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INSTRUMENTATION AND CONTROL GENERAL REQUIREMENTS

1. GENERAL

1.1 Requirements of Work

- .1 Supply, install, commission, provide warranty and fully document a complete I&C system as shown on the Drawings and as specified herein. The I&C system contains vendor component subsystems specified in this and other Sections of the Specification.
- .2 Component subsystems of the I&C system will include, but are not limited to, the following:
 - .1 Primary elements and transmitters
 - .2 Final control elements
 - .3 I&C field devices
 - .4 I&C junction boxes and marshalling panels
 - .5 Instrumentation cabling
 - .6 Instrumentation power supplies
 - .7 Conduit and cable tray
 - .8 ABB Control System hardware, software, cabinets, and communication network
 - .9 Security system components and data communication equipment.
- .3 The Contractor's responsibility also includes receiving, uncrating, examining for shortages or damage, assembling, field fitting, installing, mounting, wiring and testing of vendor supplied component subsystems.
- .4 Where packaged, stand-alone control systems are supplied under other Divisions of this Specification, provide cabling to connect to the required remote monitoring and/or control functions. Provide end-to-end Commissioning of all required remote monitoring and/or control functions. Ensure the correct functionality of any equipment supplied under other Divisions of this Specification.
- .5 Documentation referred to in 1.1.1 to include as a minimum:
 - .1 Equipment descriptive data
 - .2 Equipment installation, service manuals, O&M Manuals and recommended spare parts lists
 - .3 Schematics and interconnecting wiring diagrams
 - .4 Records of conductor identification, field terminals, changes, etc.

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- .5 Instrumentation and control panel Shop Drawings, face layouts, schematics and point-to-point wiring diagrams
- .6 Records of as-built information for the complete instrumentation system.
- .6 Documentation provided is formatted as follows:
 - .1 *Piping & Instrumentation Diagrams (P & IDS)* – depict the general intent of the control systems and are to be used as the governing document for the scope of Work.
 - .2 *Instrument Index* – an index of the detailed information for the devices shown on the P & IDS. The index lists the appropriate support documentation for the devices' supply and installation. The instrument index is the controlling document for the supply of materials.
 - .3 *Input/Output (I/O) Index* – an index of the control system I/O points shown on the P & IDS, giving the supporting documentation as per the instrument index.
 - .4 *Instrument Specification Sheets* – detail the relevant data for the supply of devices.
 - .5 *Instrument Loop Diagrams (ILDs)* – show typical interconnections and hook-up of devices. The Contractor is to reproduce an ILD for each device and record all relevant as-built information on each sheet for submission at the completion of the Work. Fill in all terminal and wiring numbers, etc., from the Shop Drawings as they become available. A set of 'B' size (11 x 17) ACAD Drawings and associated files will be made available to the successful tenderer. Where an ILD is not shown for wiring of simple devices provide a legible sketch for as-built information.
 - .6 *Location Drawings* – indicate in plan and/or elevation views where the instrument elements are physically located. These Drawings are provided to assist the Contractor in estimating the amount of cable and ducting required. All instrument locations specified on the location drawings are approximate. Exact locations will be determined during construction. Allow for locations to be up to 3 meters in each direction.
 - .7 *Standard Details* – provide a reference for installation, operation and other instructions pertinent to a particular device.
 - .8 *Detailed Specification* – lists qualifications, quality of materials and workmanship, and supplementary information.
- .7 Definitions
 - .1 Interpret specialized terms not explicitly defined herein in accordance with ISA S51.1, NEMA ICS 1, ANSI/IEEE Std 100, and The Communications Standard Dictionary, by Martin H. Weik.

INSTRUMENTATION AND CONTROL GENERAL REQUIREMENTS

.8 References

- .1 This Specification contains references to the following Documents. They are a part of this Section as specified and modified. In case of conflict between the requirements of this Section and those of the listed Documents, the requirements of this Section prevail.

