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Drawing Number	Date	Drawing Title
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SSP-1-5	**6/1/01**	**CP-SSP Point Schedule**
Valve Schedule		
V-1	**6/1/01**	**Valve Schedule**

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- ☐ Building Operations Management
- ☐ Energy Conservation Control
- ☐ Training Programs
- ☐ Performance Contracting
- ☐ Planned Service Agreements

Air Conditioning
Heating
Diagnostic Services
Coil Cleaning
Refrigeration
Automatic Temperature Controls
Facility Management Systems
Fire Management
Security Management
Building Operations and Management
Water Treatment
Electrical Equipment
Emergency Generator / Lighting Equipment
Industrial Controls / Recording / Indication Equipment

PROJECT TITLE

MEHRL - Seawater Intake System
Marine Environmental Health
Research Laboratory
Charleston, South Carolina

ARCHITECT	ENGINEER
	Newcomb & Boyd One Northside 75 Atlanta, GA 30318-7761
MECHANICAL CONTRACTOR	**ELECTRICAL CONTRACTOR**
R & G Construction Company Inc. 1700 North Graham Street Charlotte, NC 28299	

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
	1	Submittal Rejection		6/1/01	RDP

JOHNSON CONTROLS
Systems & Services Division

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Fax: 843-744-5553

SALES ENGINEER	PROJECT MANAGER	APPLICATION ENGINEER	DATE	CONTRACT NUMBER
JBN	JDM	MAN	4/24/01	1210-0034

Filename: Title.vsd

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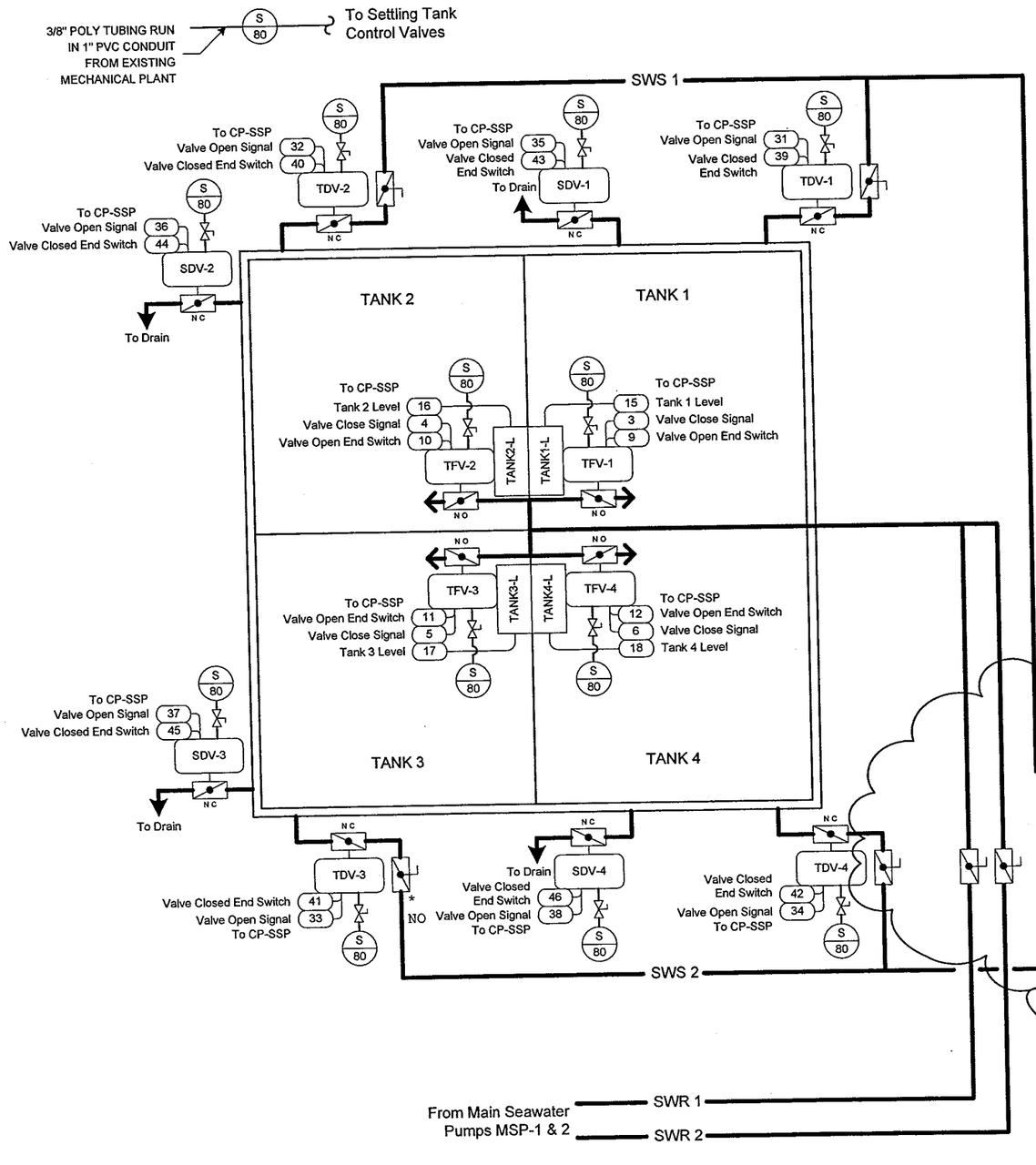
SETTLED SEAWATER SYSTEM FLOW AND CONTROL DIAGRAM

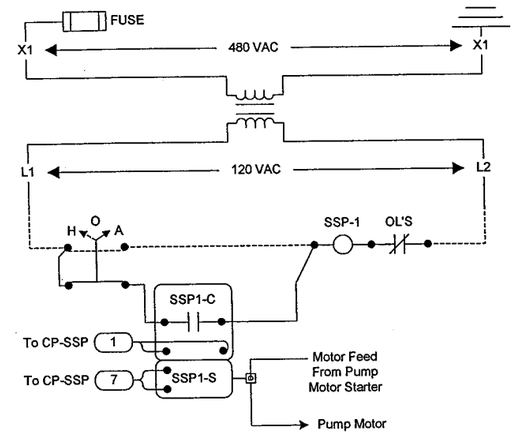


Note: Manual Valves Not Supplied By JCI Nor Controlled Through the DDC System.

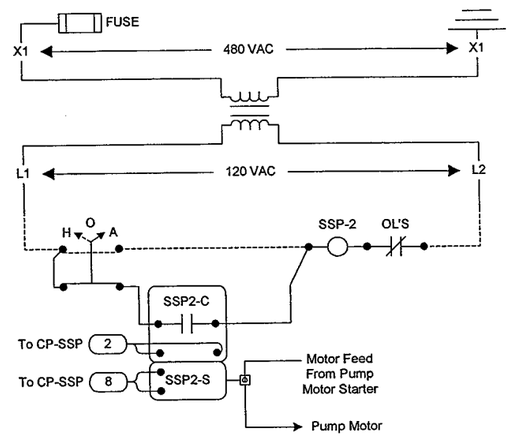
BILL OF MATERIAL

Designation:	Qty:	Part No.:	Description:
Field Devices:			
SDV,TFV,TDV	12	F-1000-94	NEEDLE VALVE 3/8" COMP
SDV-1SDV-2,SDV-3, SDV-4	4	HCYB14800E/SR	200mm (8") B-fly Valve 2-POS,Spring Ret, LS, 24VAC
SSP1-C/S,SSP2-C/S	2	H-738	SENS,CURR,1A @30VAC/DC,1/3HP,CMND RELAY
TANK1-L,TANK2-L, TANK3-L,TANK4-L	4	ALP-120B	120" ALPHASONIC LEVEL TRANS, 4-20mA
TDV-1,TDV-2TDV-3, TDV-4	4	HCYB14300E/SR	80mm (3") B-fly Valve 2-POS,Spring Ret, LS, 24VAC
TFV-1TFV-2TFV-3, TFV-4	4	HCYB14600E/SR	150mm (6") B-fly Valve 2-POS,Spring Ret, LS, 24VAC

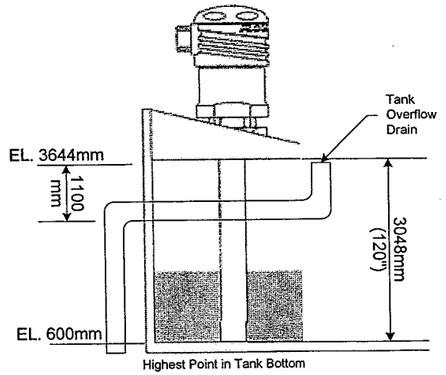
SSP-1 STARTER INTERLOCK WIRING



SSP-2 STARTER INTERLOCK WIRING



TYPICAL TANK WATER LEVEL SENSOR DETAIL



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.	1	Submittal Rejection	.	6/1/01	RDP
REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Drawing Title: **Settled Seawater Pumps Flow and Control Diagrams**

Filename: SSP-FLOW.vsd

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JBN	JDM	MAN	BY CET DATE 4/24/01	BY . DATE .

Project Title: **MEHRL - Seawater Intake System Marine Environmental Health Research Laboratory Charleston, South Carolina**

JOHNSON CONTROLS
Systems & Services Division

Branch Information
3820 Faber Place Drive
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North Charleston, SC
29405
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CONTRACT NUMBER: **1210-0034**

DRAWING NUMBER: **SSP-1-1**

Seawater Settling Tank Filling Mode

1. The DDC System will be programmed with the Date-Hour-Minute of High Tides. The Settling Tank Filling Mode will operate in either Automatic or Manual Modes.
   a) **Automatic Mode:** The DDC System will select the tank and initiate the filling process based on a rotating order with one Tank being filled at every other high tide. (One Tank Filled Per Day.)
   b) **Manual Mode:** The DDC System will select the tank and initiate the filling process based on a preprogrammed tank fill schedule set by the building operator.
2. In either mode, the building operator will be able to override the DDC System operation and manually select a tank and initiate the filling process by "Clicking" on the desired operation of the system display graphic. The DDC System will perform the safety checks as described below. If any conditions that could terminate a filling process occur, the building operator will be alerted at the operator workstation with a message describing the consequences of continuing with the filling process and be required to confirm with the DDC System to continue the filling process.
3. In the Automatic Mode, the filling process will be activated for the selected tank 2 Hours (adjustable) prior to the preprogrammed high tide data. The DDC System will close the selected tanks Sump Drain Valve SDV and Tank Drawdown Valve TDV. The DDC System will monitor the valves end switch to confirm that they both are fully closed. If either valve is not proven closed, the DDC System will terminate the filling process for that tank, disable it from future filling and proceed to the next available tank. In addition an alarm will be activated at the operator workstation describing the tank filling failure. Next, the DDC System will confirm that the water level in the tank is less than 90% (adjustable) full and that the cleaning mode for the select tank has been completed. If the water level in the selected tank is sensed as above 90% full the DDC System will terminate the filling process for that tank, set it back into the Drawdown rotation and proceed with the filling process to the next available tank. If the cleaning mode for the select tank has not yet completed and is not currently active, the DDC System will initiate the cleaning mode for the selected tank.
4. Once all the above conditions are met and filling begins, the Tank Filling Valve TFV is commanded to open and upon proof by the TFV end switch that it is open, the DDC System will energize the desired Main Seawater Pump MSP. The filling process will continue until the water level in the tank rises to 100% full. Upon sensing the tank 100% full for a period of 1 minute or if the TFV has been sensed open for a period of 3 hours (adjustable) the DDC System will close the TFV and stop the MSP. If the cause for the MSP to stop was the TFV exceeding 3 hours of open time an alarm will be activate at the operator workstation describing the event. The DDC System will trend the date, time and water level at the start and conclusion of the filling process.

Seawater Settling Tank Drawdown Mode

1. The DDC System will define the state of the tanks while in the Drawdown mode as follows. A **selected tank** is one which has been selected for draw-down but has not been checked for readiness. A **ready tank** is one that has passed the checking criteria and is ready for Drawdown. While an **active tank** is seen as currently being drawdown.
2. The Settling Tank Drawdown Mode will operate in either Automatic or Manual Modes.
   a) **Automatic Mode:** The DDC System will select the tank and initiate the drawdown process based on a rotating order.
   b) **Manual Mode:** The DDC System will select the tank and initiate the drawdown process based on a preprogrammed tank drawdown schedule set by the building operator.
3. In either mode, the building operator will be able to override the DDC System operation and manually select a tank and initiate the drawdown process by "Clicking" on the desired operation of the system display graphic. The DDC System will perform the safety checks as described below. If any conditions that could terminate a drawdown process occur, the building operator will be alerted at the operator workstation with a message describing the consequences of continuing with the drawdown process and be required to confirm with the DDC System to continue the ***draw-down*** process.
4. In the Automatic Mode, the DDC System will check the selected tank to confirm if there has been at least 5 high tides (adjustable) and 70 Hours (adjustable) since the conclusion of the tanks most recent filling process. Next, the DDC System will confirm that the water level in the tank is greater than 50% (adjustable). If these conditions are met the DDC System will transition the state of the tank from **selected** to **ready**.
5. A ready tank will transition from ready to active if the currently active tank's water level reaches 20% full (adj.) in manual or automatic mode. If there is currently no active tank, in automatic mode, the first ready tank in the automatic order will transition from ready to active. In manual mode the first ready tank in the manual schedule will transition from ready to active only upon the operator's signal. Once the state of the ready tank is set to active and drawdown begins, the Tank Drawdown Valve, TDV, is commanded to open and upon proof by the TDV end switch that it is open, the DDC System will close the TDV for the old active tank, thereby exiting active mode for the old tank. (See the heading Seawater Settling Tank Cleaning Mode for a description of the old tank's new mode.) The Drawdown process for the newly active tank will continue until the water level in the tank falls to 20% full (adjustable). If the water level in the active tank is sensed as below 20% full, and there are no currently ready tanks, the DDC System will terminate the drawdown process for the active tank, stop the Settled Seawater Pump, close the tank's TDV and issue an alarm indicating that settled seawater is unavailable. If there is at least one ready tank the ready-to-active transition described above will occur with no interruption of the settled seawater supply. When there are multiple ready tanks available the decision to select a particular tank will be controlled by the sequence described in section 2. During a given tank's exit from active mode the DDC System will monitor the TDV valve's end switch to confirm that the valve is fully closed. If the valve is not proven closed, the DDC System will terminate the drawdown process for that tank, and will also disable it from future operation. Similarly, during a tanks transition from ready to active mode the DDC system will confirm, via the TDV's end switch, that the TDV valve in fact open. Failure to open will cause the DDC System to disable the tank from future operation and attempt to transition the next available ready tank. In addition an alarm will be activated at the operator workstation describing the tank TDV failure.

Seawater Settling Tank Drawdown Mode (cont.)

6. While the drawdown process is active and the DDC system senses the failure of the assigned lead pump, the standby pump will be energized to take the place of the lead pump. ***(Failure is defined as failing to detect pump status as ON within 15 seconds of the pump's START command.)*** In addition an alarm will be activated at the Operator Workstation describing the failure of the SSP. Once the standby pump is sensed as operating, the failed lead pump will be shutdown and disabled from further operation until its failure alarm is reset by cycling the pumps DDC DISABLE point to ON then OFF again. Whenever a lead-standby switchover is made, the standby pump will be sensed as operating for 1 minute prior to the lead pump being stopped. The DDC System will monitor the runtime for each SSP and automatically select the pump with the least runtime to operate as the lead pump upon the next command to start a SSP.
7. The DDC System will trend the date, time and water level at the start and conclusion of the drawdown process.

Seawater Settling Tank Cleaning Mode

1. Once a settling tank has been drawdown to 20% full, the DDC System will initiate the Settling Tank Cleaning Mode for that tank. The Settling Tank Cleaning Mode will operate in either Automatic or Manual Modes.
   a) **Automatic Mode:** The DDC System will initiate the cleaning process and perform the functions listed below.
   b) **Manual Mode:** The DDC System will initiate the cleaning process and prompts the building operator to make selections, open/close valves and start/stop pumps in a manual fashion.
2. In the Automatic Mode, the cleaning process will be checked by the DDC System prior to initiating the cleaning process. The DDC System will monitor the Sump Drain Valve SDV and Tank Drawdown Valve TDV valve end switches to confirm that they both are fully closed. Next, the DDC System will confirm that the water level in the tank is less than 35% (adjustable) and that the settling tank is not in filling mode nor is projected to be for at least 1 Hour. If any of the criteria is not met, the cleaning mode will not be activated and the DDC System will recheck the requirements after a period of one hour has passed. Once the DDC System has made 5 ***unsuccessful*** attempts at activating the cleaning process for a tank, an alarm will be activated at the operator workstation describing the unsuccessful attempt of initiating the cleaning process. ***<Sentence deleted.>***
3. Once all the above conditions are met the DDC System will wait until proof that the MSP has stopped, then the Sump Drain Valve SDV is commanded to open to gravity drain the tank. Upon sensing the water level in the tank fall below the level of the probe, the DDC System will command open the Tank Filling Valve TFV. On proof of the tanks TFV open by its end switch, the DDC System will energize a Main Seawater Pump MSP.
4. The MSP will remain in operation for a period of 30 minutes (adjustable) at which time the DDC System will stop the MSP and close the TFV. Should the water level in the tank rise to 50% full prior to the end of the 30-minute pump runtime, the DDC System will stop the MSP and close the TFV.
5. After a period of 90 minutes (adjustable) from sensing the SDV for the tank open. The DDC System will command the SDV to close. Upon the DDC System sensing the proof of the SDV being closed, the Cleaning Mode will be set as complete.
6. Should any valve not be sensed as to confirm its commanded state, an alarm will be activate at the operator workstation describing the valve failure condition.
7. The DDC System will trend the date and time at the start and conclusion of the cleaning process.

