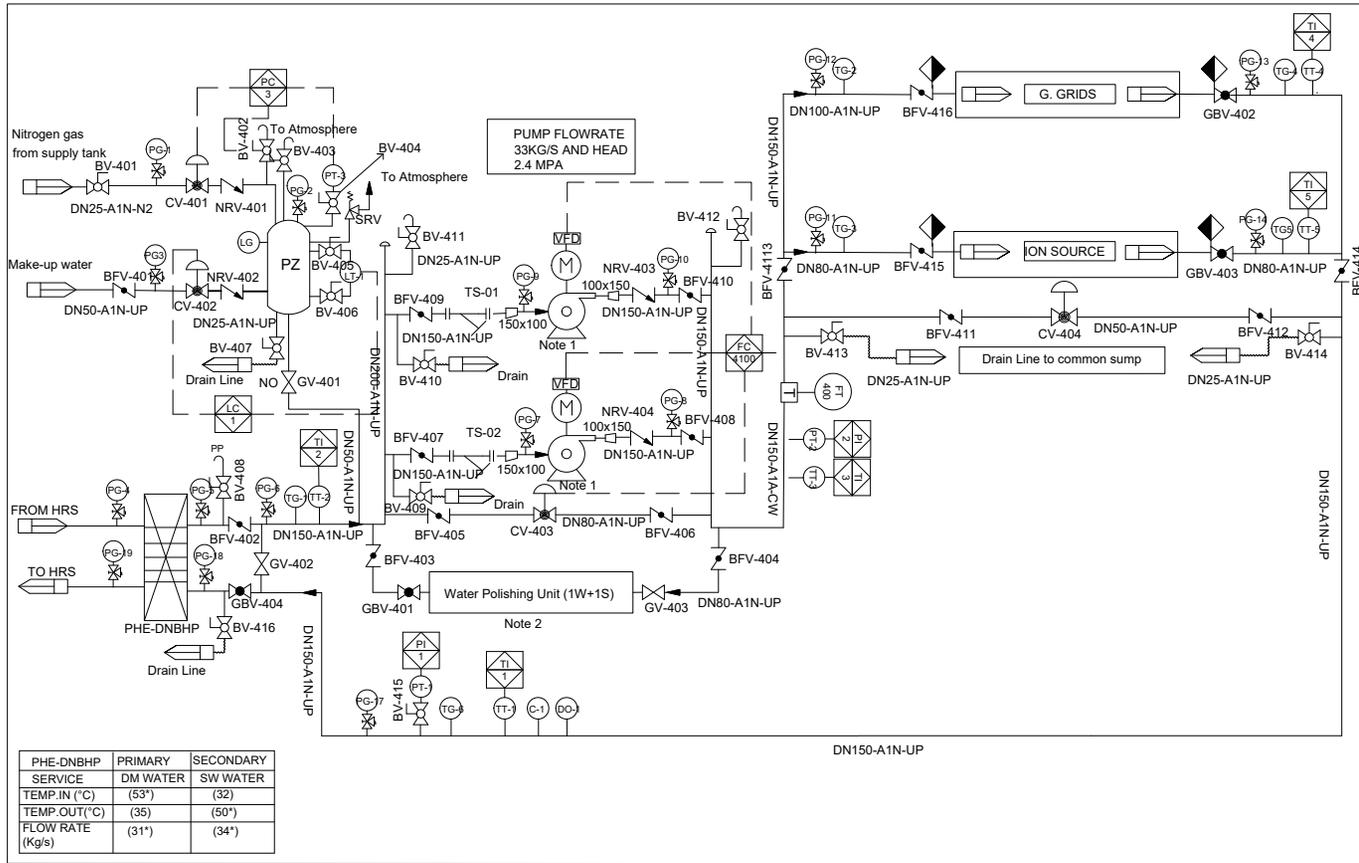
DNB : DINGNOSTIC NEUTRAL BEAM  
 BLC : BEAM LINE COMPONENTS  
 YS : Y-TYPE STRAINER  
 M : MOTOR  
 VFD : VARIABLE DRIVE FREQUENCY  
 HRS : HEAT REJECTION SYSTEM  
 T : TURBINE TYPE FLOW METER  
 PP : PRESSURE POINT  
 TS : T-TYPE STRAINER  
 FC : FLOW CONTROLLER  
 LC : LEVEL CONTROLLER  
 PZ : PRESSURIZER FLG. : Flanged connection

Sheet Title: DNBCH PUMP, PHE & PIPING Distribution, New Laboratories , IPR

Drawing Title: Piping & Instrumentation Diagram For DNBCH

IPR	Pre'd By:	MKR	
	Rev'd By:	MSH	
Status	Draft	App'd By:	DKG
Sheet:1/1	NTS	Ref. Drawing	IPR-CWS-DNBCH-PID
Dwg. No.	IPR-CWS-DNBCH-PID	Rev No.	1.6





PHE-DNBHP SERVICE	PRIMARY DM WATER	SECONDARY SW WATER
TEMP.IN (°C)	(53*)	(32)
TEMP.OUT(°C)	(35)	(50*)
FLOW RATE (Kg/s)	(31*)	(34*)

- Note:
- Centrifugal pumps: 2 nos. (1 working + 1 standby)
  - Water polishing unit: common for all CWS loops with multiple stream provided by the purchaser
  - Drains have to be provided at the lowest point and vents to be provided at the highest point on cooling network.
  - All drains shall be connected to the common drain pipe to sump.
  - Drain connection after isolation valves shall be of flexible hose.
  - For the connection of all instruments with Pipes or equipments Refer Hook-up Drawing.
  - Clients need to ensure their own bypass arrangement for the individual system with globe valve.
  - All the vents line shall be of funnel type and shall be connected with common line to the common drain line to sump.
  - For the hydro test completion, in the absence of clients, contractor has to arrange temporary arrangement for the completion of HT and make available all the necessary items at site at their own for HT.
  - Nitrogen venting should be routed to the outside of the building at appropriate height for safe disposal .
  - Drain locations marking in this drawing are only indicative, final location shall be provided only after finalization of routing.
  - Scope Legend
  - \*Values may change according to finalization of design