<u>Reference</u>	<u>Title</u>
API RP550-86	Manual on Installation of Refinery Instruments and Control Systems, Part I – Process Instrumentation and Control Sections 1 Through 13
ASME Section VII-89	Rules for Construction of Pressure Vessels
ASTM B68-86	Seamless Copper Tube
ASTM D883-89	Terms Relating to Plastics
IEEE 100-88	Dictionary of Electrical and Electronic Terms
ISA RP7.1-56	Pneumatic Control Circuit Pressure Test
ISA RP12.6-87	Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations
ISA S5.4-76	Instrument Loop Diagrams
<u>Reference</u>	<u>Title</u>
ISA S18.1-79	Annunciator Sequences and Specifications
ISA S51.1-79	Process Instrumentation Terminology
NEMA 250-85	Enclosures for Industrial Controls and System
NEMA ICS 1-88	General Standards for Industrial Control and Systems
NEMA ICS 2-88	Industrial Control Devices, Controllers, and Assemblies
NFPA 70-90	NEC
SAMA PMC 17-10-63	Bushings and Wells for Temperature Sensing Elements
UBC-88	Uniform Building Code
UL 1012-89	Power Supplies
UL 94-80	Tests for Flammability of Plastic Materials for Parts in Devices and Appliances
Weik, Martin H.	Communications Standard Dictionary, Van Nostrand Reinhold Co., 1983

INSTRUMENTATION AND CONTROL GENERAL REQUIREMENTS

.9 Related Work

- .1 Process: Division 11
- .2 Mechanical: Division 15
- .3 Electrical: Division 16

.10 Qualifications

- .1 The instrumentation sub-contractor shall be a firm normally engaged and fully competent in the type of Work described in this Section of the Specification. The firm shall have been continuously and successfully engaged in this business for at least five years.
- .2 Submit, in accordance with B10.2, a list of similar projects recently completed and resumes of the personnel proposed for the project. Resumes shall include evidence of journeyman status and CET registration.
- .3 The instrumentation sub-contractor must be experienced in the process and instrument requirements of this Contract.
- .4 The instrumentation sub-contractor must show that it maintains a fully equipped and qualified organization, capable of performing the present Work and of providing warranty service to the system after installation.
- .5 Perform all instrument hook-ups, calibrations and checkouts with qualified journeyman instrument mechanics that are licenced and have CET registration. Instrument mechanics must be familiar with the devices being installed.
- .6 Perform all control wiring installation and connections with qualified journeyman electricians.

.11 Codes, Rules, Permits and Fees

- .1 Comply with all laws, ordinances, rules, regulations, codes and orders of all authorities having jurisdiction relating to this Work.
- .2 Comply with all rules of the Electrical Safety Act of the Province, CSA Standards, ULC and the applicable building codes, whether specifically shown on Drawings or not.
- .3 Give all required notices, submit Drawings, obtain all permits, licenses and certificates and pay all fees required for this Work.
- .4 Furnish a certificate of final inspection and approvals from an inspection authority to the Contract Administrator.

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- .12 Standards of Workmanship
 - .1 Execute all Work in a manner, which will result in the completed installation presenting an acceptable appearance, to a level of quality defined in the general conditions of this Specification.
 - .2 Employ a competent supervisor and all necessary licensed tradesmen to complete the Work in the required time.
 - .3 Arrange and install products to fit properly into designated building spaces.
- .13 Unless otherwise specified or shown, install products in accordance with the recommendations and ratings of the product manufacturers.
 - .1 Supply and execute installation of all instrumentation control tubing in accordance with Division 17.
- .14 Contract Drawings and Specifications
 - .1 Refer to Division 1.
 - .2 Supply and install all items and accessories specified by the Drawings or the Specification in the quality and quantity required. Perform all operations as designated by the Specification according to the methods prescribed, complete with all necessary labour and incidentals.
 - .3 Treat any item or subject omitted from this Division's Specifications or Drawings, but which is mentioned or reasonably specified in other Divisions' Specifications or Drawings and pertains to the instrumentation and control system, as being integral to the overall system. Provide such specified items or subjects.
 - .4 Provide all minor items and Work not shown or specified but which are reasonably necessary to complete the Work.
 - .5 If discrepancies or omissions in the Drawings or Specifications are found, or if intent or meaning is not clear, consult the Contract Administrator for clarification before submitting Bid.
 - .6 The responsibility to determine which Division provides various products and Work rests with the Contractor. Additional compensation will not be considered because of differences in interpretation of Specifications.