Raw Seawater Piping SWR 1 – SWR 4 Anaerobic Cleaning

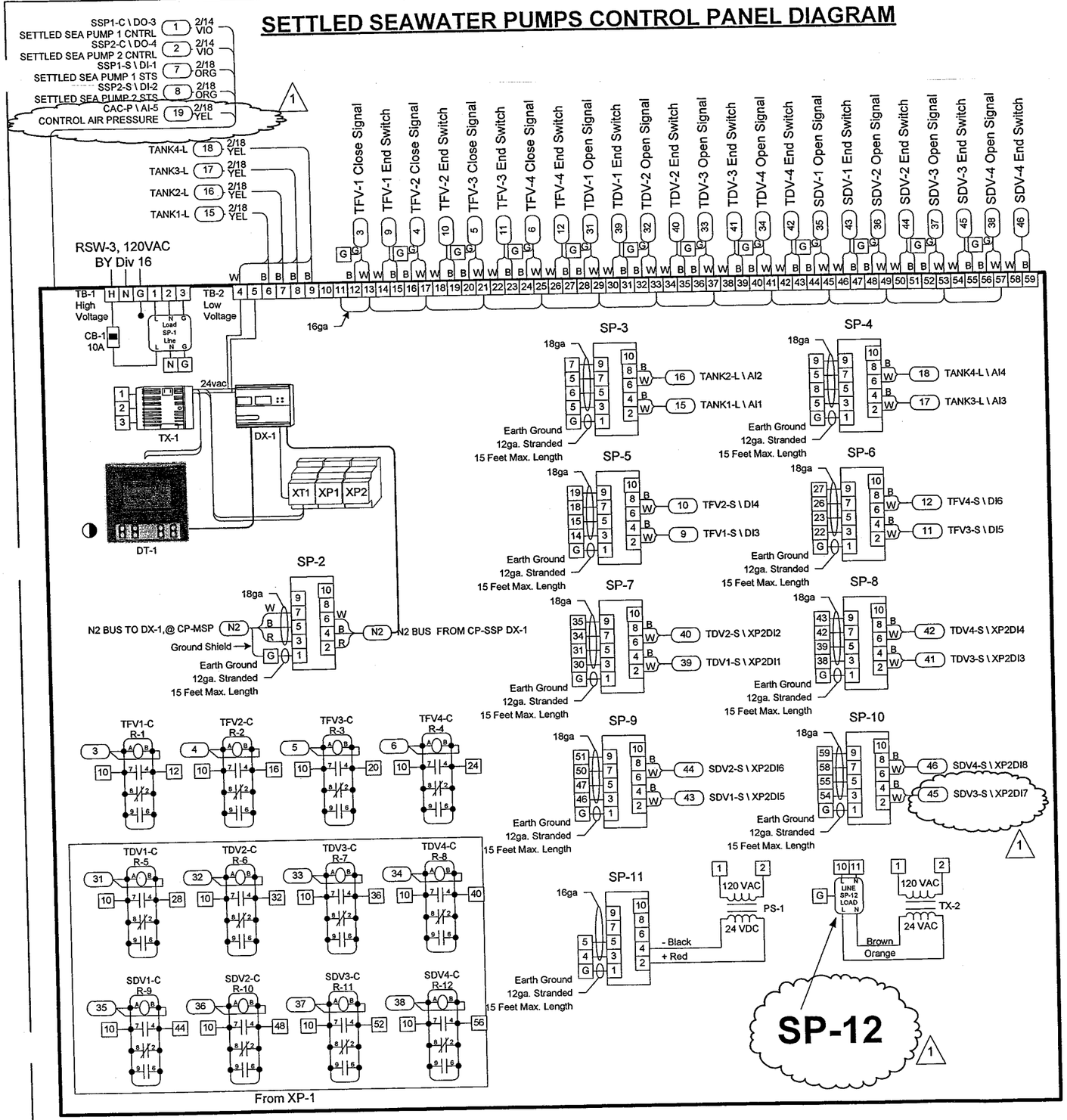
1. The building operator will log in and select the Raw Seawater SWR pipes. The non-active pipes will be isolated for anaerobic cleaning. Either SWR 1 or SWR 2 will be active and serve the settling tanks. Any two of SWR 3, SWR 4 or SWR 5 will be active and serve the MEHRL Building, Outdoor Tanks or SCDNR Building.
2. Whenever an anaerobic Raw Seawater pipe is made active steps will occur in order.
   - The manual drain valve in the selected pipe at the end of its piping run will be opened. The manual valve which allows flow to the seawater loads (Settling Tanks, MEHRL Building, Outdoor Tanks or SCDNR Building) will remain closed.
   - The manual valve in the selected pipe located at the Main Seawater Pumps will be opened
   - The building operator will manually energize a pump to run water through the newly activated pipe to purge the anaerobic water from the piping for 5 minutes.
   - After purging, the manual drain valve at the end of the piping run will be closed and the manual valves which allow flow to the seawater loads will be opened.
   - The manual valves in the deactivated pipes which allow flow to the seawater loads and the manual valves at the Main Seawater Pumps will be closed to begin anaerobic cleaning.
3. The building operator will confirm anaerobic cleaning has been completed and log out.

Settled Seawater Piping SWS 1 – SWS 4 Anaerobic Cleaning

1. The building operator will log in and select the Settled Seawater ***SWS*** pipes. The non-active pipes will be isolated for anaerobic cleaning. Either ***SWS*** 1 or ***SWS*** 2 will be active and draw water from the Settling Tanks 1 and 2 or 3 and 4. Whenever an anaerobic Raw Seawater pipe is made active steps will occur in order.
   - The manual drain valve in the selected pipe at the end of its piping run will be opened. The manual valve which allows flow to the seawater loads (***MEHRL Building or Outdoor Tanks***) will remain closed.
   - The manual valve in the selected pipe located at the Settled Seawater Pumps will be opened
   - The building operator will manually energize a pump to run water through the newly activated pipe to purge the anaerobic water from the piping for 5 minutes.
   - After purging, the manual drain valve at the end of the piping run will be closed and the manual valves which allow flow to the seawater loads will be opened.
   - The manual valves in the deactivated pipes which allow flow to the seawater loads and the manual valves at the Settled Seawater Pumps will be closed to begin anaerobic cleaning.
2. The building operator will confirm anaerobic cleaning has been completed and log out.

Drawing Title: SSP Sequence of Operation Settled Seawater System	Filename: SSP-SEQ.vsd	1	Submittal Rejection	6/1/01	RDP
		REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN / DATE / BY
		Sales Engineer: JBN; Project Manager: JDM; Application Engineer: MAN		DRAWN: BY CET DATE 4/24/01	APPROVED: BY . DATE .
Project Title: MEHRL - Seawater Intake System, Marine Environmental Health Research Laboratory, Charleston, South Carolina		JOHNSON CONTROLS, Systems & Services Division		Branch Information: 3820 Faber Place Drive, Suite 700, North Charleston, SC 29405, Phone: 843-744-0213, Fax: 843-744-5553	CONTRACT NUMBER: 1210-0034; DRAWING NUMBER: SSP-1-2

SETTLED SEAWATER PUMPS CONTROL PANEL DIAGRAM

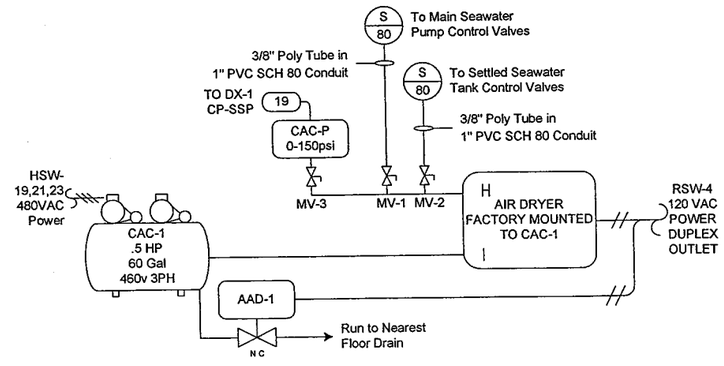


BILL OF MATERIAL

Designation:	Qty:	Part No.:	Description:
Field Devices:			
AAD-1	1	6Z948	ELECTRIC DRAIN TRAP
CAC-1	1	*QC00506DPD*	1/2HP 460/3 60G DA DRY
CAC-P	1	PTX1-08	Pressure Transducer 0-150PSI, 4-20ma
MV-1,MV-2,MV-3	3	F-1000-94	NEEDLE VALVE 3/8" COMP
Panel Devices:			
ACC	2	M-8000-382	NAMEPLT,FORMICA,2 LINE
	61	PD-113-41	TERMINAL BLOCK, UNIVERSAL
	2	PD-113-43	END SECTION, TERMINAL BLOCK
	1	PD-113-5	MTG CHANNEL,MED/HVY,6 FT
	8	PD-120-2	WIRE DUCT,1IN X2IN ,GRAY,1 FT
	8	PD-120-4	WIRE DUCT CVR,1IN,GRAY,1FT
	5	PD-120-5	WIRE DUCT,2IN X2IN ,GRAY,1 FT
	5	PD-120-9	WIRE DUCT CVR,2IN,GRAY,1FT
CB-1	1	PD-112-9	CIRCUIT BREAKER QOU-110
CP-SSP	1	M-8100-3042	PANEL,STANDARD,22 UNITS
DT-1	1	DT-9100-8104	DX LCD DISPLAY
DX-1	1	DX-9100-8454	CNTRLR,DIG,DX,8AI,8AO,6BO,8BI
	1	DX-9100-8990	CNTRLR,DIG,DX,MTG BASE,F/ DX-91?0-8454
	1	DX-9100-8991	KIT,CNTRLR,DIG,DX,WIRING PROTECTION
PS-1	1	PS200-1A-1N	PWR SUP,24DC,ADJ,1.5A,115AC,NARROW
R-1 - R-12	12	PD-101-35	RLY BASE,3PDT,11PIN,10A,IDEC #SR3B-05
	12	PD-109-51	RLY,PLUG-IN,3PDT,24VAC,P&B KUP14A25-24
SP-1	1	IC+115	Islatrol Plus Line Filter 120VAC, 15A
SP-11	1	D-MOD-5-024	Line Surge Protector 24 Volts 5A max
SP-12	1	CFCS-041	Power Surge Protector 24 Volts AC
SP-2	1	D-MOD-016-LC	Data Surge Protector RS485
SP-3 - SP-10	8	D-MOD-024	Signal Surge Protector 24 Volts
TX-1	1	AS-XFR100-1	***XFMR,92VA,120-240/24VAC***
TX-2	1	Y69T15-0	XFMR,120-208-240/24,300VA,FT[TZ-5000-11]
XP-1	1	XP-9103-8304	CNTRLR,DIG,DX EXPN MOD,8BO,TRIACS,2/XT
XP-2	1	XP-9105-8304	CNTRLR,DIG,DX EXPN MOD,8BI,TRIACS,2/XT
XT-1	1	XT-9100-8304	CNTRLR,DIG,DX EXTENSION MODULE,8/DX

COMPRESSED AIR SYSTEM SUPPLY DETAIL

MOUNT INSIDE EXISTING MECHANICAL PLANT

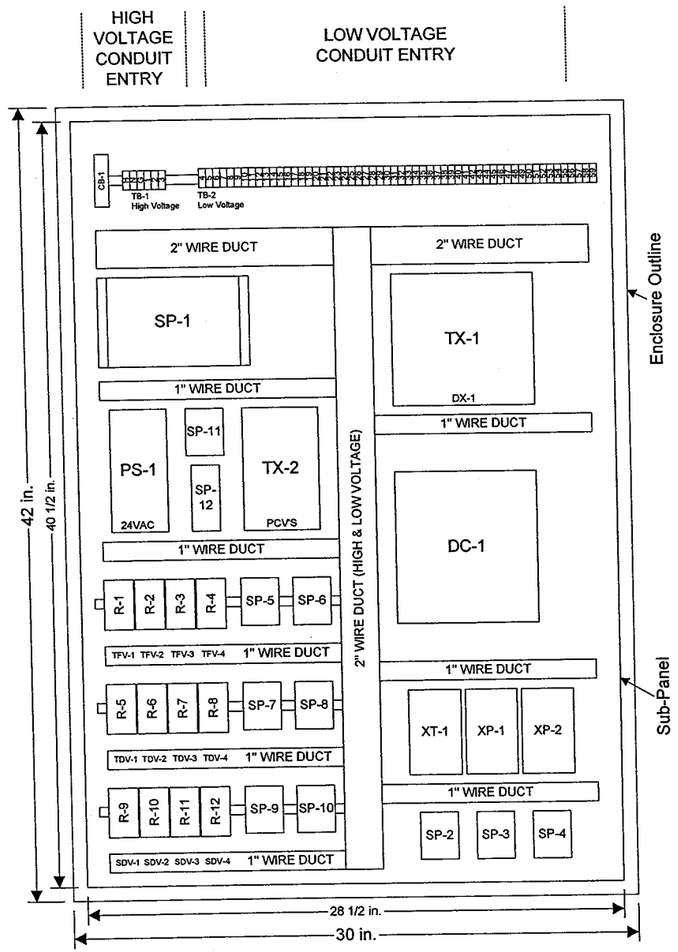


Drawing Title: SSP Control Panel Component Diagram	Filename: SSP-PANEL.vsd	.	.	.	.	.	.
		.	.	.	.	.	.
		.	1	Rejected Submittal	.	6/1/01	RDP
		REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
		Sales Engineer: JBN	Project Manager: JDM	Application Engineer: MAN	DRAWN: BY CET DATE 4/24/01	APPROVED: BY . DATE .	
Project Title: MEHRL - Seawater Intake System Marine Environmental Health Research Laboratory Charleston, South Carolina		JOHNSON CONTROLS Systems & Services Division		Branch Information: 3820 Faber Place Drive Suite 700 North Charleston, SC 29405 Phone: 843-744-0213 Fax: 843-744-5553	CONTRACT NUMBER: 1210-0034		
					DRAWING NUMBER: SSP-1-3		

CP-SSP PANEL LAYOUT

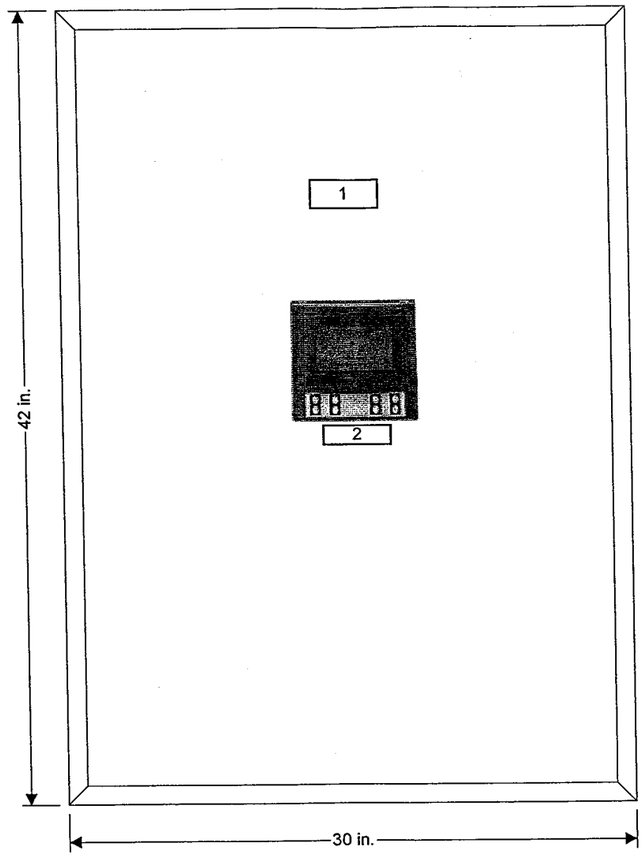
SCALE: 1/8" = 1"

LOCATED IN EXISTING MECHANICAL PLANT



CP-SSP PANEL FACE DETAIL

SCALE: 1/8" = 1"



NAMETAG SCHEDULE - ALL TAGS 1" X 3"

TAG#	ITEM	DESCRIPTION
1	CP-SSP	Settled Seawater System Control Panel CP-SSP
2	DT-1	Seawater Intake System Local Display Terminal

REFERENCE DRAWING		NO.	REVISION-LOCATION			ECN	DATE	BY
Sales Engineer	Project Manager	Application Engineer	DRAWN			APPROVED		
JBN	JDM	MAN	BY CET	DATE 4/24/01		BY	DATE	

Drawing Title: **CP-SSP Panel Detail Layout Drawing**

Filename: CP-SSP.vsd

Project Title: **MEHRL - Seawater Intake System**
Marine Environmental Health Research Laboratory
Charleston, South Carolina