Table: 01

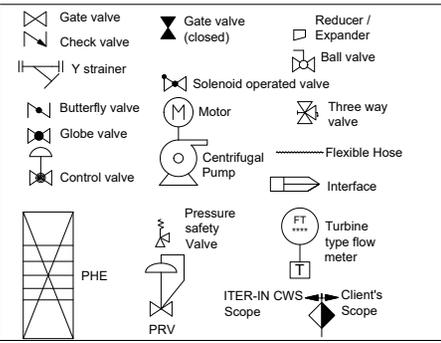


Table: 02

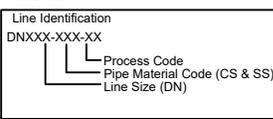


Table: 03

Process Code  
 Ultra pure water = UP  
 Chilled water = CH  
 Soft water = SW  
 CT S/R water = CT  
 Nitrogen = N2  
 Demineralized water = DM

Table: 04

TG : TEMPERATURE GAUGE  
 PG : PRESSURE GAUGE  
 LG : LEVEL GAUGE  
 DO : DISSOLVE OXYGEN METER  
 CM : CONDUCTIVITY METER  
 TT : TEMPERATURE TRANSMITTER  
 PT : PRESSURE TRANSMITTER  
 LT : LEVEL TRANSMITTER  
 TI : TEMPERATURE INDICATOR  
 PI : PRESSURE INDICATOR  
 LI : LEVEL INDICATOR  
 FI : FLOW INDICATOR  
 FT : FLOW TRANSMITTER  
 GV : GATE VALVE  
 GBV : GLOBE VALVE  
 BFV : BUTTERFLY VALVE  
 NRV : NON-RETURN VALVE  
 BLV : BALANCING VALVE  
 CV : CONTROL VALVE

PP : PRESSURE POINT  
 TS : T-TYPE STRAINER  
 YS : Y-TYPE STRAINER  
 M : MOTOR  
 VFD : VARIABLE DRIVE FREQUENCY  
 HRS : HEAT REJECTION SYSTEM  
 T : TURBINE TYPE FLOW METER

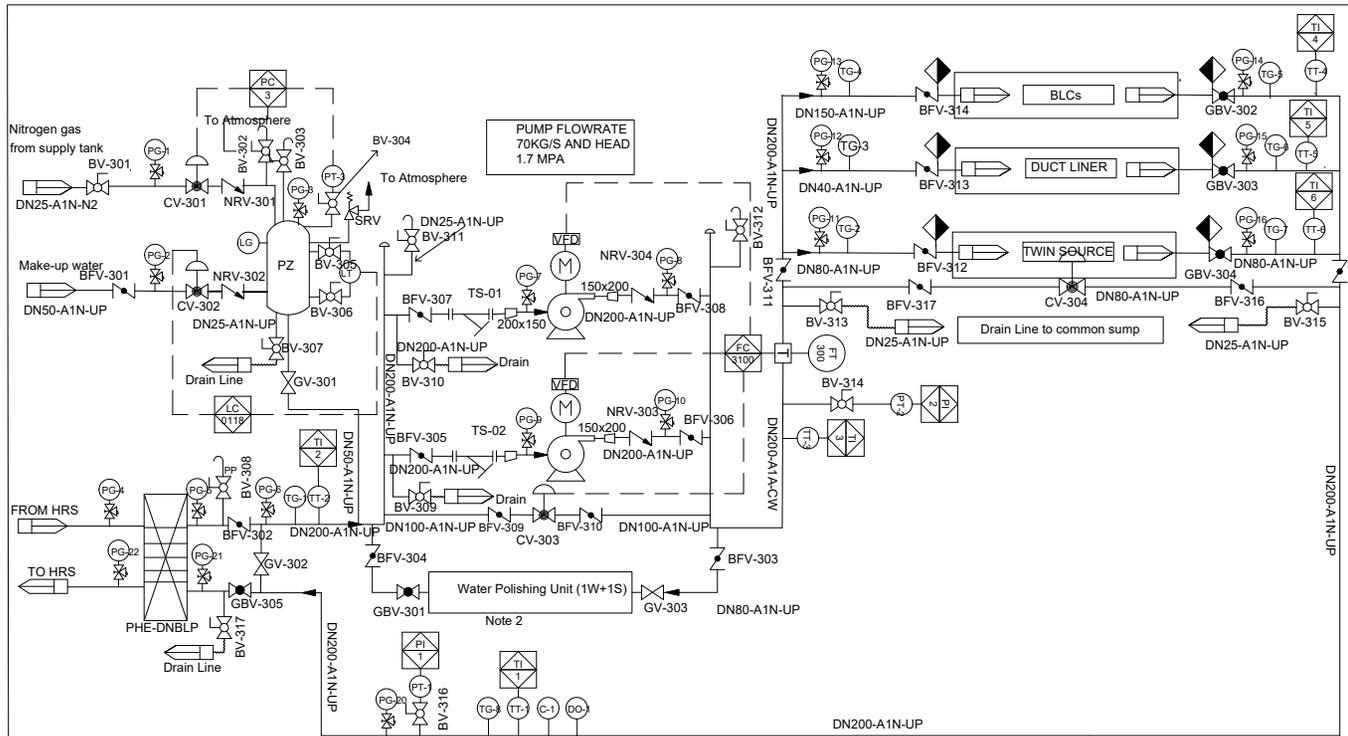
FC : FLOW CONTROLLER  
 LC : LEVEL CONTROLLER  
 PC : PRESSURE CONTROLLER  
 DNB : DINGNOSTIC NEUTRAL BEAM  
 LP : LOW PRESURE  
 PZ : PRESSURIZER  
 BLC : BEAM LINE COMPONENTS