1.2 Equipment

- .1 Receiving, Storing, and Protection of Components During Construction
 - .1 Examine each component upon delivery to Site. Report all damage noted to the Contract Administrator prior to accepting or rejecting delivery. All instrumentation primary elements, control components, panels, etc., shall be placed in a secure, dry,

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heated storage building. Maintain the space temperature above 10°C and the space relative humidity below 50 percent.

- .2 Perform a preliminary examination upon delivery to ensure that:
 - .1 All instrumentation and control components supplied for this project under this Section of the Specification comply with the requirements stated in the instrument Specification sheets.
 - .2 All instrumentation and control components supplied under other Sections of this Specification, to be connected to instrumentation and control components supplied under this Section of the Specification, comply with the requirements stated in the Contract Documents.
 - .3 Itemize all non-conformities noted above and forward them to the Contract Administrator. Any delays in construction resulting from the delivery to Site of non-conforming instrumentation and control components to be borne by the Contractor.
 - .4 Do not install primary elements or other sensitive equipment until construction is sufficiently completed to provide an "operating condition" environment. Notify the Contract Administrator prior to installing any equipment of this type.
 - .5 Ensure that covers where required are properly installed on all equipment. Provide all covers, padding, guards, etc., as required to guard any equipment against damage.
 - .6 Return all damaged equipment to the factory for total corrective repairs. If deemed necessary by the Contract Administrator, the damaged equipment shall be replaced with new product. The Contractor shall bear any costs due to construction delays resulting from the delay in delivery of acceptable equipment.

1.3 Site

- .1 Classification of Plant Areas
 - .1 Refer to Division 16.

1.4 Documentation

- .1 Bid Submittals
 - .1 Submit a schedule within 30 days of award of Contract to the Contract Administrator showing projected ordering and delivery dates of all products to meet the required construction schedule. Provide all necessary information regarding ordering and delivery dates for whose delivery affects the construction schedule.

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- .2 Submit Shop Drawings for all products supplied by this Division. Submit Shop Drawings for review prior to delivery of any products or equipment to jobsite and sufficiently in advance to allow ample time for checking.
- .3 Contractor to review, modify, and approve the Shop Drawings prior to submitting Shop Drawings to the Contract Administrator for review. Contractor approval of a Drawing indicates the following:
 - .1 The Drawing has been checked by the person making the approval.
 - .2 The equipment or material complies in all respects with the requirements of the Specifications and Drawings.
 - .3 The quantities, if indicated on the Drawing, are correct.
 - .4 The physical dimensions of the components are such that they can be installed without interference with the building structure or other equipment, and that, after installation, there are sufficient clearances on all sides for maintenance, servicing and operation of the equipment.
 - .5 The points of attachment are clearly indicated, i.e., TOP, BOTTOM, SIDE, etc.
 - .6 The arrangement and location are properly oriented.
 - .7 The product is suitable for its intended use.
- .4 Stamp and sign the Shop Drawing to show approval, indicating the above has been complied with. If Contractor revisions are too extensive, return the submission to the supplier for revision, then repeat the Shop Drawing approval process before submitting them to the Contract Administrator.
- .5 Manufacture of products shall conform to Shop Drawings marked as reviewed by the Contract Administrator and returned to the Contractor.
- .6 Keep one (1) complete, maintained set of Shop Drawings at the jobsite during the construction period, record Site modifications.
- .7 Refer to Division 1 for further information on Shop Drawing submittals.
- .2 O&M Manuals
 - .1 Refer to Division 1 for general O&M manual submittal information.
 - .2 In addition to the requirements specified in Division 1, provide the following information:
 - .1 Table of Contents – Arrange contents sequentially by systems under Section numbers.