JOHNSON CONTROLS
Systems & Services Division

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Fax: 843-744-5553

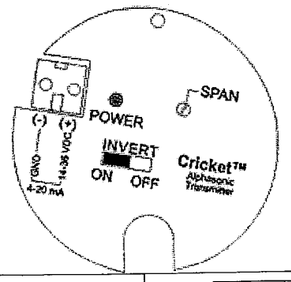
CONTRACT NUMBER: **1210-0034**

DRAWING NUMBER: **SSP-1-4**

Electrician/Fitter		Point Information			Controller Information						Panel Information					Intermediate Device					Field Device					
Cable Tag	Point Type	System Name	Object Name	Expanded ID	Controller Type	Trunk Nbr	Trunk Addr.	Cable Destination Bay/Terminal	Module Type	Termination Out	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring /Tubing	Termination In	Device	Termination Out	Location	Wiring /Tubing	Termination In	Device	Location	Ref Detail Shape	Comment
		SEAWATER			DX9100	1	1				CP-SSP	Existing Mech Plant	0	M5.05											N2 Trunk
1	DO-3	SEAWATER	SSP1-C	Settled Sea Pump 1 Cntrl	DX9100	1	1	DO-3		DO3,24V	CP-SSP	Existing Mech Plant	0	M5.05	1	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
2	DO-4	SEAWATER	SSP2-C	Settled Sea Pump 2 Cntrl	DX9100	1	1	DO-4		DO4,24V	CP-SSP	Existing Mech Plant	0	M5.05	2	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
3	DO-5	SEAWATER	TFV1-C	Tank Fill Valve 1 Cntrl	DX9100	1	1	DO-5		DO5,24V	CP-SSP	Existing Mech Plant	0	M5.05	3	2/18	Coil	Relay R-1	Com,NO		2/14	See Wiring Detail	Valve Actuator		aDX41	
4	DO-6	SEAWATER	TFV2-C	Tank Fill Valve 2 Cntrl	DX9100	1	1	DO-6		DO6,24V	CP-SSP	Existing Mech Plant	0	M5.05	4	2/18	Coil	Relay R-2	Com,NO		2/14	See Wiring Detail	Valve Actuator		aDX41	
5	DO-7	SEAWATER	TFV3-C	Tank Fill Valve 3 Cntrl	DX9100	1	1	DO-7		DO7,24V	CP-SSP	Existing Mech Plant	0	M5.05	5	2/18	Coil	Relay R-3	Com,NO		2/14	See Wiring Detail	Valve Actuator		aDX41	
6	DO-8	SEAWATER	TFV4-C	Tank Fill Valve 4 Cntrl	DX9100	1	1	DO-8		DO8,24V	CP-SSP	Existing Mech Plant	0	M5.05	6	2/18	Coil	Relay R-4	Com,NO		2/14	See Wiring Detail	Valve Actuator		aDX41	
7	DI-1	SEAWATER	SSP1-S	Settled Sea Pump 1 Sts	DX9100	1	1	DI-1		DI1,COM	CP-SSP	Existing Mech Plant	0	M5.05	7						2/18	Status Output	Current Switch		aDX60	
8	DI-2	SEAWATER	SSP2-S	Settled Sea Pump 2 Sts	DX9100	1	1	DI-2		DI2,COM	CP-SSP	Existing Mech Plant	0	M5.05	8						2/18	Status Output	Current Switch		aDX60	
9	DI-3	SEAWATER	TFV1-S	Tank Fill Valve 1 Status	DX9100	1	1	DI-3		DI3,COM	CP-SSP	Existing Mech Plant	0	M5.05	9						2/18	Com, NO	Valve Travel Switch		DX70	
10	DI-4	SEAWATER	TFV2-S	Tank Fill Valve 2 Status	DX9100	1	1	DI-4		DI4,COM	CP-SSP	Existing Mech Plant	0	M5.05	10						2/18	Com, NO	Valve Travel Switch		DX70	
11	DI-5	SEAWATER	TFV3-S	Tank Fill Valve 3 Status	DX9100	1	1	DI-5		DI5,COM	CP-SSP	Existing Mech Plant	0	M5.05	11						2/18	Com, NO	Valve Travel Switch		DX70	
12	DI-6	SEAWATER	TFV4-S	Tank Fill Valve 4 Status	DX9100	1	1	DI-6		DI6,COM	CP-SSP	Existing Mech Plant	0	M5.05	12						2/18	Com, NO	Valve Travel Switch		DX70	
13	DI-7	SEAWATER			DX9100	1	1	DI-7			CP-SSP	Existing Mech Plant	0	M5.05	13											
14	DI-8	SEAWATER			DX9100	1	1	DI-8			CP-SSP	Existing Mech Plant	0	M5.05	14											
15	AI-1	SEAWATER	TANK1-L	Settling Tank 1 Level	DX9100	1	1	AI-1		AI1,AICOM	CP-SSP	Existing Mech Plant	0	M5.05	15						2/18	See Wiring Detail	4-20mA ALP SENSOR		DX2	
16	AI-2	SEAWATER	TANK2-L	Settling Tank 2 Level	DX9100	1	1	AI-2		AI2,AICOM	CP-SSP	Existing Mech Plant	0	M5.05	16						2/18	See Wiring Detail	4-20mA ALP SENSOR		DX2	
17	AI-3	SEAWATER	TANK3-L	Settling Tank 3 Level	DX9100	1	1	AI-3		AI3,AICOM	CP-SSP	Existing Mech Plant	0	M5.05	17						2/18	See Wiring Detail	4-20mA ALP SENSOR		DX2	
18	AI-4	SEAWATER	TANK4-L	Settling Tank 4 Level	DX9100	1	1	AI-4		AI4,AICOM	CP-SSP	Existing Mech Plant	0	M5.05	18						2/18	See Wiring Detail	4-20mA ALP SENSOR		DX2	
19	AI-5	SEAWATER	CAC-P	Control Air Pressure	DX9100	1	1	AI-5		AI5,+15V	CP-SSP	Existing Mech Plant	0	M5.05	19						2/18	Black,White	Kele PTX1		aDX1	
20	AI-6	SEAWATER			DX9100	1	1	AI-6			CP-SSP	Existing Mech Plant	0	M5.05	20											
21	AI-7	SEAWATER			DX9100	1	1	AI-7			CP-SSP	Existing Mech Plant	0	M5.05	21											
22	AI-8	SEAWATER			DX9100	1	1	AI-8			CP-SSP	Existing Mech Plant	0	M5.05	22											
23	AO-1	SEAWATER			DX9100	1	1	AO-1			CP-SSP	Existing Mech Plant	0	M5.05	23											
24	AO-2	SEAWATER			DX9100	1	1	AO-2			CP-SSP	Existing Mech Plant	0	M5.05	24											
25	AO-9	SEAWATER			DX9100	1	1	AO-9			CP-SSP	Existing Mech Plant	0	M5.05	25											
26	AO-10	SEAWATER			DX9100	1	1	AO-10			CP-SSP	Existing Mech Plant	0	M5.05	26											
27	AO-11	SEAWATER			DX9100	1	1	AO-11			CP-SSP	Existing Mech Plant	0	M5.05	27											
28	AO-12	SEAWATER			DX9100	1	1	AO-12			CP-SSP	Existing Mech Plant	0	M5.05	28											
29	AO-13	SEAWATER			DX9100	1	1	AO-13			CP-SSP	Existing Mech Plant	0	M5.05	29											
30	AO-14	SEAWATER			DX9100	1	1	AO-14			CP-SSP	Existing Mech Plant	0	M5.05	30											
		SEAWATER			XT9100						CP-SSP	Existing Mech Plant		M5.05												
		SEAWATER			XT9100	1	2				CP-SSP	Existing Mech Plant	0	M5.05												
31	X@1DO1	SEAWATER	TDV1-C	Tank Draw Valve 1 Cntrl	XP9103	1	2	DO-1		DO1,DO1	CP-SSP	Existing Mech Plant	0	M5.05	31	2/18	Coil	Relay R-5	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
32	X@1DO2	SEAWATER	TDV2-C	Tank Draw Valve 2 Cntrl	XP9103	1	2	DO-2		DO2,DO2	CP-SSP	Existing Mech Plant	0	M5.05	32	2/18	Coil	Relay R-6	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
33	X@1DO3	SEAWATER	TDV3-C	Tank Draw Valve 3 Cntrl	XP9103	1	2	DO-3		DO3,DO3	CP-SSP	Existing Mech Plant	0	M5.05	33	2/18	Coil	Relay R-7	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
34	X@1DO4	SEAWATER	TDV4-C	Tank Draw Valve 4 Cntrl	XP9103	1	2	DO-4		DO4,DO4	CP-SSP	Existing Mech Plant	0	M5.05	34	2/18	Coil	Relay R-8	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
35	X@1DO5	SEAWATER	SDV1-C	Sump Drain Valve 1 Cntrl	XP9103	1	2	DO-5		DO5,DO5	CP-SSP	Existing Mech Plant	0	M5.05	35	2/18	Coil	Relay R-9	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
36	X@1DO6	SEAWATER	SDV2-C	Sump Drain Valve 2 Cntrl	XP9103	1	2	DO-6		DO6,DO6	CP-SSP	Existing Mech Plant	0	M5.05	36	2/18	Coil	Relay R-10	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
37	X@1DO7	SEAWATER	SDV3-C	Sump Drain Valve 3 Cntrl	XP9103	1	2	DO-7		DO7,DO7	CP-SSP	Existing Mech Plant	0	M5.05	37	2/18	Coil	Relay R-11	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
38	X@1DO8	SEAWATER	SDV4-C	Sump Drain Valve 4 Cntrl	XP9103	1	2	DO-8		DO8,DO8	CP-SSP	Existing Mech Plant	0	M5.05	38	2/18	Coil	Relay R-12	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
39	X@2DI1	SEAWATER	TDV1-S	Tank Draw Valve 1 Status	XP9105NC	1	2	DI-1		DI1,COM	CP-SSP	Existing Mech Plant	0	M5.05	39						2/18	Com, NO	Valve Travel Switch		XP40	
40	X@2DI2	SEAWATER	TDV2-S	Tank Draw Valve 2 Status	XP9105NC	1	2	DI-2		DI2,COM	CP-SSP	Existing Mech Plant	0	M5.05	40						2/18	Com, NO	Valve Travel Switch		XP40	
41	X@2DI3	SEAWATER	TDV3-S	Tank Draw Valve 3 Status	XP9105NC	1	2	DI-3		DI3,COM	CP-SSP	Existing Mech Plant	0	M5.05	41						2/18	Com, NO	Valve Travel Switch		XP40	
42	X@2DI4	SEAWATER	TDV4-S	Tank Draw Valve 4 Status	XP9105NC	1	2	DI-4		DI4,COM	CP-SSP	Existing Mech Plant	0	M5.05	42						2/18	Com, NO	Valve Travel Switch		XP40	
43	X@2DI5	SEAWATER	SDV1-S	Sump Drain Valve 1 Sts	XP9105NC	1	2	DI-5		DI5,COM	CP-SSP	Existing Mech Plant	0	M5.05	43						2/18	Com, NO	Valve Travel Switch		XP40	
44	X@2DI6	SEAWATER	SDV2-S	Sump Drain Valve 2 Sts	XP9105NC	1	2	DI-6		DI6,COM	CP-SSP	Existing Mech Plant	0	M5.05	44						2/18	Com, NO	Valve Travel Switch		XP40	
45	X@2DI7	SEAWATER	SDV3-S	Sump Drain Valve 3 Sts	XP9105NC	1	2	DI-7		DI7,COM	CP-SSP	Existing Mech Plant	0	M5.05	45						2/18	Com, NO	Valve Travel Switch		XP40	
46	X@2DI8	SEAWATER	SDV4-S	Sump Drain Valve 4 Sts	XP9105NC	1	2	DI-8		DI8,COM	CP-SSP	Existing Mech Plant	0	M5.05	46						2/18	Com, NO	Valve Travel Switch		XP40	

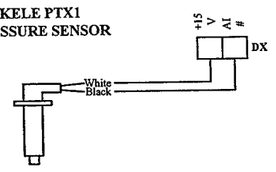
DETAIL DX2:

ALP WATER LEVEL SENSOR



DETAIL aDX1:

KELE PTX1
PRESSURE SENSOR



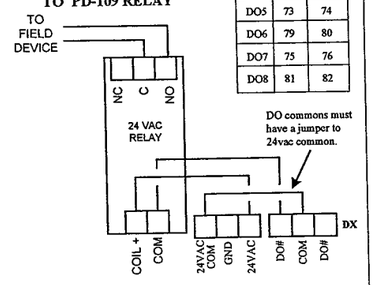
NOTE: SEE DETAIL DX-TERM OR LCP-TERM FOR ANALOG INPUT JUMPER SETTINGS.

NOTE: IF SHIELDED CABLE IS USED SEE DETAIL A-SHIELD-GROUND FOR SHIELD TERMINATION

DETAIL aDX41:

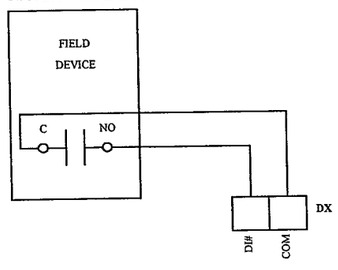
24VAC BINARY OUTPUT TO PD-109 RELAY

	DO	COM
DO3	71	72
DO4	77	78
DO5	73	74
DO6	79	80
DO7	75	76
DO8	81	82



DETAIL DX70:

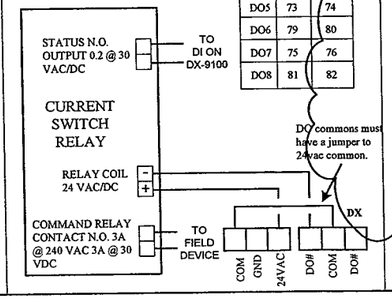
N.O. BINARY INPUT



DETAIL aDX42:

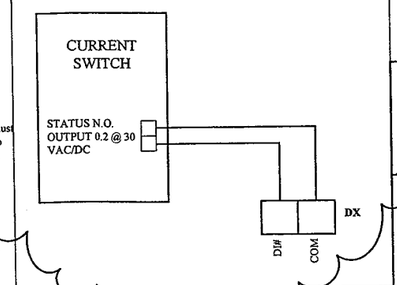
24VAC BINARY OUTPUT TO CURRENT SWITCH RELAY

	DO	COM
DO3	71	72
DO4	77	78
DO5	73	74
DO6	79	80
DO7	75	76
DO8	81	82



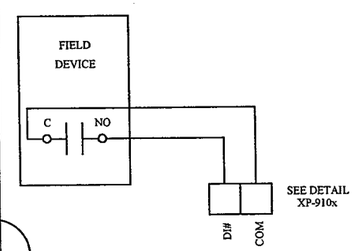
DETAIL aDX60:

VERIS CURRENT SWITCH



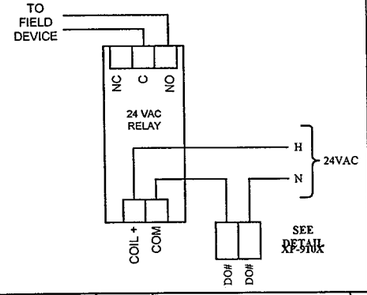
DETAIL XP40:

N.O. BINARY INPUT



DETAIL aXP41:

24VAC BINARY OUTPUT TO PD-109 RELAY



	1	Submittal Rejection		6/1/01	RDP	
REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY

Drawing Title: CP-SSP Point Schedule
Filename: CP-SSP-PT.vsd

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JBN	JDM	MAN	BY CET DATE 4/24/01	BY DATE

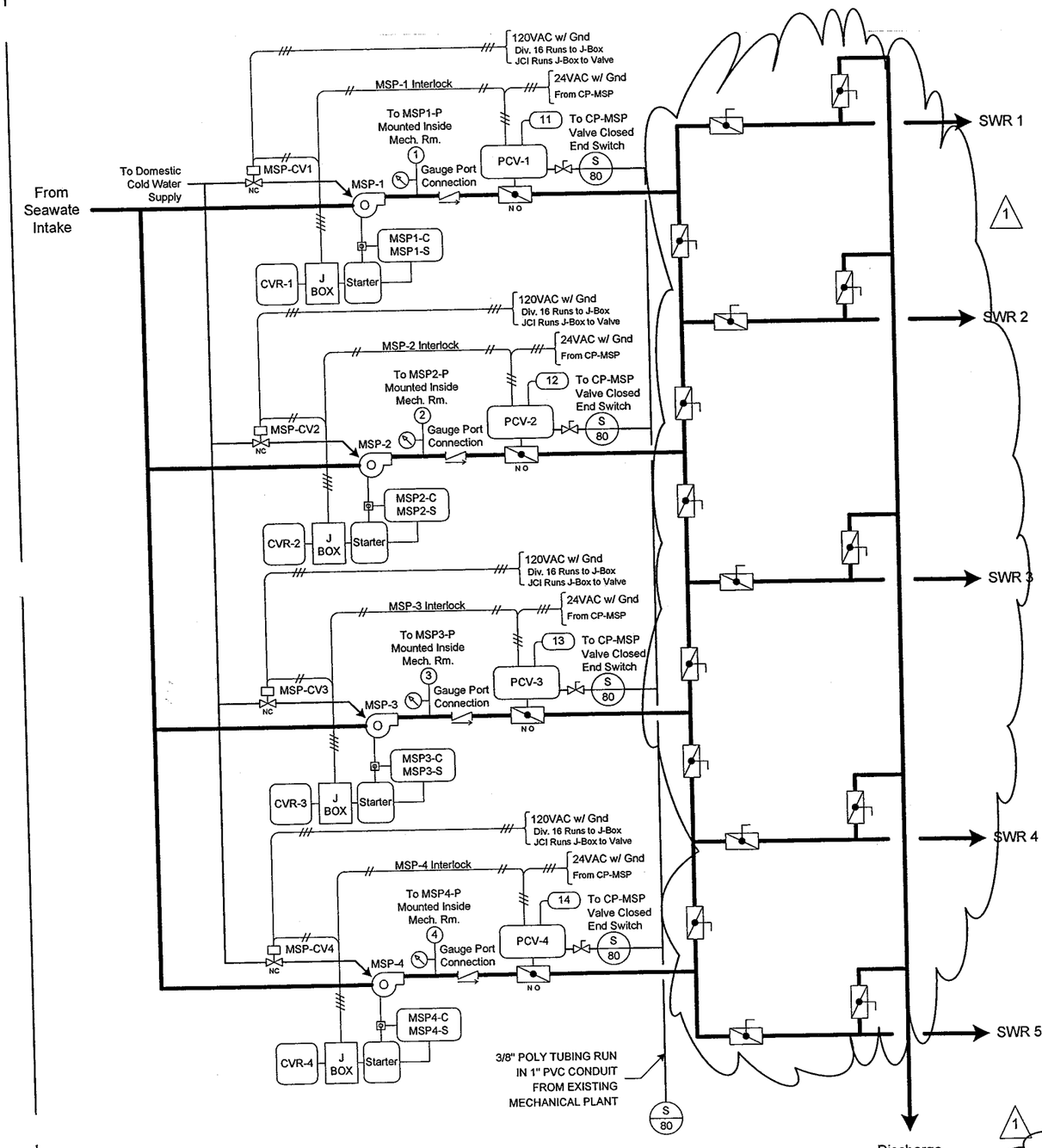
Project Title
MEHRL - Seawater Intake System
Marine Environmental Health Research Laboratory
Charleston, South Carolina

JOHNSON CONTROLS
Systems & Services Division
Branch Information
3820 Faber Place Drive
Suite 700
North Charleston, SC 29405
Phone: 843-744-0213
Fax: 843-744-5553

CONTRACT NUMBER: 1210-0034

DRAWING NUMBER: SSP-1-5

MAIN SEAWATER PUMPS FLOW AND CONTROL DIAGRAM



BILL OF MATERIAL

Designation:	Qty:	Part No.:	Description:
Field Devices:			
CVR-1,CVR-2, CVR-3,CVR-4	4	RIB2401D	DPDT Relay w/Enclosure, 120Vac Coil
MSP-CV1,MSP-CV2, MSP-CV3,MSP-CV4	4	8210G88120	20mm (3/4") Solenoid Valve, NC, 120VAC
MSP1-C/S,MSP2-C/S, MSP3-C/S,MSP4-C/S	4	H-738	SENS,CURR,1A @30VAC/DC,1/3HP,CMND RELAY
PCV-1,PCV-2,	4	F-1000-94	NEEDLE VALVE 3/8" COMP
PCV-3,PCV-4	4	HCYB14800E/SR	200mm (8") B-fly Valve 2-POS,Spring Ret, LS, 24VAC

SEQUENCE OF OPERATION

Main Seawater Pumps

The Main Seawater Pumps will be configured for operation as follows:

a. Main Seawater Pump MSP-1 will be assigned to the Settling Tank Filling/Cleaning System.
b. Main Seawater Pump MSP-3 will be assigned to the Raw Seawater System.
c. Main Seawater Pump MSP-4 will be assigned to the SCDNR Building.
d. Main Seawater Pump MSP-2 will be assigned as a standby pump capable of being assigned to the Settling Tank Filling/Cleaning System, the Raw Seawater System, and the SCDNR Building or set as "inactive". A building operator will make the operating assignment for MSP-2 **AFTER** positioning the manual valves at the Main Seawater Pumps and "Clicking" on the desired standby operation of the system Graphical Display. Whenever MSP-2 is assigned to either system, the pump will be energized as required for that specific systems operation. In addition to selecting the desired system, the building operator will assign MSP-2 to operate as the systems lead or lag pump. Upon the DDC system sensing the failure of the assigned lead pump, the lag pump will be energized to take the place of the lead pump. In addition an alarm will be activated at the Operator Workstation. Once the lag pump is sensed as operating, the failed lead pump will be shutdown and disabled from further operation until its failure alarm is reset by cycling the pumps DDC DISABLE point to ON then OFF again. Whenever MSP-2 is set on the DDC system as "inactive", the building operator will only be capable of energizing the pump manually at the motor starter.