Sheet Title: DNBHP PUMP, PHE & PIPING Distribution, New Laboratories , IPR

Drawing Title: Piping & Instrumentation Diagram For DNBHP

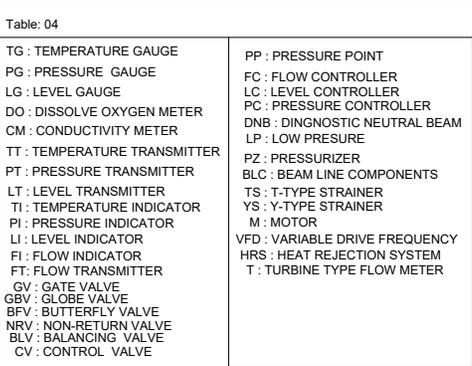
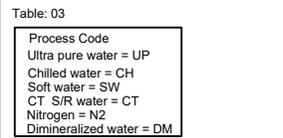
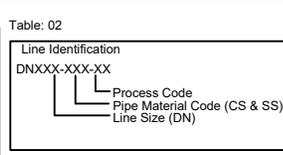
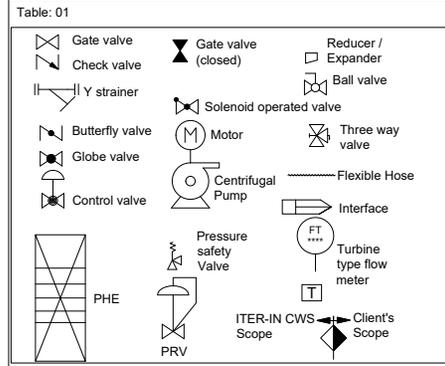
IPR		Pre'd By:	MKR	
		Rev'd By:	MSH	
Status	Draft	App'd By:	DKG	
Sheet: 1/1	NTS	Ref. Drawing	IPR-CWS-DNBHP-PID	
Dwg. No.	IPR-CWS-DNBHP-PID	Rev No.	1.6	





PHE-DNBLP SERVICE	PRIMARY DM WATER	SECONDARY SW WATER
TEMP. IN (°C)	(43°)	(32)
TEMP. OUT (°C)	(35)	(41°)
FLOW RATE (Kg/s)	(66°)	(66°)

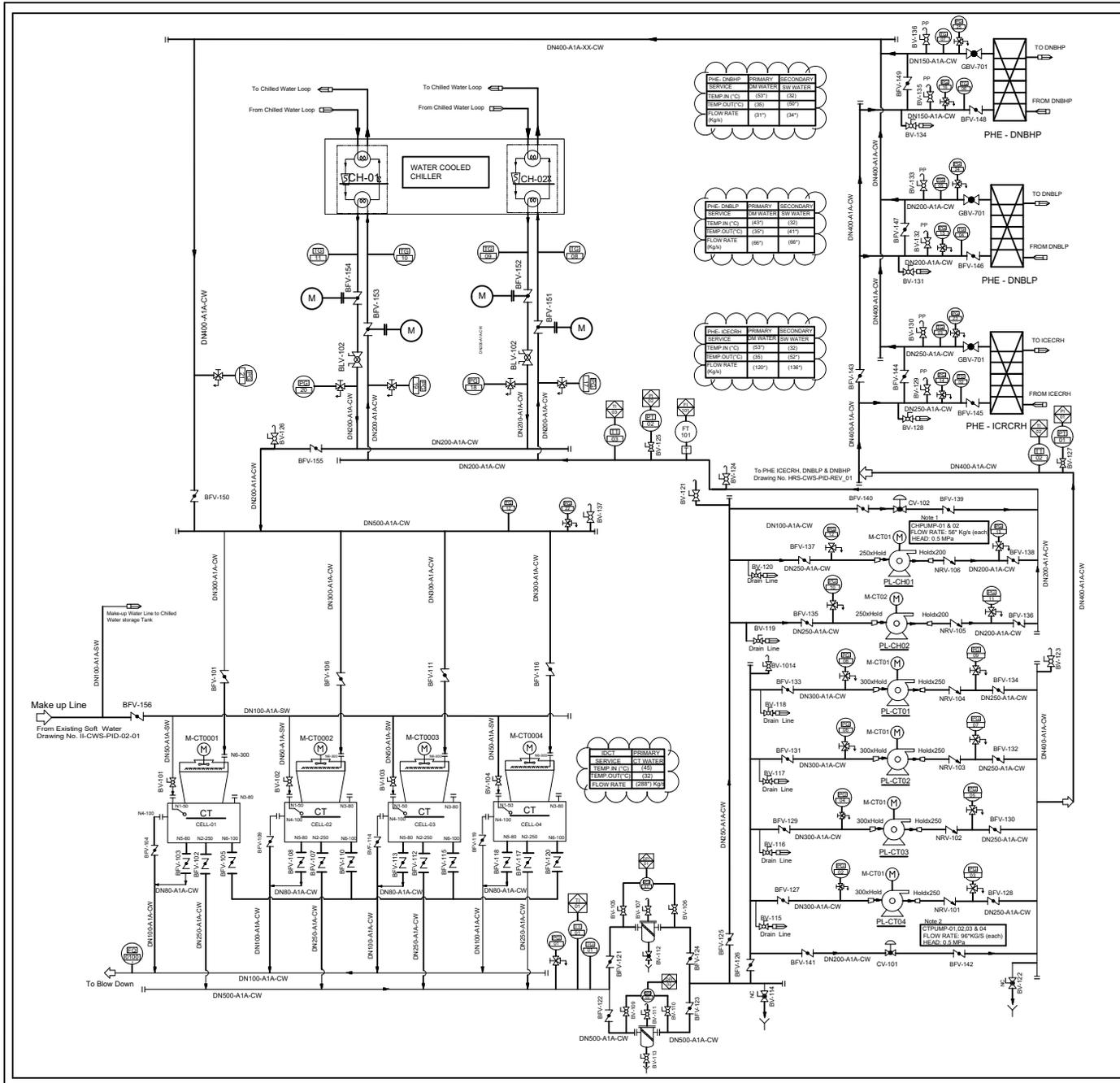
- Note:
- Centrifugal pumps: 2 nos. (1 working + 1 standby)
  - Water polishing unit: common for all CWS loops with multiple stream provided by the purchaser
  - Drains have to be provided at the lowest point and vents to be provided at the highest point on cooling network.
  - All drains shall be connected to the common drain pipe to sump.
  - Drain connection after isolation valves shall be of flexible hose.
  - For the connection of all instruments with Pipes or equipments Refer Hook-up Drawing.
  - Clients need to ensure their own bypass arrangement for the individual system with globe valve.
  - All the vents line shall be of funnel type and shall be connected with common line to the common drain line to sump.
  - For the hydro test completion, in the absence of clients, contractor has to arrange temporary arrangement for the completion of HT and make available all the necessary items at site at their own for HT.
  - Nitrogen venting should be routed to the outside of the building at appropriate height for safe disposal.
  - Drain locations marking in this drawing are only indicative, final location shall be provided only after finalization of routing.
  - Scope Legend
  - \*Values may change according to finalization of design