INSTRUMENTATION AND CONTROL GENERAL REQUIREMENTS

- .2 Systems Descriptions – A brief synopsis of each system typed and inserted at the beginning of each section. Include sketches and diagrams where appropriate.
 - .3 Maintenance and operating instructions for all equipment and controls – These operating instructions need not be manufacturer's data but may be typewritten instructions in simple language to guide the City in the proper operation and maintenance of his installation.
 - .4 A copy of all wiring diagrams complete with wire coding.
 - .5 Set of final reviewed Shop Drawings.
- .3 Record Drawings
- .1 Maintain on-site a complete set of As-built Drawings as listed in Division 1 of this Specification.
 - .2 In addition to the requirements as stated in Division 1, record on the Drawings the following information:
 - .1 Mark all change orders, alterations or additions.
 - .2 Show all instrumentation cable and control tubing.
 - .3 Show all changes to the numbers and location of outlets, motors, panels and end devices that may occur during the course of the Work.
 - .3 Before requesting the final completion certificate make any necessary final corrections to the Drawings, sign each print as a certification of accuracy and deliver all sets to the Contract Administrator for approval.

2. PRODUCTS

2.1 General

- .1 Refer to the requirements of Division 1
- .2 Selected Products and Equivalent
 - .1 Provide products and materials that are new and free from all defects.
 - .2 Products and materials called for on the Drawings or in the Specifications by trade names, manufacturer's name and catalogue reference are those, which are to be used as the basis for the Bid.
 - .3 The design has been based on the use of the first named product, where applicable equivalent products are listed.

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- .4 Provide the products specified unless a proposal for an alternative or substitute product has been accepted by the Contract Administrator.
- .3 Review of Products
 - .1 Immediately after notification of award of Contract, review with the Contract Administrator the list of products to be provided by this Division.
 - .2 After agreement on product list has been reached, no subsequent changes will be permitted except as specified hereafter.
- .4 Substitution of Products After Contract Award
 - .1 After acceptance of the list of products, no substitution of any item will be permitted unless the approved item cannot be delivered in time to comply with the Work schedule.
 - .2 To receive acceptance, proposed substitute products are to equal or exceed the quality, finish, and performance of those specified and/or shown, and not to exceed the physical space requirements allotted, as shown on the Drawings.
 - .3 Provide to the Contract Administrator documentary proof of equality, difference in price (if any) and delivery dates, in the form of certified quotations from suppliers of both specified items and proposed substitutions.
 - .4 Include costs for any required revisions to other structures and products to accommodate such substitutions.
 - .5 Refer to Division 1 for additional information on substitutions.
- .5 Quality of Products
 - .1 All products provided to be CSA Approved, and Underwriters' Laboratories of Canada approved where applicable.
 - .2 If products specified are not CSA approved, obtain approval of the relevant provincial regulatory authority. Pay all applicable charges levied and make all modifications required for approval.
 - .3 Refer to Division 1 of this Specification for further information.
- .6 Uniformity of Manufacture
 - .1 Unless otherwise specifically called for in the Specification, uniformity of manufacture to be maintained for similar products throughout the Work.
- .7 Product Finishes

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- .1 Products to be manufacturers' standard finish. Where special finishes are specified refer to Division 9 for details on quality and workmanship of the finishes.

.8 Use of Products During Construction

- .1 Any equipment used for temporary or construction purposes to be approved by the Contract Administrator and in accordance with Division 1 of this Specification. Clean and restore to "as new" condition all equipment prior to the time of Substantial Completion.
- .2 The warranty period does not begin until the date of Substantial Completion of the Work.

2.2 Instrumentation

.1 General

- .1 Instruments to be suitable for the environmental conditions in which they are to be installed.
- .2 Determine where injurious conditions may be expected to occur and make proper provision to protect the instruments to ensure their proper and reliable operation.
- .3 Provide power surge protectors, heating cables and devices to protect instruments, equipment and lines from being functionally impaired or damaged by power surges or environmental conditions such as moisture or freezing.