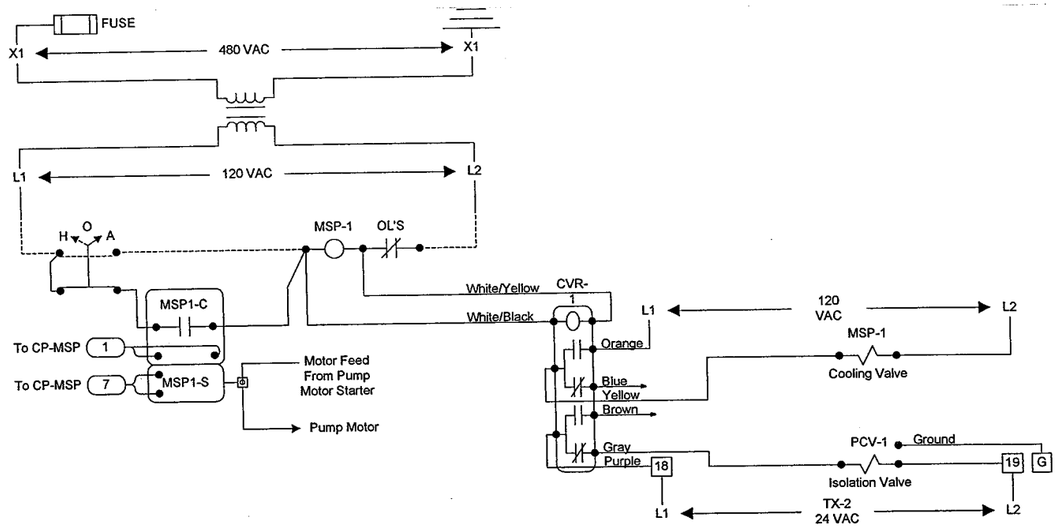
1 ***The DDC System will perform runtime totalization of the MSP status inputs.***

Pump Control Valve (PCV)

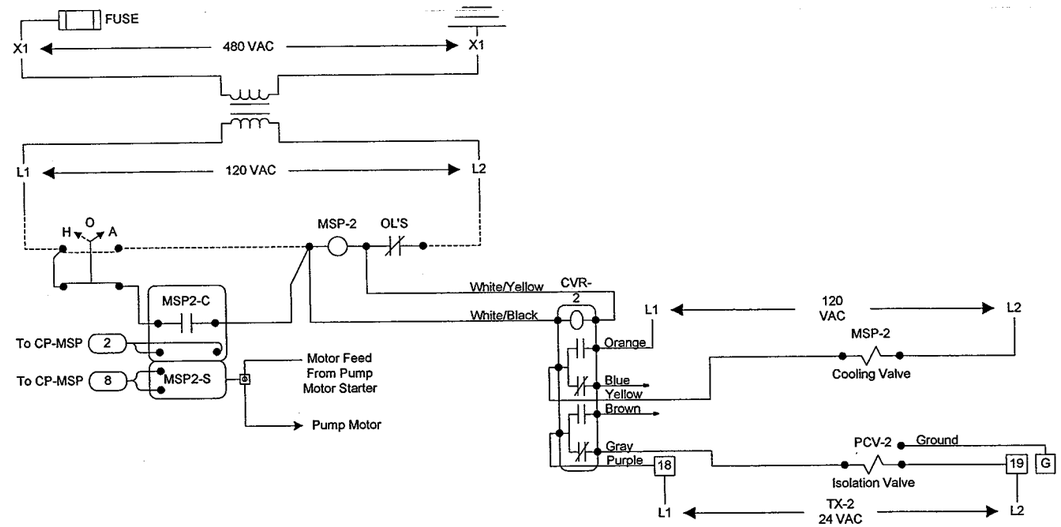
When any pump is started in either the Hand or Automatic positions, the Pump Control Valve PCV and cooling water valve MSP-CV will be electrically interlocked to energize open. The DDC system will monitor the PCV Closed Position Switch. If a pump has been operating for a period of 1 minute (adjustable) and its PCV is still indicating closed, the DDC System will shutdown the pump as described above for MSP-2 and activate an alarm for the failed PCV operation at the Operator Workstation. The DDC system will also monitor the discharge pressure of each MSP prior to the PCV. If a pump has been operating for a period of 3 minutes (adjustable) with the discharge pressure below 103.4Kpa (15psi) (adjustable), the DDC System will shutdown the pump as described above for MSP-2 and activate an alarm for the pumps low pressure operation at the Operator Workstation.

Drawing Title: Main Seawater Pumps Flow and Control Diagrams	Filename: MSP-FLOW.vsd				
		1	Submittal Rejection	6/1/01	RDP
	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN DATE	BY
	Sales Engineer: JBN / Project Manager: JDM / Application Engineer: MAN	DRAWN BY CET DATE 4/24/01		APPROVED BY DATE	
Project Title: MEHRL - Seawater Intake System, Marine Environmental Health Research Laboratory, Charleston, South Carolina	JOHNSON CONTROLS, Systems & Services Division	Branch Information: 3820 Faber Place Drive, Suite 700, North Charleston, SC 29405, Phone: 843-744-0213, Fax: 843-744-5553		CONTRACT NUMBER: 1210-0034	DRAWING NUMBER: MSP-1-1

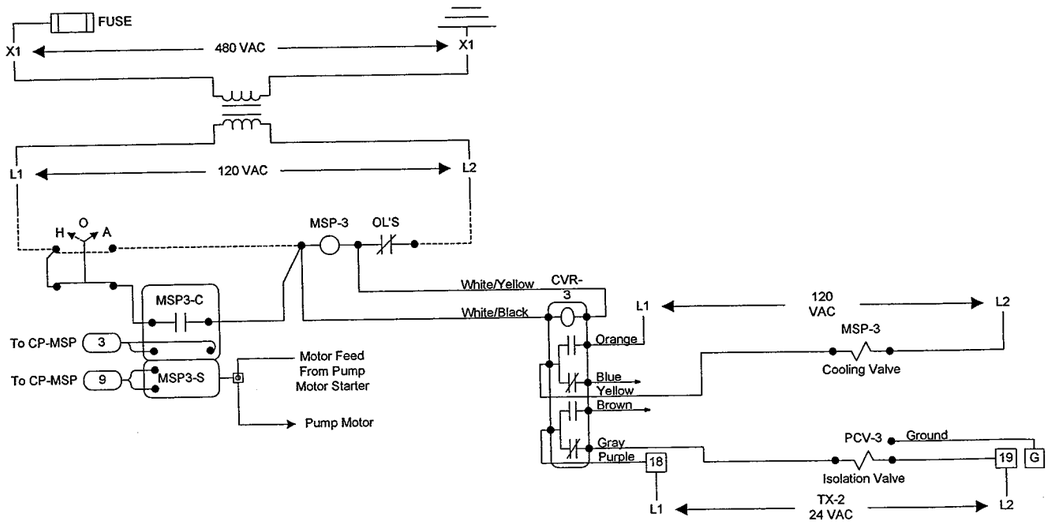
MSP-1 CONTROL INTERLOCK WIRING DETAIL



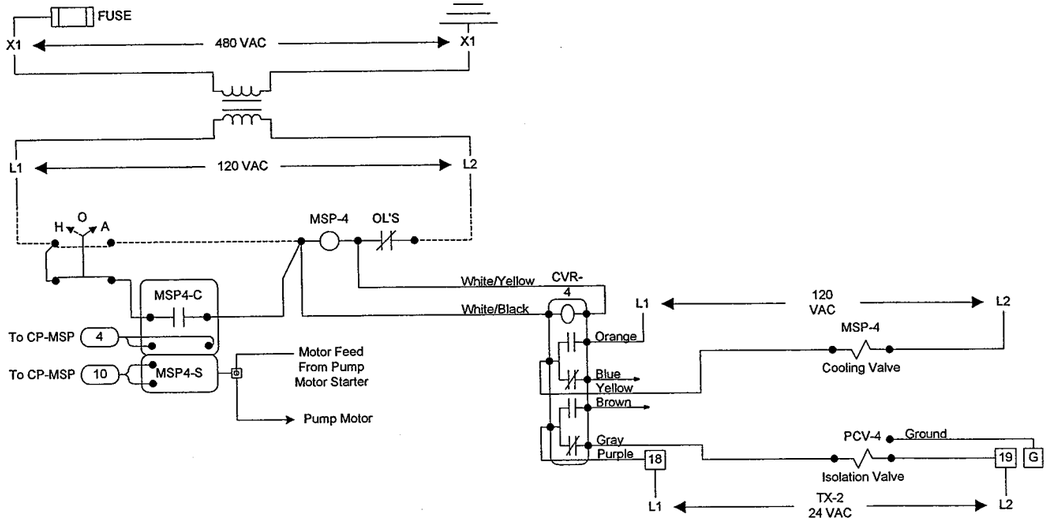
MSP-2 CONTROL INTERLOCK WIRING DETAIL



MSP-3 CONTROL INTERLOCK WIRING DETAIL



MSP-4 CONTROL INTERLOCK WIRING DETAIL



Wiring Legend

- Pneumatic Tubing
- Wire
- Cable
- PCV Terminals
- Wired by JCI
- Wired by other
- VAC Power

Drawing Title: MSP Control Interlock Wiring Diagrams

Filename: MSP-WIRE.vsd

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JBN	JDM	MAN	BY CET DATE 4/24/01	BY DATE

Project Title: MEHRL - Seawater Intake System
Marine Environmental Health Research Laboratory
Charleston, South Carolina

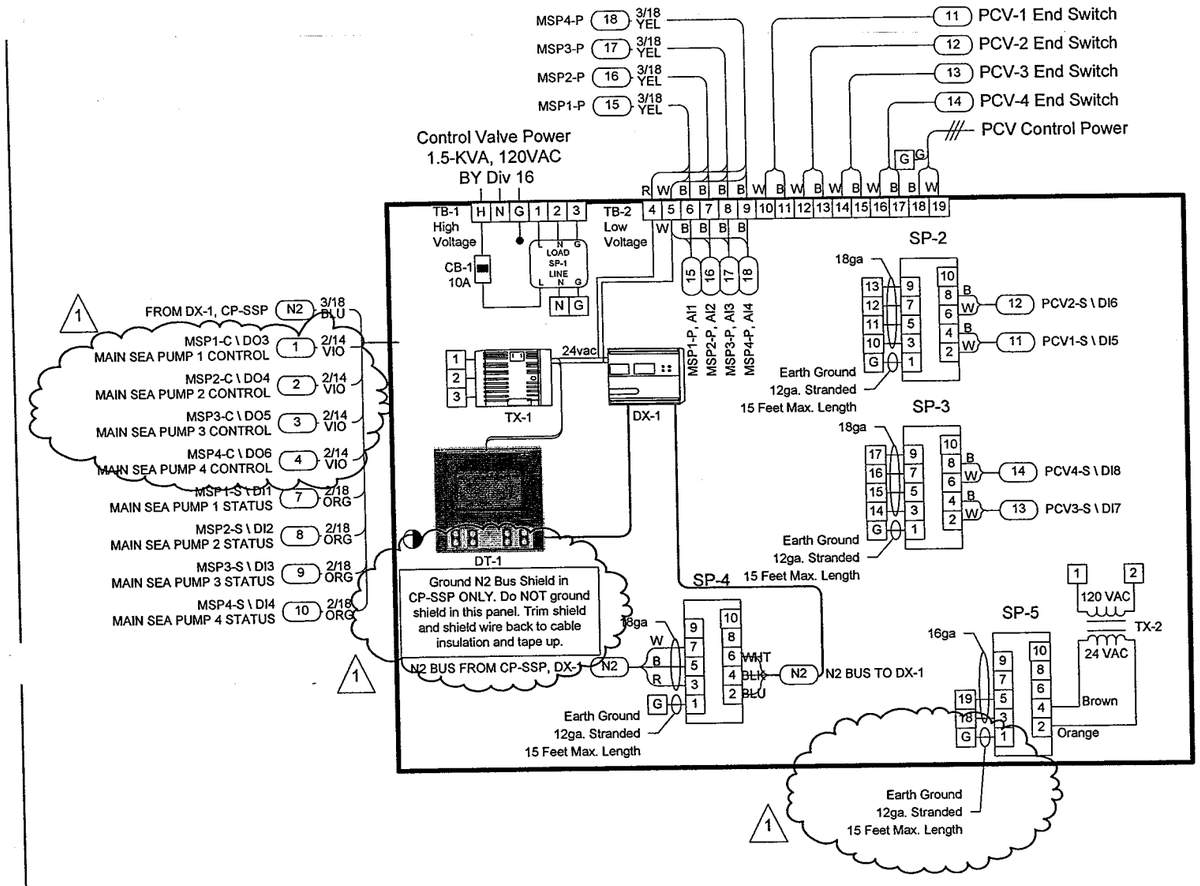
JOHNSON CONTROLS
Systems & Services Division

Branch Information
3820 Faber Place Drive
Suite 700
North Charleston, SC
29405
Phone: 843-744-0213
Fax: 843-744-5553

CONTRACT NUMBER: 1210-0034

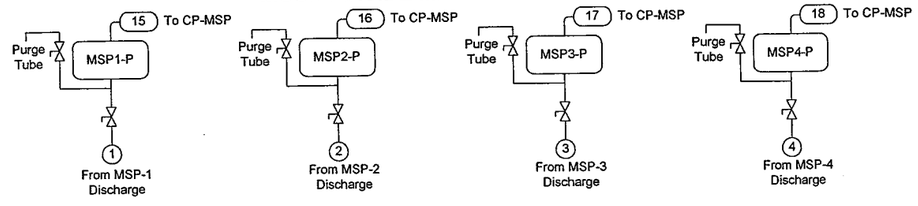
DRAWING NUMBER: MSP-1-2

MAIN SEAWATER PUMPS CONTROL PANEL DIAGRAM



MAIN SEAWATER PUMPS DISCHARGE PRESSURE SENSORS DETAIL

MOUNT INSIDE MECHANICAL ROOM

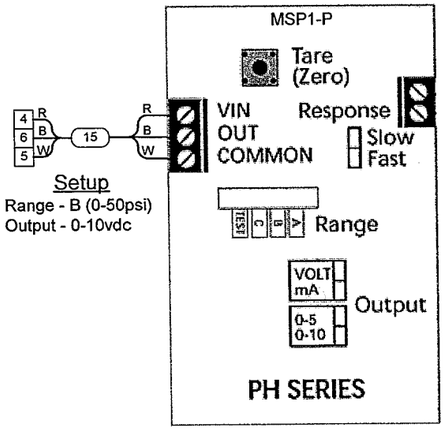


BILL OF MATERIAL

Designation:	Qty:	Part No.:	Description:
Field Devices:			
MSP1-P,MSP2-P, MSP3-P,MSP4-P	8	F-1000-93	NEEDLE VALVE 1/4" COMP
	4	PHP-100	Pressure Transducer 0-100, 0-10vdc
Panel Devices:			
ACC	2	M-8000-382	NAMEPLT,FORMICA,2 LINE
	20	PD-113-41	TERMINAL BLOCK, UNIVERSAL
	2	PD-113-43	END SECTION, TERMINAL BLOCK
	1	PD-113-5	MTG CHANNEL,MED/HVY,6 FT
	4	PD-120-2	WIRE DUCT,1IN X2IN ,GRAY,1 FT
	4	PD-120-4	WIRE DUCT CVR,1IN,GRAY,1FT
	4	PD-120-5	WIRE DUCT,2IN X2IN ,GRAY,1 FT
	4	PD-120-9	WIRE DUCT CVR,2IN,GRAY,1FT
CB-1	1	PD-112-9	CIRCUIT BREAKER QOU-110
CP-MSP	1	M-8100-2430	PANEL,STANDARD,12 UNITS
DT-1	1	DT-9100-8104	DX LCD DISPLAY
DX-1	1	DX-9100-8454	CNTRLR,DIG,DX,8AI,8AO,6BO,8BI
	1	DX-9100-8990	CNTRLR,DIG,DX,MTG BASE,F/ DX-91?0-8454
	1	DX-9100-8991	KIT,CNTRLR,DIG,DX,WIRING PROTECTION
SP-1	1	IC+115	Islatrol Plus Line Filter 120VAC, 15A
SP-2,SP-3	2	D-MOD-024	Signal Surge Protector 24 Volts
SP-4	1	D-MOD-016-LC	Data Surge Protector RS485
SP-5	1	D-MOD-5-024	Line Surge Protector 24 Volts 5A max
TX-1	1	AS-XFR100-1	***XFMR,92VA,120-240/24VAC*** 1
TX-2	1	Y66T13-0	XFMR,120-208-240/24,75VA,FOOT 30IN LEADS

MAIN SEAWATER PUMP 1 DISCHARGE PRESSURE SENSOR DETAIL

TYPICAL FOR MSP2-P, MSP3-P & MSP4-P



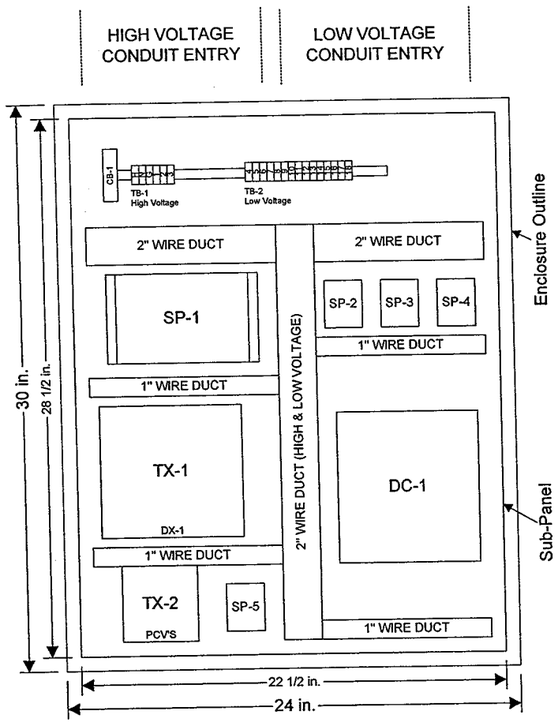
Drawing Title	Filename: MSP-PANEL.vsd					
MSP Control Panel Component Diagram		.	.	.	.	.	.
		.	.	.	.	.	.
		.	1	Submittal Rejection	.	6/1/01	RDP
		REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
		Sales Engineer: JBN	Project Manager: JDM	Application Engineer: MAN	DRAWN: BY CET DATE 4/24/01	APPROVED: BY . DATE .	