Sheet Title: DNBLP PUMP, PHE & PIPING Distribution, New Laboratories, IPR

Drawing Title: Piping & Instrumentation Diagram For DNBLP

IPR	Pre'd By:	MKR	
	Rev'd By:	MSH	
Status	Draft	App'd By:	DKG
Sheet: 1/1	NTS	Ref. Drawing	IPR-CWS-DNBLP-PID
Dwg. No.	IPR-CWS-DNBLP-PID	Rev No.	1.6



- Note:
- Centrifugal pumps: 2 nos. (1 working + 1 standby)
  - Centrifugal pumps: 4 nos. (3 working + 1 standby)
  - Drains have to be provided at the lowest point and vents to be provided at the highest point network.
  - Chilled water overflow and drain line to main drain header.
  - All drains shall be connected to the common drain pipe to sump.
  - Drain connection after isolation valves shall be of flexible hose.
  - For the connection of all instruments with Pipes or equipments Refer Hook-up Drawing.
  - Clients need to ensure their own bypass arrangement for the individual system with globe valve.
  - All the vents line shall be of funnel type and shall be connected with common line to the common drain line to sump.
  - For hydro test completion, in the absence of clients, contractor has to arrange temporary arrangement for the completion of HT & make available all the necessary items at site at their own for HT.
  - Nitrogen venting should be routed to the outside of the building at appropriate height for safe disposal.
  - Drain locations marking in this drawing are only indicative, final location shall be provided only after finalization of routing.
  - Water Cooled Chillers Two nos. (one working and one standby)
  - PHE primary & secondary side process specification are provided.
  - \*Values may change according to finalization of design

Table: 01

Line Identification	DNXXX-XX-XX	Process Code	Pipe Material Code (CS & SS)	Line Size (DN)
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Table: 02

Process Code	Ultra pure water = UP	Soft water = SW	Chilled water = CH	CT S/R water = CT	Dimineralized water = DM	Nitrogen = N2
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Table: 03

Gate valve	Motor	Flexible Hose
Check valve	Centrifugal	Interface
Butterfly valve	Pump	Reducer / Expander
Globe valve	Thermal Insulation	Turbine type flow meter
Control valve	Pressure safety Valve	PHE
Ball valve	Y type strainer	Balancing Valve

Table: 04

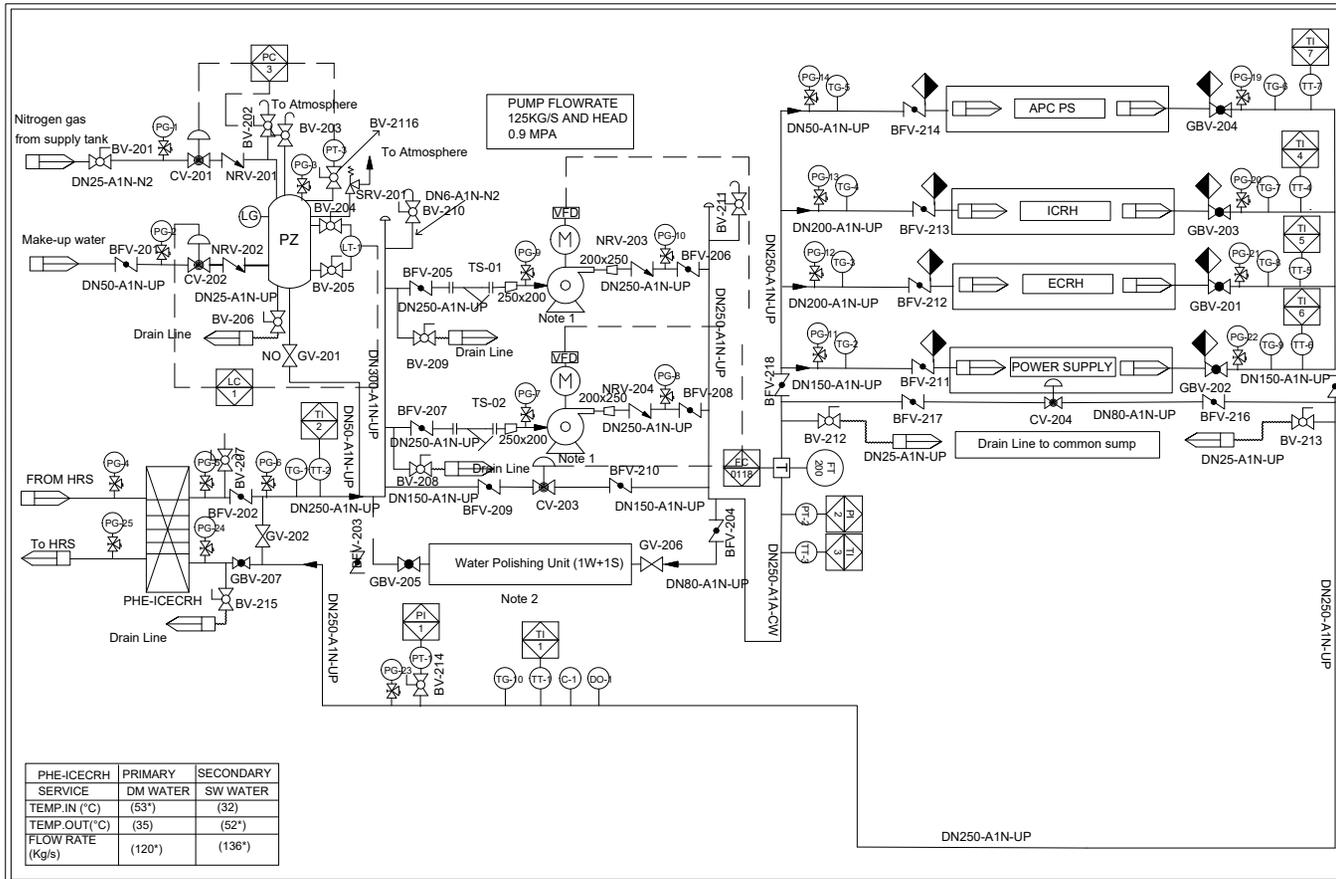
TG : TEMPERATURE GAUGE	BV : BALANCING VALVE
PG : PRESSURE GAUGE	CV : CONTROL VALVE
LG : LEVEL GAUGE	PP : PRESSURE POINT
DD : DISSOLVE OXYGEN METER	TS : T-TYPE STRAINER
CM : CONDUCTIVITY METER	YS : Y-TYPE STRAINER
TT : TEMPERATURE TRANSMITTER	M : MOTOR
PT : PRESSURE TRANSMITTER	HRS : HEAT REJECTION SYSTEM
LT : LEVEL TRANSMITTER	T : TURBINE TYPE FLOW METER
TI : TEMPERATURE INDICATOR	FC : FLOW CONTROLLER
PI : PRESSURE INDICATOR	LC : LEVEL CONTROLLER
LI : LEVEL INDICATOR	PC : PRESSURE CONTROLLER
FI : FLOW INDICATOR	LP : LOW PRESSURE
FT : FLOW TRANSMITTER	PZ : PRESSURIZER
GV : GATE VALVE	NC : Normally Closed
GBV : GLOBE VALVE	
BFV : BUTTERFLY VALVE	
NRV : NON-RETURN VALVE	