Project Title		Branch Information	CONTRACT NUMBER
MEHRL - Seawater Intake System Marine Environmental Health Research Laboratory Charleston, South Carolina	JOHNSON CONTROLS Systems & Services Division	3820 Faber Place Drive Suite 700 North Charleston, SC 29405 Phone: 843-744-0213 Fax: 843-744-5553	1210-0034 DRAWING NUMBER MSP-1-3

CP-MSP PANEL LAYOUT

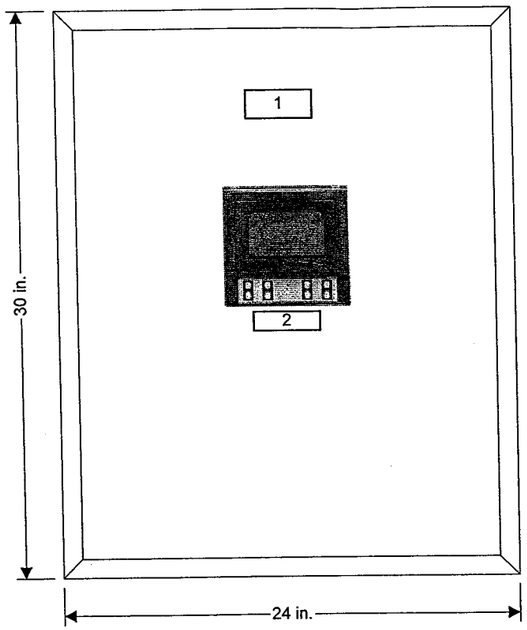
SCALE: 1/8" = 1"

LOCATED IN EXISTING MECHANICAL ROOM



CP-MSP PANEL FACE DETAIL

SCALE: 1/8" = 1"



NAMETAG SCHEDULE - ALL TAGS 1" X 3"

TAG#	ITEM	DESCRIPTION
1	CP-SSP	Main Seawater Pump Control Panel CP-MSP
2	DT-1	Main Seawater Pump Local Display Terminal

Drawing Title: CP-MSP Panel Detail Layout Drawing

Filename: CP-MSP.vsd

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JBN	JDM	MAN	BY CET DATE 4/24/01	BY DATE

Project Title: MEHRL - Seawater Intake System
Marine Environmental Health Research Laboratory
Charleston, South Carolina

JOHNSON CONTROLS
Systems & Services Division

Branch Information
3820 Faber Place Drive
Suite 700
North Charleston, SC 29405
Phone: 843-744-0213
Fax: 843-744-5553

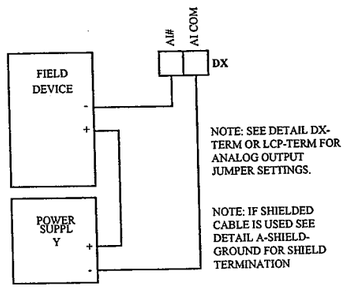
CONTRACT NUMBER: 1210-0034

DRAWING NUMBER: MSP-1-4

Electrician/Fitter		Point Information			Controller Information						Panel Information					Intermediate Device					Field Device					
Cable Tag	Point Type	System Name	Object Name	Expanded ID	Controller Type	Trunk Nbr	Trunk Addr.	Cable Destination Bay/Terminal	Module Type	Termination Out	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring /Tubing	Termination In	Device	Termination Out	Location	Wiring /Tubing	Termination In	Device	Location	Ref Detail Shape	Comment
		MSP			DX9100						CP-MSP	Existing Mech Room		M5.05												Power to Controller
		MSP			DX9100	1	3				CP-MSP	Existing Mech Room	0	M5.05												N2 Trunk
DO-3	MSP	MSP1-C	Main Sea Pump 1 Control		DX9100	1	3	DO-3		DO3,24V	CP-MSP	Existing Mech Room	0	M5.05	1	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
DO-4	MSP	MSP2-C	Main Sea Pump 2 Control		DX9100	1	3	DO-4		DO4,24V	CP-MSP	Existing Mech Room	0	M5.05	2	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
DO-5	MSP	MSP3-C	Main Sea Pump 3 Control		DX9100	1	3	DO-5		DO5,24V	CP-MSP	Existing Mech Room	0	M5.05	3	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
DO-6	MSP	MSP4-C	Main Sea Pump 4 Control		DX9100	1	3	DO-6		DO6,24V	CP-MSP	Existing Mech Room	0	M5.05	4	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
DO-7	MSP				DX9100	1	3	DO-7			CP-MSP	Existing Mech Room	0	M5.05	5											
DO-8	MSP				DX9100	1	3	DO-8			CP-MSP	Existing Mech Room	0	M5.05	6											
DI-1	MSP	MSP1-S	Main Sea Pump 1 Status		DX9100	1	3	DI-1		DI1,COM	CP-MSP	Existing Mech Room	0	M5.05	7						2/18	Status Output	Current Switch		aDX60	
DI-2	MSP	MSP2-S	Main Sea Pump 2 Status		DX9100	1	3	DI-2		DI2,COM	CP-MSP	Existing Mech Room	0	M5.05	8						2/18	Status Output	Current Switch		aDX60	
DI-3	MSP	MSP3-S	Main Sea Pump 3 Status		DX9100	1	3	DI-3		DI3,COM	CP-MSP	Existing Mech Room	0	M5.05	9						2/18	Status Output	Current Switch		aDX60	
DI-4	MSP	MSP4-S	Main Sea Pump 4 Status		DX9100	1	3	DI-4		DI4,COM	CP-MSP	Existing Mech Room	0	M5.05	10						2/18	Status Output	Current Switch		aDX60	
DI-5	MSP	PCV1-S	MSP-1 Cntrl Valve Status		DX9100	1	3	DI-5		DI5,COM	CP-MSP	Existing Mech Room	0	M5.05	11						2/18	Com, NO	Valve ClosedTravel Switch		DX70	
DI-6	MSP	PCV2-S	MSP-2 Cntrl Valve Status		DX9100	1	3	DI-6		DI6,COM	CP-MSP	Existing Mech Room	0	M5.05	12						2/18	Com, NO	Valve ClosedTravel Switch		DX70	
DI-7	MSP	PCV3-S	MSP-3 Cntrl Valve Status		DX9100	1	3	DI-7		DI7,COM	CP-MSP	Existing Mech Room	0	M5.05	13						2/18	Com, NO	Valve ClosedTravel Switch		DX70	
DI-8	MSP	PCV4-S	MSP-4 Cntrl Valve Status		DX9100	1	3	DI-8		DI8,COM	CP-MSP	Existing Mech Room	0	M5.05	14						2/18	Com, NO	Valve ClosedTravel Switch		DX70	
AI-1	MSP	MSP1-P	MSP-1 Discharge Pressure		DX9100	1	3	AI-1		AI1,AICOM,24VAC	CP-MSP	Existing Mech Room	0	M5.05	15						3/18	See Wiring Detail	Veris PH 0-10VDC		DX2	
AI-2	MSP	MSP2-P	MSP-2 Discharge Pressure		DX9100	1	3	AI-2		AI2,AICOM,24VAC	CP-MSP	Existing Mech Room	0	M5.05	16						3/18	See Wiring Detail	Veris PH 0-10VDC		DX2	
AI-3	MSP	MSP3-P	MSP-3 Discharge Pressure		DX9100	1	3	AI-3		AI3,AICOM,24VAC	CP-MSP	Existing Mech Room	0	M5.05	17						3/18	See Wiring Detail	Veris PH 0-10VDC		DX2	
AI-4	MSP	MSP4-P	MSP-4 Discharge Pressure		DX9100	1	3	AI-4		AI4,AICOM,24VAC	CP-MSP	Existing Mech Room	0	M5.05	18						3/18	See Wiring Detail	Veris PH 0-10VDC		DX2	
AI-5	MSP				DX9100	1	3	AI-5			CP-MSP	Existing Mech Room	0	M5.05	19											
AI-6	MSP				DX9100	1	3	AI-6			CP-MSP	Existing Mech Room	0	M5.05	20											
AI-7	MSP				DX9100	1	3	AI-7			CP-MSP	Existing Mech Room	0	M5.05	21											
AI-8	MSP				DX9100	1	3	AI-8			CP-MSP	Existing Mech Room	0	M5.05	22											
AO-1	MSP				DX9100	1	3	AO-1			CP-MSP	Existing Mech Room	0	M5.05	23											
AO-2	MSP				DX9100	1	3	AO-2			CP-MSP	Existing Mech Room	0	M5.05	24											
AO-9	MSP				DX9100	1	3	AO-9			CP-MSP	Existing Mech Room	0	M5.05	25											
AO-10	MSP				DX9100	1	3	AO-10			CP-MSP	Existing Mech Room	0	M5.05	26											
AO-11	MSP				DX9100	1	3	AO-11			CP-MSP	Existing Mech Room	0	M5.05	27											
AO-12	MSP				DX9100	1	3	AO-12			CP-MSP	Existing Mech Room	0	M5.05	28											
AO-13	MSP				DX9100	1	3	AO-13			CP-MSP	Existing Mech Room	0	M5.05	29											
AO-14	MSP				DX9100	1	3	AO-14			CP-MSP	Existing Mech Room	0	M5.05	30											

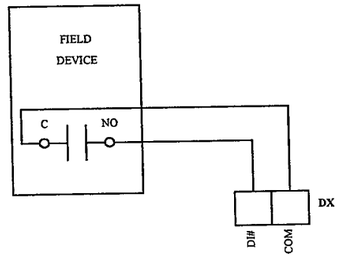
DETAIL DX2:

CURRENT INPUT EXTERNAL SOURCE



DETAIL DX70:

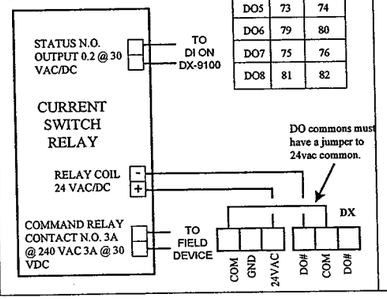
N.O. BINARY INPUT



DETAIL aDX42:

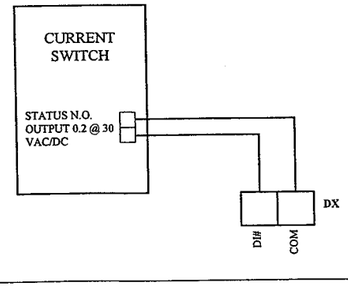
24VAC BINARY OUTPUT TO CURRENT SWITCH RELAY

	DO	COM
DO3	71	72
DO4	77	78
DO5	73	74
DO6	79	80
DO7	75	76
DO8	81	82



DETAIL aDX60:

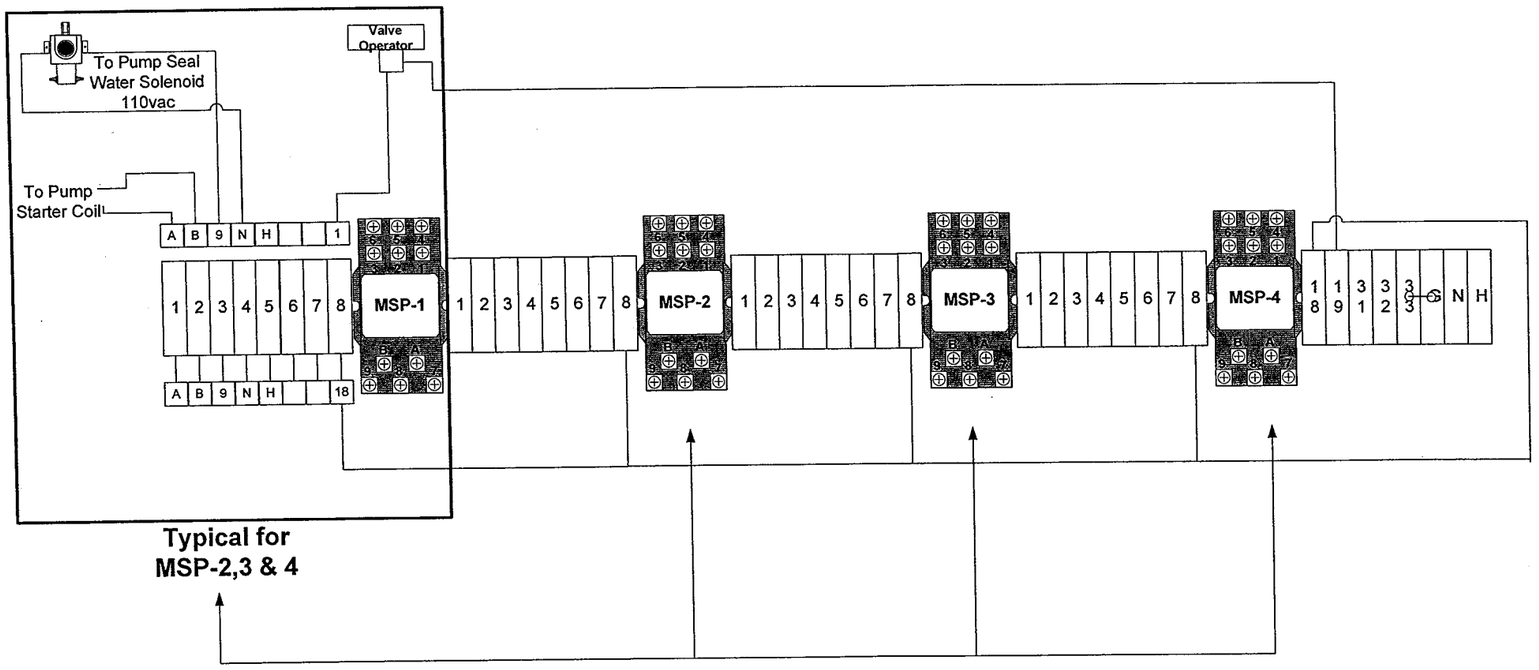
VERIS CURRENT SWITCH



Drawing Title: CP-MSP Point Schedule	Filename: CP-MSP-PT.vsd		
Project Title: MEHRL - Seawater Intake System Marine Environmental Health Research Laboratory Charleston, South Carolina	JOHNSON CONTROLS Systems & Services Division	Branch Information: 3820 Faber Place Drive, Suite 700, North Charleston, SC 29405, Phone: 843-744-0213, Fax: 843-744-5553	CONTRACT NUMBER: 1210-0034 DRAWING NUMBER: MSP-1-5

REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JBN	JDM	MAN	BY CET DATE 4/24/01	BY . DATE .



Drawing Title: MSP Interlock.vsd	Filename: MSP Interlock.vsd					
	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
Sales Engineer: JBN	Project Manager: JDM	Application Engineer: MAN	DRAWN: BY CET DATE 4/24/01	APPROVED: BY	DATE	

Project Title

MEHRL - Seawater Intake System
Marine Environmental Health
Research Laboratory
Charleston, South Carolina

JOHNSON CONTROLS
Systems & Services Division

Branch Information
3820 Faber Place Drive
Suite 700
North Charleston, SC
29405
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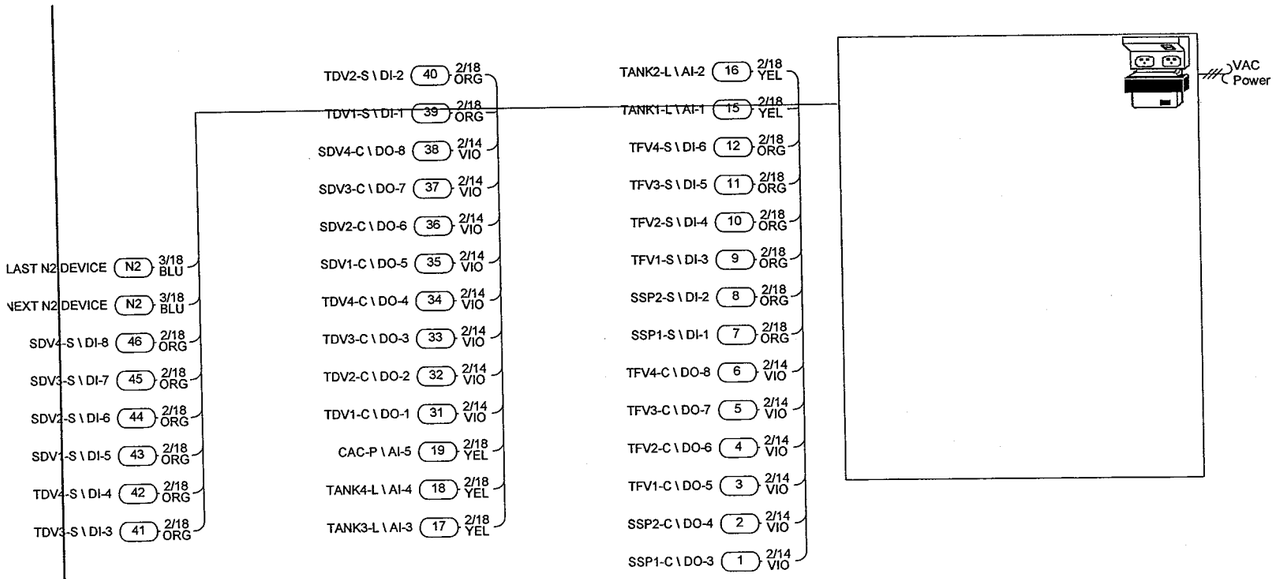
Fax: 843-744-5553