Sheet Title: Chiller, Chiller water tank, Chilled water Pump & PHEs

Drawing Title: Piping & Instrumentation Diagram for HRS Loop

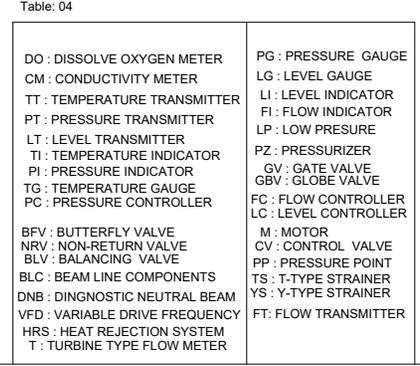
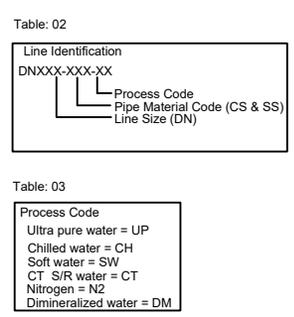
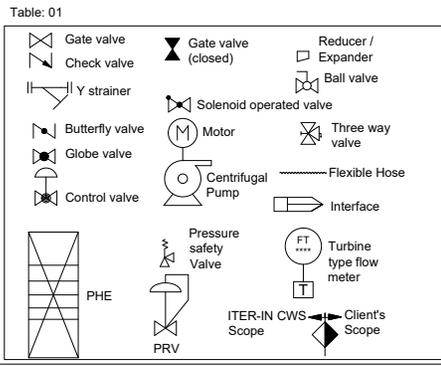
IPR	Pre'd By: MKR
Status	Rev'd By: MSH
Sheet: 1/1 NTS	App'd By: DKG
Dwg. No.	Ref. Drawing: IPR-HRS-PID
IPR-HRS-PID	Rev No. 1.4





- Note:
- Centrifugal pumps: 2 nos. (1 working + 1 standby)
  - Water polishing unit: common for all CWS loops with multiple stream provided by the purchaser
  - Drains have to be provided at the lowest point and vents to be provided at the highest point on cooling network.
  - All drains shall be connected to the common drain pipe to sump.
  - Drain connection after isolation valves shall be of flexible hose.
  - For the connection of all instruments with Pipes or equipments Refer Hook-up Drawing.
  - Clients need to ensure their own bypass arrangement for the individual system with globe valve.
  - All the vents line shall be of funnel type and shall be connected with common line to the common drain line to sump.
  - For the hydro test completion in the absence of clients, contractor has to arrange temporary arrangement for the completion of HT and make available all the necessary items at site at their own for HT.
  - Nitrogen venting should be routed to the outside of the building at appropriate height for safe disposal .
  - Drain locations marking in this drawing are only indicative, final location shall be provided only after finalization of routing.
  - Scope Legend  

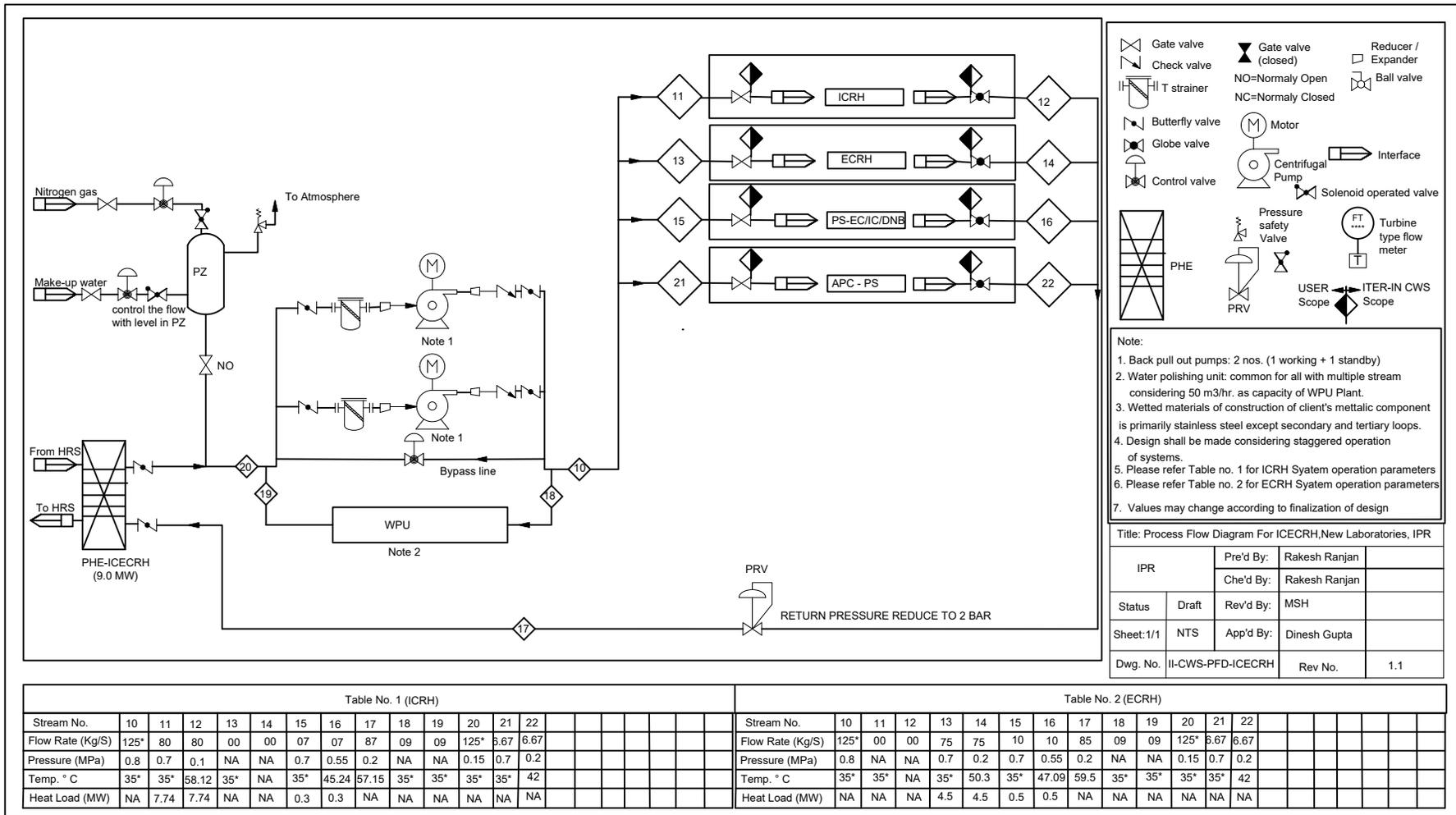
  - \*Values may change according to finalization of design