CONTRACT NUMBER: **1210-0034**

DRAWING NUMBER



Drawing Title: hvac1.vsd					1/1/1999	
					1/1/1999	
					1/1/1999	
	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
	Sales Engineer: JBN / Project Manager: JDM / Application Engineer: RDP		DRAWN BY / DATE 0		APPROVED BY / DATE 0	

Project Title:
MEHRL - Seawater Intake System
Marine Environmental Health Research Laboratory
Charleston, South Carolina

JOHNSON CONTROLS
Systems & Services Division

Branch Information
JCI-Atlanta
1350 Northmeadow Pkwy
Suite 100
Roswell
GA 30076
Phone: 770-663-0663
Fax: 770-663-1490

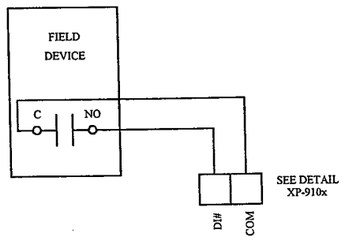
CONTRACT NUMBER: **1210-0034**

DRAWING NUMBER:

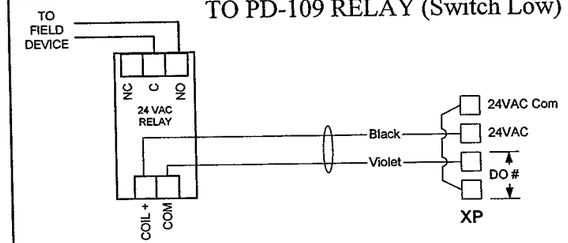
Electrician/Fitter		Point Information			Controller Information						Panel Information					Intermediate Device					Field Device					
Cable Tag	Point Type	System Name	Object Name	Expanded ID	Controller Type	Trunk Nbr	Trunk Addr.	Cable Destination Bay/Terminal	Module Type	Termination Out	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring /Tubing	Termination In	Device	Termination Out	Location	Wiring /Tubing	Termination In	Device	Location	Ref Detail Shape	Comment
		SEAWATER			DX9100	1	1				CP-SSP	Existing Mech Plant	0	M5.05												N2 Trunk
	DO-3	SEAWATER	SSP1-C	Settled Sea Pump 1 Cntrl	DX9100	1	1	DO-3		DO3,24V	CP-SSP	Existing Mech Plant	0	M5.05	1	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
2	DO-4	SEAWATER	SSP2-C	Settled Sea Pump 2 Cntrl	DX9100	1	1	DO-4		DO4,24V	CP-SSP	Existing Mech Plant	0	M5.05	2	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
3	DO-5	SEAWATER	TFV1-C	Tank Fill Valve 1 Cntrl	DX9100	1	1	DO-5		DO5,24V	CP-SSP	Existing Mech Plant	0	M5.05	3	2/18	Coil	Relay R-1	Com,NO		2/14	See Wiring Detail	Valve Actuator		aDX41	
4	DO-6	SEAWATER	TFV2-C	Tank Fill Valve 2 Cntrl	DX9100	1	1	DO-6		DO6,24V	CP-SSP	Existing Mech Plant	0	M5.05	4	2/18	Coil	Relay R-2	Com,NO		2/14	See Wiring Detail	Valve Actuator		aDX41	
5	DO-7	SEAWATER	TFV3-C	Tank Fill Valve 3 Cntrl	DX9100	1	1	DO-7		DO7,24V	CP-SSP	Existing Mech Plant	0	M5.05	5	2/18	Coil	Relay R-3	Com,NO		2/14	See Wiring Detail	Valve Actuator		aDX41	
6	DO-8	SEAWATER	TFV4-C	Tank Fill Valve 4 Cntrl	DX9100	1	1	DO-8		DO8,24V	CP-SSP	Existing Mech Plant	0	M5.05	6	2/18	Coil	Relay R-4	Com,NO		2/14	See Wiring Detail	Valve Actuator		aDX41	
7	DI-1	SEAWATER	SSP1-S	Settled Sea Pump 1 Sts	DX9100	1	1	DI-1		DI1,COM	CP-SSP	Existing Mech Plant	0	M5.05	7						2/18	Status Output	Current Switch		aDX60	
8	DI-2	SEAWATER	SSP2-S	Settled Sea Pump 2 Sts	DX9100	1	1	DI-2		DI2,COM	CP-SSP	Existing Mech Plant	0	M5.05	8						2/18	Status Output	Current Switch		aDX60	
9	DI-3	SEAWATER	TFV1-S	Tank Fill Valve 1 Status	DX9100	1	1	DI-3		DI3,COM	CP-SSP	Existing Mech Plant	0	M5.05	9						2/18	Com, NO	Valve Travel Switch		DX70	
10	DI-4	SEAWATER	TFV2-S	Tank Fill Valve 2 Status	DX9100	1	1	DI-4		DI4,COM	CP-SSP	Existing Mech Plant	0	M5.05	10						2/18	Com, NO	Valve Travel Switch		DX70	
11	DI-5	SEAWATER	TFV3-S	Tank Fill Valve 3 Status	DX9100	1	1	DI-5		DI5,COM	CP-SSP	Existing Mech Plant	0	M5.05	11						2/18	Com, NO	Valve Travel Switch		DX70	
12	DI-6	SEAWATER	TFV4-S	Tank Fill Valve 4 Status	DX9100	1	1	DI-6		DI6,COM	CP-SSP	Existing Mech Plant	0	M5.05	12						2/18	Com, NO	Valve Travel Switch		DX70	
13	DI-7	SEAWATER			DX9100	1	1	DI-7			CP-SSP	Existing Mech Plant	0	M5.05	13											
14	DI-8	SEAWATER			DX9100	1	1	DI-8			CP-SSP	Existing Mech Plant	0	M5.05	14											
15	AI-1	SEAWATER	TANK1-L	Settling Tank 1 Level	DX9100	1	1	AI-1		AI1,AICOM	CP-SSP	Existing Mech Plant	0	M5.05	15						2/18	See Wiring Detail	4-20mA ALP SENSOR		DX2	
16	AI-2	SEAWATER	TANK2-L	Settling Tank 2 Level	DX9100	1	1	AI-2		AI2,AICOM	CP-SSP	Existing Mech Plant	0	M5.05	16						2/18	See Wiring Detail	4-20mA ALP SENSOR		DX2	
17	AI-3	SEAWATER	TANK3-L	Settling Tank 3 Level	DX9100	1	1	AI-3		AI3,AICOM	CP-SSP	Existing Mech Plant	0	M5.05	17						2/18	See Wiring Detail	4-20mA ALP SENSOR		DX2	
18	AI-4	SEAWATER	TANK4-L	Settling Tank 4 Level	DX9100	1	1	AI-4		AI4,AICOM	CP-SSP	Existing Mech Plant	0	M5.05	18						2/18	See Wiring Detail	4-20mA ALP SENSOR		DX2	
19	AI-5	SEAWATER	CAC-P	Control Air Pressure	DX9100	1	1	AI-5		AI5,+15V	CP-SSP	Existing Mech Plant	0	M5.05	19						2/18	Black,White	Kele PTX1		aDX1	
20	AI-6	SEAWATER			DX9100	1	1	AI-6			CP-SSP	Existing Mech Plant	0	M5.05	20											
21	AI-7	SEAWATER			DX9100	1	1	AI-7			CP-SSP	Existing Mech Plant	0	M5.05	21											
22	AI-8	SEAWATER			DX9100	1	1	AI-8			CP-SSP	Existing Mech Plant	0	M5.05	22											
23	AO-1	SEAWATER			DX9100	1	1	AO-1			CP-SSP	Existing Mech Plant	0	M5.05	23											
24	AO-2	SEAWATER			DX9100	1	1	AO-2			CP-SSP	Existing Mech Plant	0	M5.05	24											
25	AO-9	SEAWATER			DX9100	1	1	AO-9			CP-SSP	Existing Mech Plant	0	M5.05	25											
26	AO-10	SEAWATER			DX9100	1	1	AO-10			CP-SSP	Existing Mech Plant	0	M5.05	26											
27	AO-11	SEAWATER			DX9100	1	1	AO-11			CP-SSP	Existing Mech Plant	0	M5.05	27											
28	AO-12	SEAWATER			DX9100	1	1	AO-12			CP-SSP	Existing Mech Plant	0	M5.05	28											
29	AO-13	SEAWATER			DX9100	1	1	AO-13			CP-SSP	Existing Mech Plant	0	M5.05	29											
30	AO-14	SEAWATER			DX9100	1	1	AO-14			CP-SSP	Existing Mech Plant	0	M5.05	30											
		SEAWATER			XT9100						CP-SSP	Existing Mech Plant		M5.05												
		SEAWATER			XT9100	1	2				CP-SSP	Existing Mech Plant	0	M5.05												
31	XT1DO1	SEAWATER	TDV1-C	Tank Draw Valve 1 Cntrl	XP9103	1	2	DO-1		DO1,DO1	CP-SSP	Existing Mech Plant	0	M5.05	31	2/18	Coil	Relay R-5	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
32	XT1DO2	SEAWATER	TDV2-C	Tank Draw Valve 2 Cntrl	XP9103	1	2	DO-2		DO2,DO2	CP-SSP	Existing Mech Plant	0	M5.05	32	2/18	Coil	Relay R-6	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
33	XT1DO3	SEAWATER	TDV3-C	Tank Draw Valve 3 Cntrl	XP9103	1	2	DO-3		DO3,DO3	CP-SSP	Existing Mech Plant	0	M5.05	33	2/18	Coil	Relay R-7	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
34	XT1DO4	SEAWATER	TDV4-C	Tank Draw Valve 4 Cntrl	XP9103	1	2	DO-4		DO4,DO4	CP-SSP	Existing Mech Plant	0	M5.05	34	2/18	Coil	Relay R-8	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
35	XT1DO5	SEAWATER	SDV1-C	Sump Drain Valve 1 Cntrl	XP9103	1	2	DO-5		DO5,DO5	CP-SSP	Existing Mech Plant	0	M5.05	35	2/18	Coil	Relay R-9	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
36	XT1DO6	SEAWATER	SDV2-C	Sump Drain Valve 2 Cntrl	XP9103	1	2	DO-6		DO6,DO6	CP-SSP	Existing Mech Plant	0	M5.05	36	2/18	Coil	Relay R-10	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
37	XT1DO7	SEAWATER	SDV3-C	Sump Drain Valve 3 Cntrl	XP9103	1	2	DO-7		DO7,DO7	CP-SSP	Existing Mech Plant	0	M5.05	37	2/18	Coil	Relay R-11	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
38	XT1DO8	SEAWATER	SDV4-C	Sump Drain Valve 4 Cntrl	XP9103	1	2	DO-8		DO8,DO8	CP-SSP	Existing Mech Plant	0	M5.05	38	2/18	Coil	Relay R-12	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
39	XT2DI1	SEAWATER	TDV1-S	Tank Draw Valve 1 Status	XP9105NC	1	2	DI-1		DI1,COM	CP-SSP	Existing Mech Plant	0	M5.05	39						2/18	Com, NO	Valve Travel Switch		XP40	
40	XT2DI2	SEAWATER	TDV2-S	Tank Draw Valve 2 Status	XP9105NC	1	2	DI-2		DI2,COM	CP-SSP	Existing Mech Plant	0	M5.05	40						2/18	Com, NO	Valve Travel Switch		XP40	
41	XT2DI3	SEAWATER	TDV3-S	Tank Draw Valve 3 Status	XP9105NC	1	2	DI-3		DI3,COM	CP-SSP	Existing Mech Plant	0	M5.05	41						2/18	Com, NO	Valve Travel Switch		XP40	
42	XT2DI4	SEAWATER	TDV4-S	Tank Draw Valve 4 Status	XP9105NC	1	2	DI-4		DI4,COM	CP-SSP	Existing Mech Plant	0	M5.05	42						2/18	Com, NO	Valve Travel Switch		XP40	
43	XT2DI5	SEAWATER	SDV1-S	Sump Drain Valve 1 Sts	XP9105NC	1	2	DI-5		DI5,COM	CP-SSP	Existing Mech Plant	0	M5.05	43						2/18	Com, NO	Valve Travel Switch		XP40	
44	XT2DI6	SEAWATER	SDV2-S	Sump Drain Valve 2 Sts	XP9105NC	1	2	DI-6		DI6,COM	CP-SSP	Existing Mech Plant	0	M5.05	44						2/18	Com, NO	Valve Travel Switch		XP40	
45	XT2DI7	SEAWATER	SDV3-S	Sump Drain Valve 3 Sts	XP9105NC	1	2	DI-7		DI7,COM	CP-SSP	Existing Mech Plant	0	M5.05	45						2/18	Com, NO	Valve Travel Switch		XP40	
46	XT2DI8	SEAWATER	SDV4-S	Sump Drain Valve 4 Sts	XP9105NC	1	2	DI-8		DI8,COM	CP-SSP	Existing Mech Plant	0	M5.05	46											

DETAIL XP40

N.O. BINARY INPUT

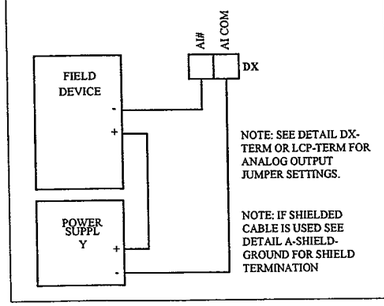


DETAIL XP41 24 VAC BINARY OUTPUT TO PD-109 RELAY (Switch Low)



DETAIL DX2:

CURRENT INPUT EXTERNAL SOURCE

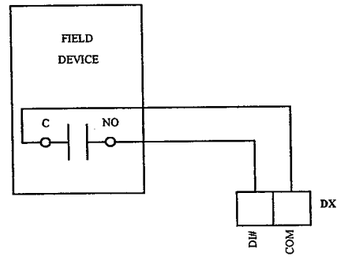


NOTE: SEE DETAIL DX-TERM OR LCP-TERM FOR ANALOG OUTPUT JUMPER SETTINGS.

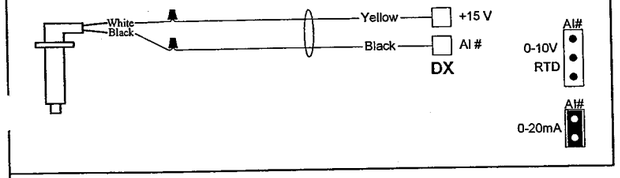
NOTE: IF SHIELDED CABLE IS USED SEE DETAIL A-SHIELD-GROUND FOR SHIELD TERMINATION

DETAIL DX70:

N.O. BINARY INPUT



DETAIL aDX1 CURRENT INPUT from KELE PTX1 PRESSURE SENSOR



					1/1/1999	
					1/1/1999	
					1/1/1999	
REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY

Drawing Title: **hvac2.vsd**

Sales Engineer	Project Manager	Application Engineer	DRAWN		APPROVED	
JBN	JDM	RDP	BY	DATE 0	BY	DATE 0

Project Title: **MEHRL - Seawater Intake System**
Marine Environmental Health Research Laboratory
Charleston, South Carolina

JOHNSON CONTROLS
Systems & Services Division

Branch Information
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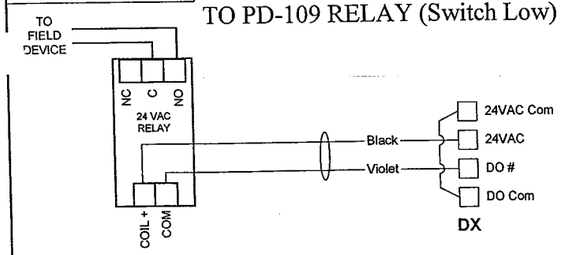
1350 Northmeadow Pkwy
Suite 100
Roswell
GA 30076
Phone: 770-663-0663
Fax: 770-663-1490

CONTRACT NUMBER: **1210-0034**

DRAWING NUMBER

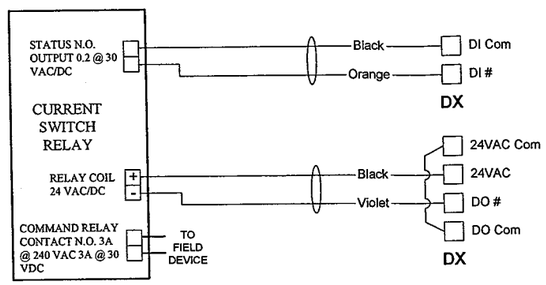
DETAIL aDX41

24 VAC BINARY OUTPUT TO PD-109 RELAY (Switch Low)



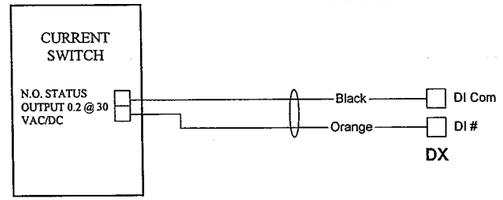
DETAIL aDX42

24VAC BINARY OUTPUT TO CURRENT SWITCH RELAY (Switch Low)