Sheet Title: ICECRH PUMP, PHE & PIPING Distribution, New Laboratories , IPR

Drawing Title: Piping & Instrumentation Diagram For ICECRH

IPR		Pre'd By:	MKR
Status		Rev'd By:	MSH
Draft	App'd By:	DKG	
Sheet: 1/1	NTS	Ref. Drawing IPR-CWS-ICECRH-PID	
Dwg. No.	IPR-CWS-ICECRH-PID	Rev No.	1.6



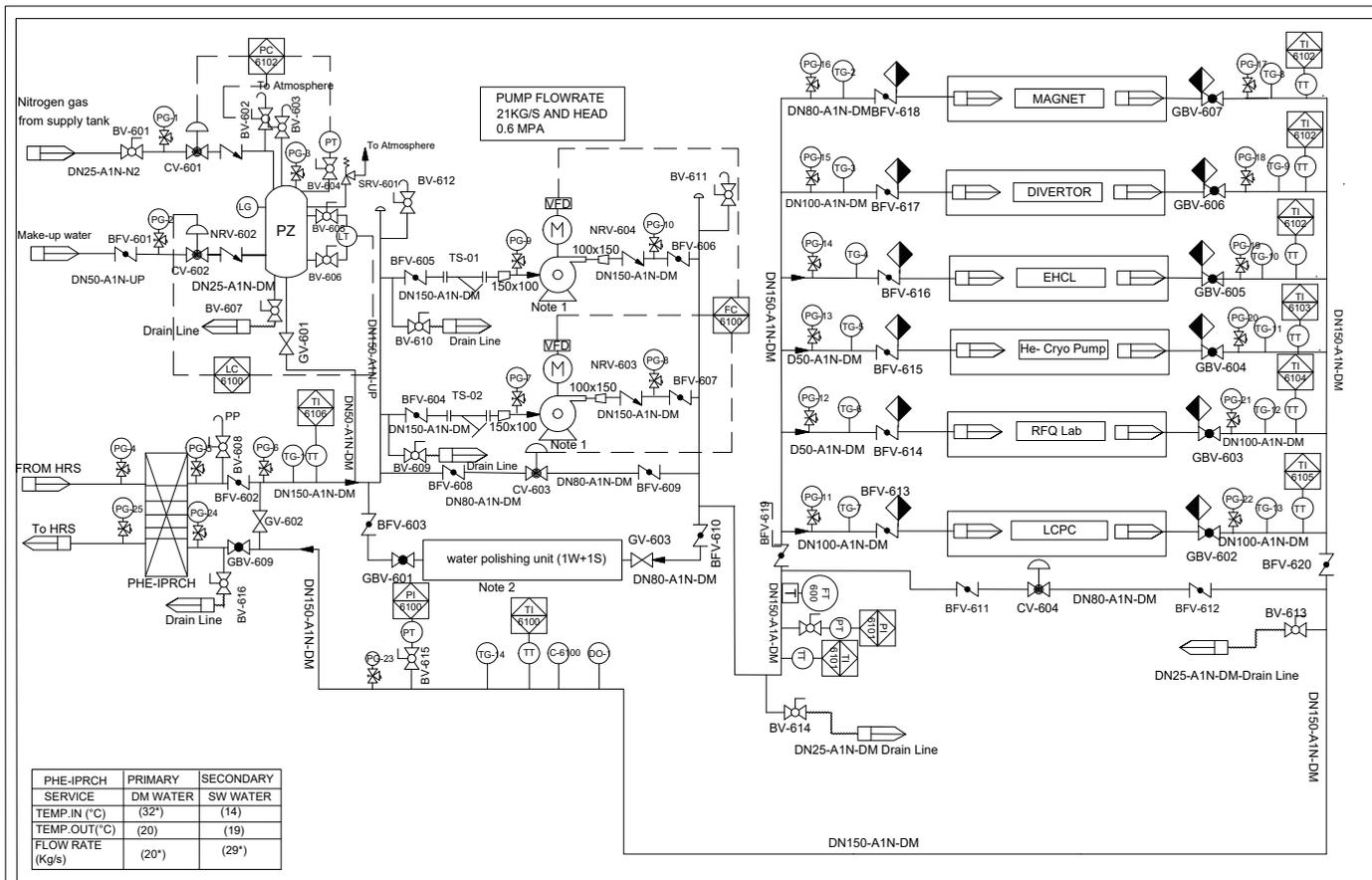
**Table No. 1 (ICRH)**

Stream No.	10	11	12	13	14	15	16	17	18	19	20	21	22							
Flow Rate (Kg/S)	125*	80	80	00	00	07	07	87	09	09	125*	6.67	6.67							
Pressure (MPa)	0.8	0.7	0.1	NA	NA	0.7	0.55	0.2	NA	NA	0.15	0.7	0.2							
Temp. ° C	35*	35*	58.12	35*	NA	35*	45.24	57.15	35*	35*	35*	35*	42							
Heat Load (MW)	NA	7.74	7.74	NA	NA	0.3	0.3	NA	NA	NA	NA	NA	NA							

**Table No. 2 (ECRH)**

Stream No.	10	11	12	13	14	15	16	17	18	19	20	21	22							
Flow Rate (Kg/S)	125*	00	00	75	75	10	10	85	09	09	125*	6.67	6.67							
Pressure (MPa)	0.8	NA	NA	0.7	0.2	0.7	0.55	0.2	NA	NA	0.15	0.7	0.2							
Temp. ° C	35*	35*	NA	35*	50.3	35*	47.09	59.5	35*	35*	35*	35*	42							
Heat Load (MW)	NA	NA	NA	4.5	4.5	0.5	0.5	NA	NA	NA	NA	NA	NA							

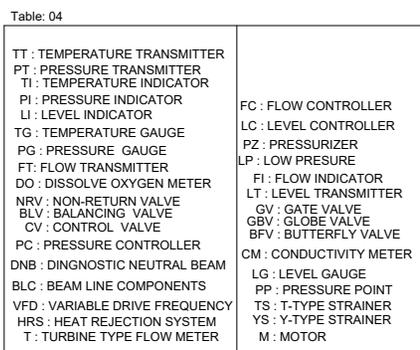
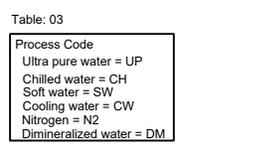
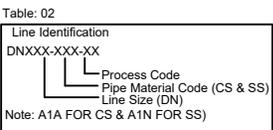
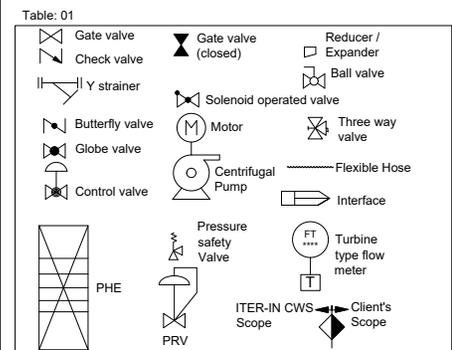




PHE-IPRCH	PRIMARY	SECONDARY
SERVICE	DM WATER	SW WATER
TEMP.IN (°C)	(32°)	(14)
TEMP.OUT(°C)	(20)	(19)
FLOW RATE (Kg/s)	(20°)	(29°)

- Note:
- Centrifugal pumps: 2 nos. (1 working + 1 standby)
  - Water polishing unit: common for all CWS loops with multiple stream provided by the purchaser
  - Drains have to be provided at the lowest point and vents to be provided at the highest point on cooling network.
  - All drains shall be connected to the common drain pipe to sump.
  - Drain connection after isolation valves shall be of flexible hose.
  - For the connection of all instruments with Pipes or equipments Refer Hook-up Drawing.
  - Clients need to ensure their own bypass arrangement for the individual system with globe valve.
  - All the vents line shall be of funnel type and shall be connected with common line to the common drain line to sump.
  - For the hydro test completion, in the absence of clients, contractor has to arrange temporary arrangement for the completion of HT and make available all the necessary items at site at their own for HT.
  - Nitrogen venting should be routed to the outside of the building at appropriate height for safe disposal .
  - Drain locations marking in this drawing are only indicative, final location shall be provided only after finalization of routing.
  - Scope Legend  
 Client's Scope
  - \*Values may change according to finalization of design

Revision History:  
NA



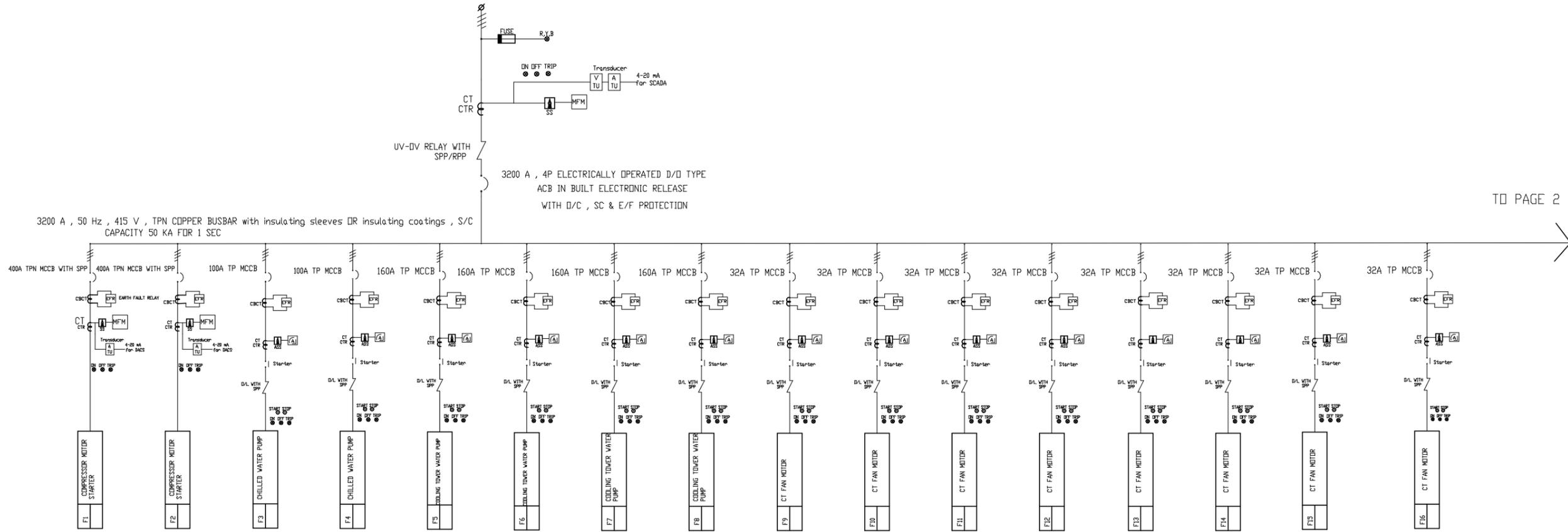
Sheet Title: IPRCH PUMP, PHE & PIPING Distribution, New Laboratories, IPR