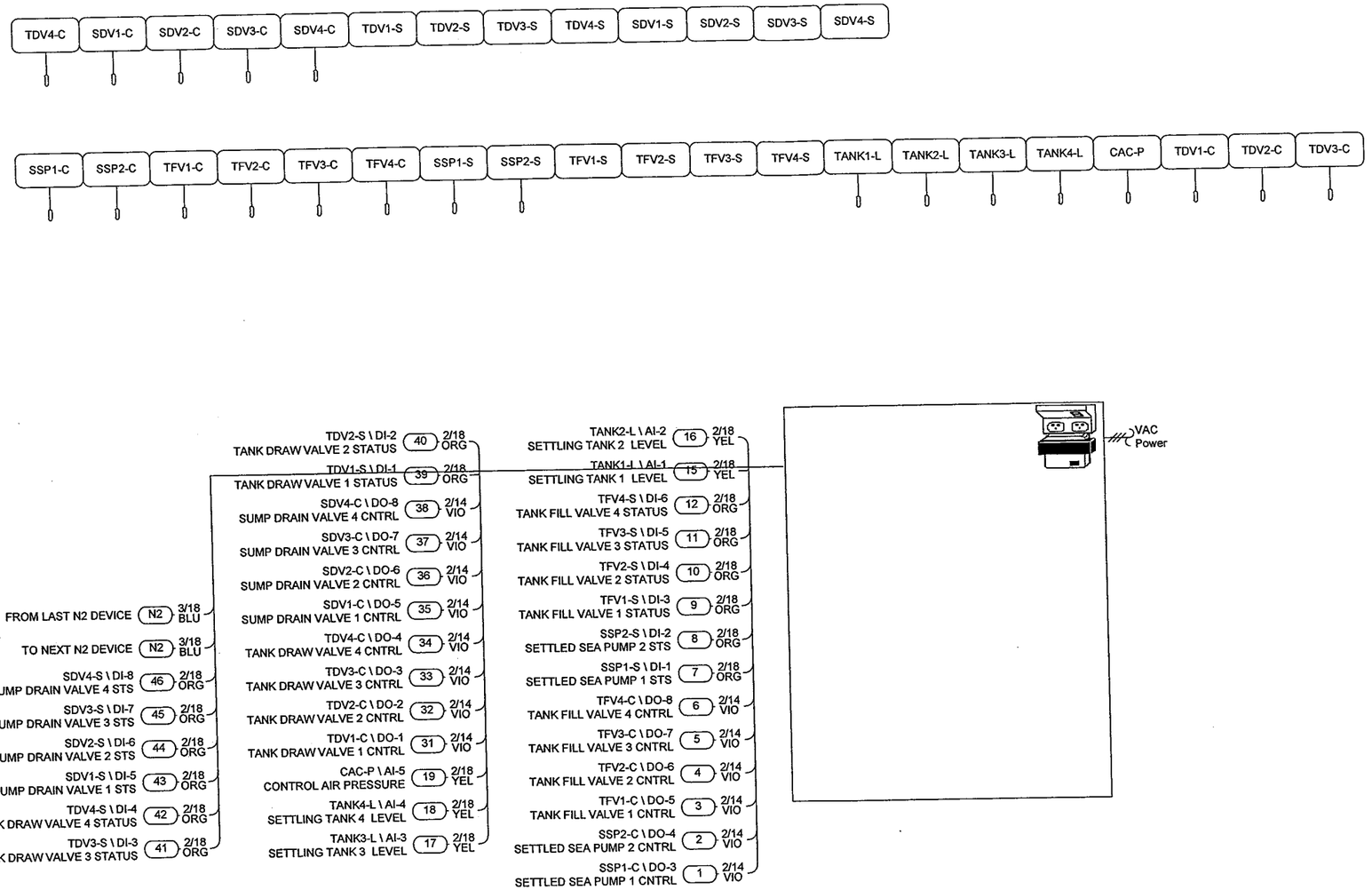


DETAIL aDX60

BINARY INPUT from VERIS CURRENT SWITCH



Drawing Title						1/1/1999	
						1/1/1999	
						1/1/1999	
	REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY
	Sales Engineer / Project Manager	Application Engineer	DRAWN BY / DATE 0		APPROVED BY / DATE 0		
Project Title	JOHNSON CONTROLS Systems & Services Division		Branch Information , Phone: Fax:		CONTRACT NUMBER		
					DRAWING NUMBER		



Drawing Title: hvac4.vsd	Filename: hvac4.vsd				
REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
Sales Engineer: JBN	Project Manager: JDM	Application Engineer: MAN	DRAWN: BY CET DATE 4/24/01	APPROVED: BY - DATE -	

Project Title

MEHRL - Seawater Intake System
Marine Environmental Health Research Laboratory
Charleston, South Carolina

JOHNSON CONTROLS
Systems & Services Division

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29405
Phone: 843-744-0213
Fax: 843-744-5553

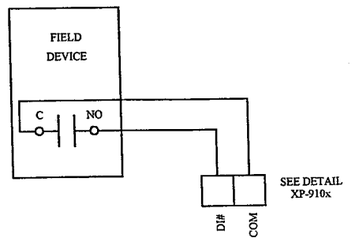
CONTRACT NUMBER: **1210-0034**

DRAWING NUMBER

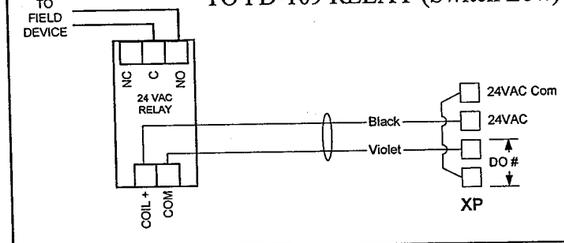
Electrician/Fitter		Point Information			Controller Information						Panel Information						Intermediate Device				Field Device					
Cable Tag	Point Type	System Name	Object Name	Expanded ID	Controller Type	Trunk Nbr	Trunk Addr.	Cable Destination Bay/Terminal	Module Type	Termination Out	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring /Tubing	Termination In	Device	Termination Out	Location	Wiring /Tubing	Termination In	Device	Location	Ref Detail Shape	Comment
		SEAWATER			DX9100	1	1				CP-SSP	Existing Mech Plant	0	M5.05												N2 Trunk
1	DO-3	SEAWATER	SSP1-C	Settled Sea Pump 1 Cntrl	DX9100	1	1	DO-3		DO3,24V	CP-SSP	Existing Mech Plant	0	M5.05	1	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
2	DO-4	SEAWATER	SSP2-C	Settled Sea Pump 2 Cntrl	DX9100	1	1	DO-4		DO4,24V	CP-SSP	Existing Mech Plant	0	M5.05	2	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
3	DO-5	SEAWATER	TFV1-C	Tank Fill Valve 1 Cntrl	DX9100	1	1	DO-5		DO5,24V	CP-SSP	Existing Mech Plant	0	M5.05	3	2/18	Coil	Relay R-1	Com,NO		2/14	See Wiring Detail	Valve Actuator		aDX41	
4	DO-6	SEAWATER	TFV2-C	Tank Fill Valve 2 Cntrl	DX9100	1	1	DO-6		DO6,24V	CP-SSP	Existing Mech Plant	0	M5.05	4	2/18	Coil	Relay R-2	Com,NO		2/14	See Wiring Detail	Valve Actuator		aDX41	
5	DO-7	SEAWATER	TFV3-C	Tank Fill Valve 3 Cntrl	DX9100	1	1	DO-7		DO7,24V	CP-SSP	Existing Mech Plant	0	M5.05	5	2/18	Coil	Relay R-3	Com,NO		2/14	See Wiring Detail	Valve Actuator		aDX41	
6	DO-8	SEAWATER	TFV4-C	Tank Fill Valve 4 Cntrl	DX9100	1	1	DO-8		DO8,24V	CP-SSP	Existing Mech Plant	0	M5.05	6	2/18	Coil	Relay R-4	Com,NO		2/14	See Wiring Detail	Valve Actuator		aDX41	
7	DI-1	SEAWATER	SSP1-S	Settled Sea Pump 1 Sts	DX9100	1	1	DI-1		DI1,COM	CP-SSP	Existing Mech Plant	0	M5.05	7						2/18	Status Output	Current Switch		aDX60	
8	DI-2	SEAWATER	SSP2-S	Settled Sea Pump 2 Sts	DX9100	1	1	DI-2		DI2,COM	CP-SSP	Existing Mech Plant	0	M5.05	8						2/18	Status Output	Current Switch		aDX60	
9	DI-3	SEAWATER	TFV1-S	Tank Fill Valve 1 Status	DX9100	1	1	DI-3		DI3,COM	CP-SSP	Existing Mech Plant	0	M5.05	9						2/18	Com, NO	Valve Travel Switch		DX70	
10	DI-4	SEAWATER	TFV2-S	Tank Fill Valve 2 Status	DX9100	1	1	DI-4		DI4,COM	CP-SSP	Existing Mech Plant	0	M5.05	10						2/18	Com, NO	Valve Travel Switch		DX70	
11	DI-5	SEAWATER	TFV3-S	Tank Fill Valve 3 Status	DX9100	1	1	DI-5		DI5,COM	CP-SSP	Existing Mech Plant	0	M5.05	11						2/18	Com, NO	Valve Travel Switch		DX70	
12	DI-6	SEAWATER	TFV4-S	Tank Fill Valve 4 Status	DX9100	1	1	DI-6		DI6,COM	CP-SSP	Existing Mech Plant	0	M5.05	12											
13	DI-7	SEAWATER			DX9100	1	1	DI-7			CP-SSP	Existing Mech Plant	0	M5.05	13											
14	DI-8	SEAWATER			DX9100	1	1	DI-8			CP-SSP	Existing Mech Plant	0	M5.05	14											
15	AI-1	SEAWATER	TANK1-L	Settling Tank 1 Level	DX9100	1	1	AI-1		AI1,AICOM	CP-SSP	Existing Mech Plant	0	M5.05	15						2/18	See Wiring Detail	4-20mA ALP SENSOR		DX2	
16	AI-2	SEAWATER	TANK2-L	Settling Tank 2 Level	DX9100	1	1	AI-2		AI2,AICOM	CP-SSP	Existing Mech Plant	0	M5.05	16						2/18	See Wiring Detail	4-20mA ALP SENSOR		DX2	
17	AI-3	SEAWATER	TANK3-L	Settling Tank 3 Level	DX9100	1	1	AI-3		AI3,AICOM	CP-SSP	Existing Mech Plant	0	M5.05	17						2/18	See Wiring Detail	4-20mA ALP SENSOR		DX2	
18	AI-4	SEAWATER	TANK4-L	Settling Tank 4 Level	DX9100	1	1	AI-4		AI4,AICOM	CP-SSP	Existing Mech Plant	0	M5.05	18						2/18	See Wiring Detail	4-20mA ALP SENSOR		DX2	
19	AI-5	SEAWATER	CAC-P	Control Air Pressure	DX9100	1	1	AI-5		AI5,+15V	CP-SSP	Existing Mech Plant	0	M5.05	19						2/18	Black,White	Kele PTX1		aDX1	
20	AI-6	SEAWATER			DX9100	1	1	AI-6			CP-SSP	Existing Mech Plant	0	M5.05	20											
21	AI-7	SEAWATER			DX9100	1	1	AI-7			CP-SSP	Existing Mech Plant	0	M5.05	21											
22	AI-8	SEAWATER			DX9100	1	1	AI-8			CP-SSP	Existing Mech Plant	0	M5.05	22											
23	AO-1	SEAWATER			DX9100	1	1	AO-1			CP-SSP	Existing Mech Plant	0	M5.05	23											
24	AO-2	SEAWATER			DX9100	1	1	AO-2			CP-SSP	Existing Mech Plant	0	M5.05	24											
25	AO-9	SEAWATER			DX9100	1	1	AO-9			CP-SSP	Existing Mech Plant	0	M5.05	25											
26	AO-10	SEAWATER			DX9100	1	1	AO-10			CP-SSP	Existing Mech Plant	0	M5.05	26											
27	AO-11	SEAWATER			DX9100	1	1	AO-11			CP-SSP	Existing Mech Plant	0	M5.05	27											
28	AO-12	SEAWATER			DX9100	1	1	AO-12			CP-SSP	Existing Mech Plant	0	M5.05	28											
29	AO-13	SEAWATER			DX9100	1	1	AO-13			CP-SSP	Existing Mech Plant	0	M5.05	29											
30	AO-14	SEAWATER			DX9100	1	1	AO-14			CP-SSP	Existing Mech Plant	0	M5.05	30											
		SEAWATER			XT9100						CP-SSP	Existing Mech Plant		M5.05												
		SEAWATER			XT9100	1	2				CP-SSP	Existing Mech Plant	0	M5.05												
31	XT1DO1	SEAWATER	TDV1-C	Tank Draw Valve 1 Cntrl	XP9103	1	2	DO-1		DO1,DO1	CP-SSP	Existing Mech Plant	0	M5.05	31	2/18	Coil	Relay R-5	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
32	XT1DO2	SEAWATER	TDV2-C	Tank Draw Valve 2 Cntrl	XP9103	1	2	DO-2		DO2,DO2	CP-SSP	Existing Mech Plant	0	M5.05	32	2/18	Coil	Relay R-6	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
33	XT1DO3	SEAWATER	TDV3-C	Tank Draw Valve 3 Cntrl	XP9103	1	2	DO-3		DO3,DO3	CP-SSP	Existing Mech Plant	0	M5.05	33	2/18	Coil	Relay R-7	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
34	XT1DO4	SEAWATER	TDV4-C	Tank Draw Valve 4 Cntrl	XP9103	1	2	DO-4		DO4,DO4	CP-SSP	Existing Mech Plant	0	M5.05	34	2/18	Coil	Relay R-8	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
35	XT1DO5	SEAWATER	SDV1-C	Sump Drain Valve 1 Cntrl	XP9103	1	2	DO-5		DO5,DO5	CP-SSP	Existing Mech Plant	0	M5.05	35	2/18	Coil	Relay R-9	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
36	XT1DO6	SEAWATER	SDV2-C	Sump Drain Valve 2 Cntrl	XP9103	1	2	DO-6		DO6,DO6	CP-SSP	Existing Mech Plant	0	M5.05	36	2/18	Coil	Relay R-10	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
37	XT1DO7	SEAWATER	SDV3-C	Sump Drain Valve 3 Cntrl	XP9103	1	2	DO-7		DO7,DO7	CP-SSP	Existing Mech Plant	0	M5.05	37	2/18	Coil	Relay R-11	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
38	XT1DO8	SEAWATER	SDV4-C	Sump Drain Valve 4 Cntrl	XP9103	1	2	DO-8		DO8,DO8	CP-SSP	Existing Mech Plant	0	M5.05	38	2/18	Coil	Relay R-12	Com,NO		2/14	See Wiring Detail	Valve Actuator		aXP41	
39	XT2DI1	SEAWATER	TDV1-S	Tank Draw Valve 1 Status	XP9105NC	1	2	DI-1		DI1,COM	CP-SSP	Existing Mech Plant	0	M5.05	39						2/18	Com, NO	Valve Travel Switch		XP40	
40	XT2DI2	SEAWATER	TDV2-S	Tank Draw Valve 2 Status	XP9105NC	1	2	DI-2		DI2,COM	CP-SSP	Existing Mech Plant	0	M5.05	40						2/18	Com, NO	Valve Travel Switch		XP40	
41	XT2DI3	SEAWATER	TDV3-S	Tank Draw Valve 3 Status	XP9105NC	1	2	DI-3		DI3,COM	CP-SSP	Existing Mech Plant	0	M5.05	41						2/18	Com, NO	Valve Travel Switch		XP40	
42	XT2DI4	SEAWATER	TDV4-S	Tank Draw Valve 4 Status	XP9105NC	1	2	DI-4		DI4,COM	CP-SSP	Existing Mech Plant	0	M5.05	42						2/18	Com, NO	Valve Travel Switch		XP40	
43	XT2DI5	SEAWATER	SDV1-S	Sump Drain Valve 1 Sts	XP9105NC	1	2	DI-5		DI5,COM	CP-SSP	Existing Mech Plant	0	M5.05	43						2/18	Com, NO	Valve Travel Switch		XP40	
44	XT2DI6	SEAWATER	SDV2-S	Sump Drain Valve 2 Sts	XP9105NC	1	2	DI-6		DI6,COM	CP-SSP	Existing Mech Plant	0	M5.05	44						2/18	Com, NO	Valve Travel Switch		XP40	
45	XT2DI7	SEAWATER	SDV3-S	Sump Drain Valve 3 Sts	XP9105NC	1	2	DI-7		DI7,COM	CP-SSP	Existing Mech Plant	0	M5.05	45						2/18	Com, NO	Valve Travel Switch		XP40	
46	XT2DI8	SEAWATER	SDV4-S	Sump Drain Valve 4 Sts	XP9105NC	1	2	DI-8		DI8,COM	CP-SSP	Existing Mech Plant	0	M5.05	46						2/18	Com, NO	Valve Travel Switch		XP40	

DETAIL XP40

N.O. BINARY INPUT

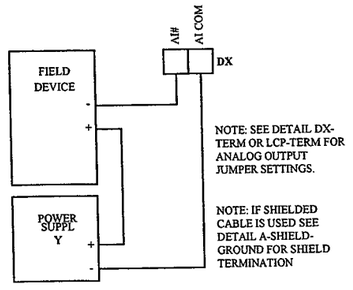


DETAIL aXP41 24 VAC BINARY OUTPUT TO PD-109 RELAY (Switch Low)



DETAIL DX2:

CURRENT INPUT EXTERNAL SOURCE

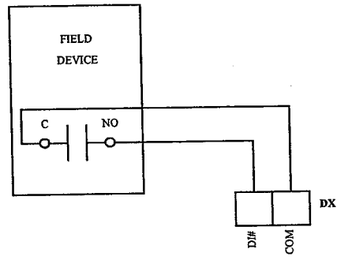


NOTE: SEE DETAIL DX-TERM OR LCP-TERM FOR ANALOG OUTPUT JUMPER SETTINGS.

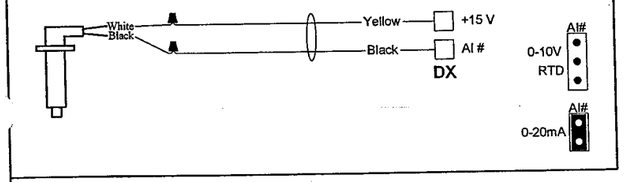
NOTE: IF SHIELDED CABLE IS USED SEE DETAIL A-SHIELD-GROUND FOR SHIELD TERMINATION

DETAIL DX70:

N.O. BINARY INPUT



DETAIL aDX1 CURRENT INPUT from KELE PTX1 PRESSURE SENSOR



REFERENCE DRAWING	NO.	REVISION-LOCATION		ECN	DATE	BY

Drawing Title: hvac5.vsd
Filename: hvac5.vsd

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JBN	JDM	MAN	BY CET DATE 4/24/01	BY . DATE .