Drawing Title: Piping & Instrumentation Diagram For IPRCH

IPR		Pre'd By: MKR	
		Rev'd By: MSH	
Status	Draft	App'd By: DKG	
Sheet: 1/1	NTS	Ref. Drawing: IPR-CWS-IPRCH-PID	
Dwg. No.	IPR-CWS-IPRCH-PID	Rev No.	1.6

# Proposed Electrical SLD for CWS, New laboratories, IPR

INCOMER  
415V AC, 3Ph, 4WIRE (R,Y,B,N),50Hz



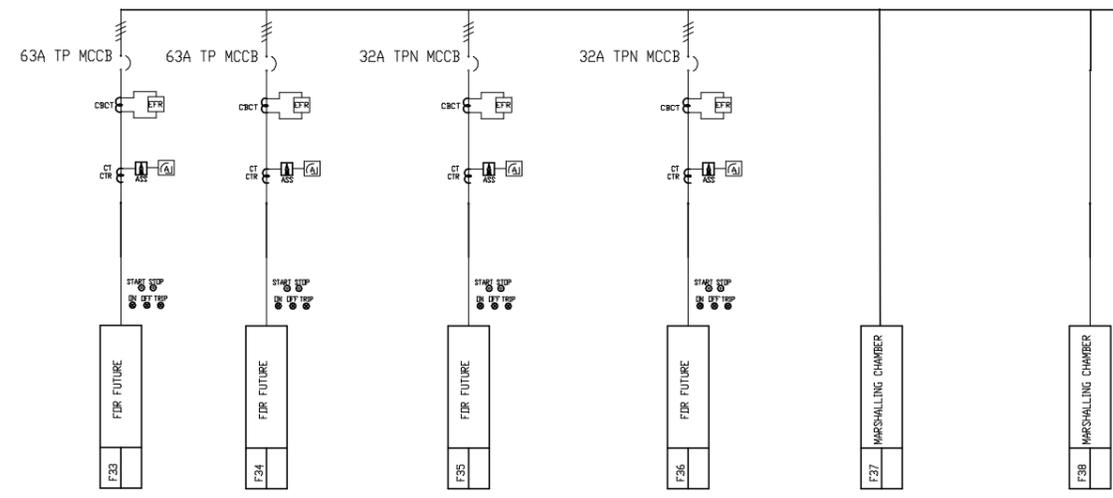
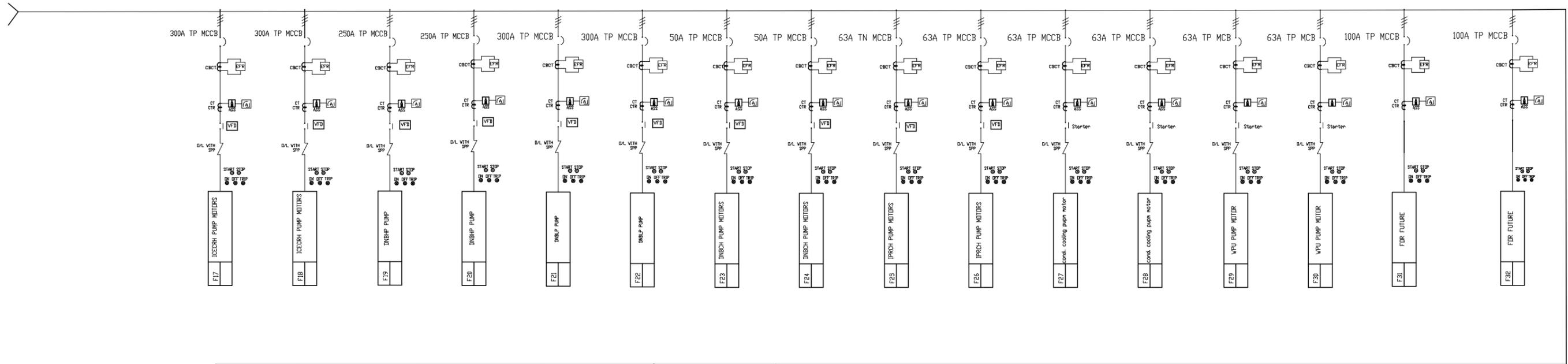
- Multifunction Meter
- Selector Switch
- Digital Ammeter

NOTE:  
A) Please note this drawing is proposed/tentative SLD as per system requirement.  
Refer tender specifications and SOQ for more detail

ASS'Y GROUP: IIIS.		ITER-INDIA INSTITUTE FOR PLASMA RESEARCH	
SCALE	NOT IN SCALE		TITLE: ELECTRICAL SLD FOR CWS, NEW LABORATORIES, IPR
PREPARED BY	MGC		REF. DRG. NO:
REVIEWED BY	DPR	DRG. NO.	ITER-INDIA/CWS/ELE/01
APPROVED BY	SNR		
			REV:1.2 SHEET 1 OF 2

# Proposed Electrical SLD for CWS, New laboratories, IPR

FROM PAGE-1 CONTINUE



NOTE:  
 A) Please note this drawing is proposed/tentative SLD as per system requirement.  
 Refer tender specifications and SOQ for more detail

	Multifunction Meter
	Selector Switch
	Digital Ammeter

ASS'Y GROUP: IIIS.		ITER-INDIA INSTITUTE FOR PLASMA RESEARCH		
SCALE	NOT IN SCALE		TITLE: ELECTRICAL SLD FOR CWS, NEW LABORATORIES, IPR	
PREPARED BY	MGC		REF DRG NO:	ITER-INDIA/CWS/ELE/01
REVIEWED BY	DP	DRG.NO	ITER-INDIA/CWS/ELE/01	SHEET 2 OF 2
APPROVED BY	SN			