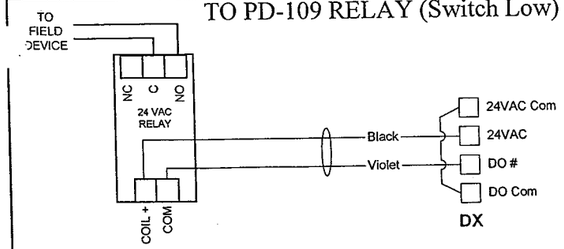
Project Title
MEHRL - Seawater Intake System
Marine Environmental Health Research Laboratory
Charleston, South Carolina

JOHNSON CONTROLS
Systems & Services Division
Branch Information
3820 Faber Place Drive
Suite 700
North Charleston, SC
29405
Phone: 843-744-0213
Fax: 843-744-5553

CONTRACT NUMBER: 1210-0034
DRAWING NUMBER

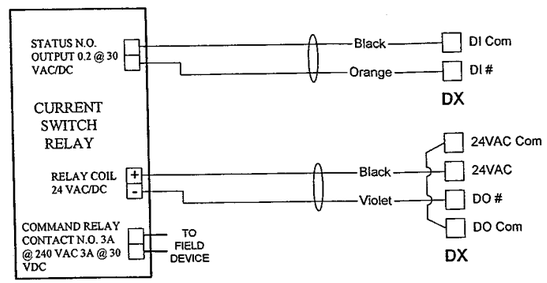
DETAIL aDX41

24 VAC BINARY OUTPUT
TO PD-109 RELAY (Switch Low)



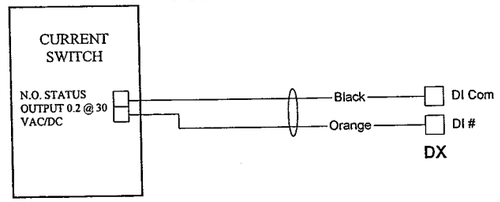
DETAIL aDX42

24VAC BINARY OUTPUT TO
CURRENT SWITCH RELAY
(Switch Low)



DETAIL aDX60

BINARY INPUT from VERIS
CURRENT SWITCH



Drawing Title
hvac6.vsd

Filename: hvac6.vsd

NO.	REVISION-LOCATION	ECN	DATE	BY
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.

REFERENCE DRAWING			DRAWN	APPROVED
Sales Engineer	Project Manager	Application Engineer	BY CET DATE 4/24/01	BY . DATE .
JBN	JDM	MAN		

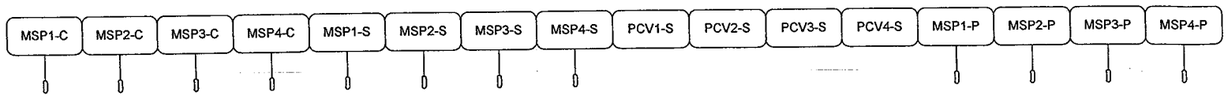
Project Title
MEHRL - Seawater Intake System
Marine Environmental Health
Research Laboratory
Charleston, South Carolina

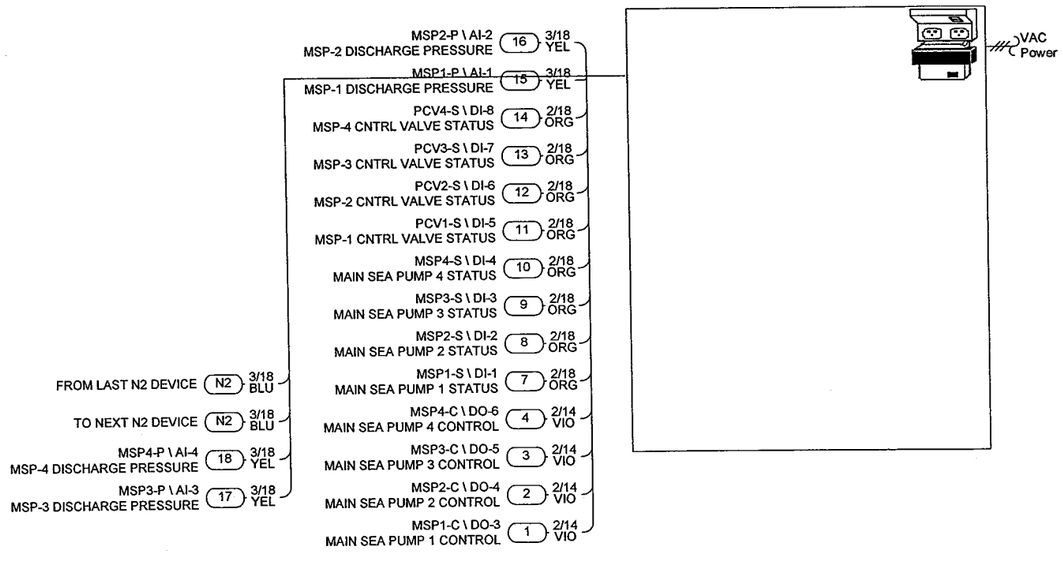
JOHNSON CONTROLS
Systems & Services Division

Branch Information
3820 Faber Place Drive
Suite 700
North Charleston, SC
29405
Phone: 843-744-0213
Fax: 843-744-5553

CONTRACT NUMBER
1210-0034

DRAWING NUMBER



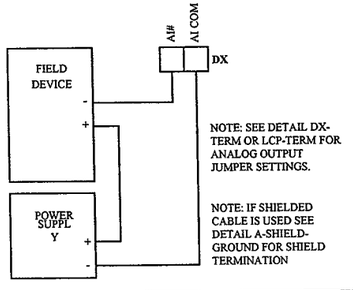


Drawing Title: hvac7.vsd	Filename: hvac7.vsd					
hvac7.vsd						
	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
	Sales Engineer: JBN	Project Manager: JDM	Application Engineer: MAN	DRAWN: BY CET DATE 4/24/01	APPROVED: BY . DATE .	
Project Title: MEHRL - Seawater Intake System, Marine Environmental Health Research Laboratory, Charleston, South Carolina	JOHNSON CONTROLS, Systems & Services Division	Branch Information: 3820 Faber Place Drive, Suite 700, North Charleston, SC 29405, Phone: 843-744-0213, Fax: 843-744-5553		CONTRACT NUMBER: 1210-0034	DRAWING NUMBER	

Electrician/Fitter		Point Information			Controller Information						Panel Information					Intermediate Device					Field Device					
Cable Tag	Point Type	System Name	Object Name	Expanded ID	Controller Type	Trunk Nbr	Trunk Addr.	Cable Destination Bay/Terminal	Module Type	Termination Out	Panel	Panel Location	Slot Number	Reference Drawing	Cable Number	Wiring /Tubing	Termination In	Device	Termination Out	Location	Wiring /Tubing	Termination In	Device	Location	Ref Detail Shape	Comment
		MSP			DX9100						CP-MSP	Existing Mech Room		M5.05												Power to Controller
		MSP			DX9100	1	3				CP-MSP	Existing Mech Room	0	M5.05												N2 Trunk
	DO-3	MSP	MSP1-C	Main Sea Pump 1 Control	DX9100	1	3	DO-3		DO3,24V	CP-MSP	Existing Mech Room	0	M5.05	1	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
	DO-4	MSP	MSP2-C	Main Sea Pump 2 Control	DX9100	1	3	DO-4		DO4,24V	CP-MSP	Existing Mech Room	0	M5.05	2	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
	DO-5	MSP	MSP3-C	Main Sea Pump 3 Control	DX9100	1	3	DO-5		DO5,24V	CP-MSP	Existing Mech Room	0	M5.05	3	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
	DO-6	MSP	MSP4-C	Main Sea Pump 4 Control	DX9100	1	3	DO-6		DO6,24V	CP-MSP	Existing Mech Room	0	M5.05	4	2/18	Relay Coil	Current Sw Relay	Com,NO		2/14	See Wiring Detail	Starter		aDX42	
	DO-7	MSP			DX9100	1	3	DO-7			CP-MSP	Existing Mech Room	0	M5.05	5											
	DO-8	MSP			DX9100	1	3	DO-8			CP-MSP	Existing Mech Room	0	M5.05	6											
	DI-1	MSP	MSP1-S	Main Sea Pump 1 Status	DX9100	1	3	DI-1		DI1,COM	CP-MSP	Existing Mech Room	0	M5.05	7						2/18	Status Output	Current Switch		aDX60	
	DI-2	MSP	MSP2-S	Main Sea Pump 2 Status	DX9100	1	3	DI-2		DI2,COM	CP-MSP	Existing Mech Room	0	M5.05	8						2/18	Status Output	Current Switch		aDX60	
	DI-3	MSP	MSP3-S	Main Sea Pump 3 Status	DX9100	1	3	DI-3		DI3,COM	CP-MSP	Existing Mech Room	0	M5.05	9						2/18	Status Output	Current Switch		aDX60	
	DI-4	MSP	MSP4-S	Main Sea Pump 4 Status	DX9100	1	3	DI-4		DI4,COM	CP-MSP	Existing Mech Room	0	M5.05	10						2/18	Status Output	Current Switch		aDX60	
	DI-5	MSP	PCV1-S	MSP-1 Cntrl Valve Status	DX9100	1	3	DI-5		DI5,COM	CP-MSP	Existing Mech Room	0	M5.05	11						2/18	Com, NO	Valve ClosedTravel Switch		DX70	
	DI-6	MSP	PCV2-S	MSP-2 Cntrl Valve Status	DX9100	1	3	DI-6		DI6,COM	CP-MSP	Existing Mech Room	0	M5.05	12						2/18	Com, NO	Valve ClosedTravel Switch		DX70	
	DI-7	MSP	PCV3-S	MSP-3 Cntrl Valve Status	DX9100	1	3	DI-7		DI7,COM	CP-MSP	Existing Mech Room	0	M5.05	13						2/18	Com, NO	Valve ClosedTravel Switch		DX70	
	DI-8	MSP	PCV4-S	MSP-4 Cntrl Valve Status	DX9100	1	3	DI-8		DI8,COM	CP-MSP	Existing Mech Room	0	M5.05	14						2/18	Com, NO	Valve ClosedTravel Switch		DX70	
	AI-1	MSP	MSP1-P	MSP-1 Discharge Pressure	DX9100	1	3	AI-1		AI1,AICOM,24VAC	CP-MSP	Existing Mech Room	0	M5.05	15						3/18	See Wiring Detail	Veris PH 0-10VDC		DX2	
	AI-2	MSP	MSP2-P	MSP-2 Discharge Pressure	DX9100	1	3	AI-2		AI2,AICOM,24VAC	CP-MSP	Existing Mech Room	0	M5.05	16						3/18	See Wiring Detail	Veris PH 0-10VDC		DX2	
	AI-3	MSP	MSP3-P	MSP-3 Discharge Pressure	DX9100	1	3	AI-3		AI3,AICOM,24VAC	CP-MSP	Existing Mech Room	0	M5.05	17						3/18	See Wiring Detail	Veris PH 0-10VDC		DX2	
	AI-4	MSP	MSP4-P	MSP-4 Discharge Pressure	DX9100	1	3	AI-4		AI4,AICOM,24VAC	CP-MSP	Existing Mech Room	0	M5.05	18						3/18	See Wiring Detail	Veris PH 0-10VDC		DX2	
	AI-5	MSP			DX9100	1	3	AI-5			CP-MSP	Existing Mech Room	0	M5.05	19											
	AI-6	MSP			DX9100	1	3	AI-6			CP-MSP	Existing Mech Room	0	M5.05	20											
	AI-7	MSP			DX9100	1	3	AI-7			CP-MSP	Existing Mech Room	0	M5.05	21											
	AI-8	MSP			DX9100	1	3	AI-8			CP-MSP	Existing Mech Room	0	M5.05	22											
	AO-1	MSP			DX9100	1	3	AO-1			CP-MSP	Existing Mech Room	0	M5.05	23											
	AO-2	MSP			DX9100	1	3	AO-2			CP-MSP	Existing Mech Room	0	M5.05	24											
	AO-9	MSP			DX9100	1	3	AO-9			CP-MSP	Existing Mech Room	0	M5.05	25											
	AO-10	MSP			DX9100	1	3	AO-10			CP-MSP	Existing Mech Room	0	M5.05	26											
	AO-11	MSP			DX9100	1	3	AO-11			CP-MSP	Existing Mech Room	0	M5.05	27											
	AO-12	MSP			DX9100	1	3	AO-12			CP-MSP	Existing Mech Room	0	M5.05	28											
	AO-13	MSP			DX9100	1	3	AO-13			CP-MSP	Existing Mech Room	0	M5.05	29											
	AO-14	MSP			DX9100	1	3	AO-14			CP-MSP	Existing Mech Room	0	M5.05	30											

DETAIL DX2:

CURRENT INPUT EXTERNAL SOURCE

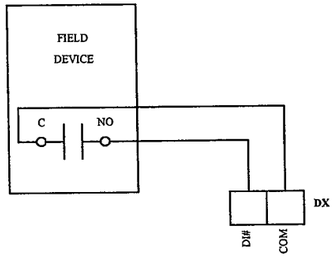


NOTE: SEE DETAIL DX-TERM OR LCP-TERM FOR ANALOG OUTPUT JUMPER SETTINGS.

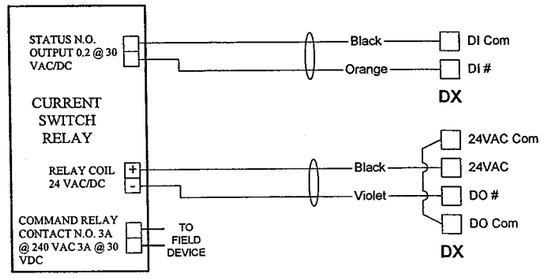
NOTE: IF SHIELDED CABLE IS USED SEE DETAIL A-SHIELD-GROUND FOR SHIELD TERMINATION

DETAIL DX70:

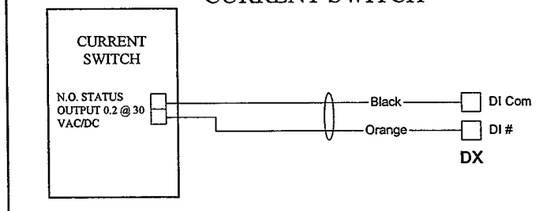
N.O. BINARY INPUT



DETAIL aDX42 24VAC BINARY OUTPUT TO CURRENT SWITCH RELAY (Switch Low)



DETAIL aDX60 BINARY INPUT from VERIS CURRENT SWITCH



REFERENCE DRAWING		NO.	REVISION-LOCATION		ECN	DATE	BY

Drawing Title: hvac8.vsd
Filename: hvac8.vsd

Sales Engineer	Project Manager	Application Engineer	DRAWN	APPROVED
JBN	JDM	MAN	BY CET DATE 4/24/01	BY . DATE .

Project Title

MEHRL - Seawater Intake System
Marine Environmental Health Research Laboratory
Charleston, South Carolina

JOHNSON CONTROLS
Systems & Services Division

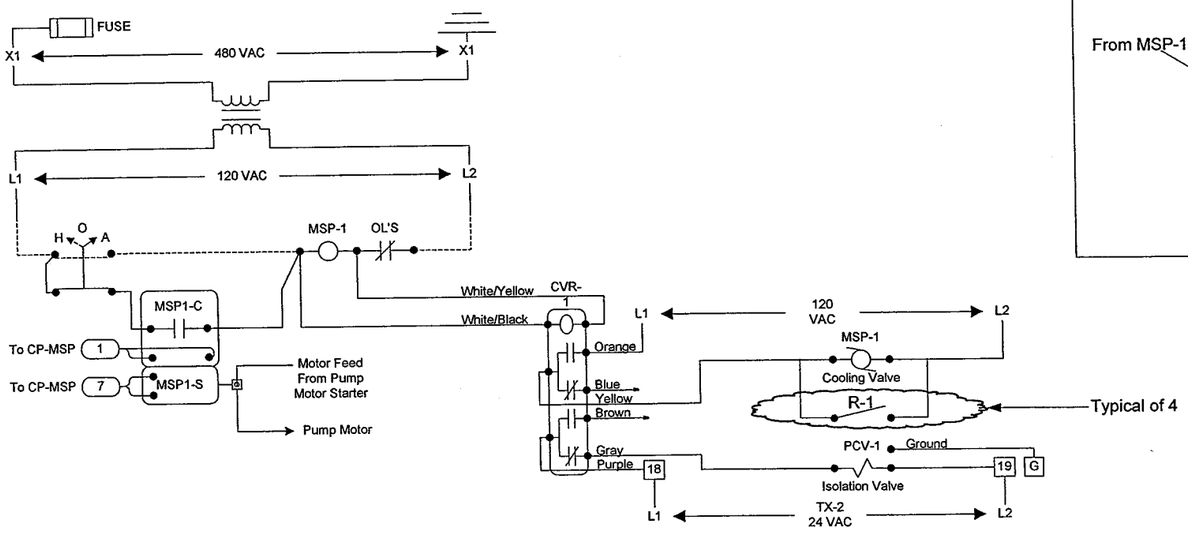
Branch Information
3820 Faber Place Drive
Suite 700
North Charleston, SC
29405
Phone: 843-744-0213
Fax: 843-744-5553

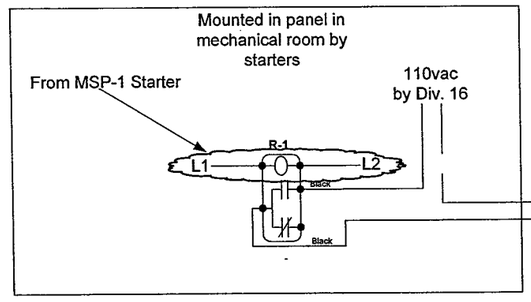
CONTRACT NUMBER: **1210-0034**

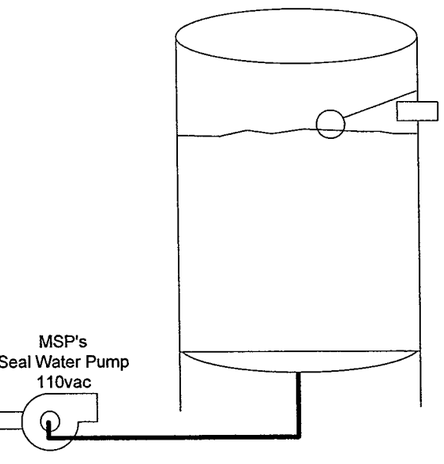
DRAWING NUMBER

MSP-1 Seal Water Pump Interlock
Typical for
MSP-2,3 4

MSP-1 CONTROL INTERLOCK WIRING DETAIL







Drawing Title: MSP Seal Water Pump Interlock	Filename: ehvac001.vsd					
	REFERENCE DRAWING	NO.	REVISION-LOCATION	ECN	DATE	BY
Sales Engineer: JBN	Project Manager: JDM	Application Engineer: JMP	DRAWN: BY CET DATE 4/24/01	APPROVED: BY . DATE .		
Project Title: MEHRL - Seawater Intake System Marine Environmental Health Research Laboratory Charleston, South Carolina	JOHNSON CONTROLS Systems & Services Division	Branch Information 3820 Faber Place Drive Suite 700 North Charleston, SC 29405 Phone: 843-744-0213 Fax: 843-744-5553		CONTRACT NUMBER: 1210-0034		
				DRAWING NUMBER: ADD#1		