2.3 Identification

- .1 Refer to Division 16 for general identification requirements. Provide lamacoid nameplates with 5 mm white lettering on black background. Identify the loop tag number (where applicable) and the device name, function, and instrument range or setpoint value on the nameplate.
- .2 Where it is not possible to attach a lamacoid nameplate to a field instrument component, provide the component with a stainless steel metal tag firmly wired to the device and identified with the loop tag number.
- .3 Identify all wires where they terminate at the marshalling panels, junction boxes and field devices with a heat shrink sleeve with machine printed labeling.
- .4 Clearly mark all panels, pull boxes, junction boxes, etc., to indicate the nature of service.
- .5 Provide neatly typed circuit directories for panel power distribution systems to indicate loops or devices powered by the circuit and the fuse size.
- .6 Identify all exposed control conduits at all pull box locations, where the conduits enter or leave a room, and 13 m on centre throughout the room. This shall apply to conduits above removable ceilings. Use Thomas & Betts TY-RAP 5532-M labels conduit identification.

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- .7 For direct current wiring use black for positive and white for negative.
- .8 For thermistor wiring to motors use red and blue coloured, insulated wire.

2.4 Control Circuit Protection

- .1 All control circuits and I/O points shall be individually fused.
- .2 Protection parameters shall match what is currently installed on-site at the NEWPCC.

3. EXECUTION

3.1 Site Examination

- .1 Refer to the requirements of Division 1.
- .2 No additional compensation will be given for extra Work due to existing conditions that a Site examination prior to Bid should have disclosed.

3.2 Coordination With Other Divisions

- .1 Examine the Drawings and Specifications of all Divisions and become fully familiar with the Work. Before commencing Work, obtain a ruling from the Contract Administrator on any conflicting issues between Divisions. No compensation will be made for any costs arising from conflict not identified before Work has commenced.
- .2 Coordinate the Work to be performed under this Section of the Specification with all Divisions installing equipment to ensure that there are no conflicts.
- .3 Install anchors, bolts, pipe sleeves, hanger inserts, etc., required in ample time to prevent delays to other Division's installation Work.
- .4 Lay out the Work and equipment with due regard to architectural, structural and mechanical features. Architectural and structural Drawings take precedence over electrical Drawings regarding locations of walls, doors and equipment.
- .5 Structural members shall not be cut without prior approval of the Contract Administrator.
- .6 Examine previously constructed Work and notify the Contract Administrator of any conditions, which prejudice the proper completion of this Work.

3.3 Product Handling

- .1 Use all means necessary to protect the products included in this Division before, during and after installation, and to protect products and installed Work of all other trades.

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- .2 Any damage to the products and/or installed Work shall be repaired or replaced by the Contractor at no additional cost to the City, and to the approval of the Contract Administrator.
- .3 Remove advertising labels from all products installed that have such labels attached. Identification or CSA labels are not to be removed.
- .4 Remove dirt, rubbish, grease, etc., resulting from Work performed under this Section of the Contract from all surfaces.

3.4 Separation of Services

- .1 Maintain separation between the electrical wiring system, building piping, ductwork, and the instrumentation cables so that each system is isolated (except at approved connections to such systems) to prevent galvanic corrosion. In particular, contact between dissimilar metals, such as copper and aluminum, in damp or wet locations is unacceptable.
- .2 Do not support wiring from pipes, ductwork, etc. Hangers for suspended ceilings are not to be used for the support of wiring.

3.5 Wire And Cable

- .1 Refer to Section 17124.

3.6 Equipment Connections

- .1 Prior to the connection of signal wiring to process control and instrumentation devices check the device voltage rating and polarity for compatibility with the corresponding loop and/or schematic diagram. Where device and circuit characteristics are found to be incompatible, the connections are not to be made. Report the condition immediately to the Contract Administrator.
- .2 All control-wiring diagrams illustrate typical control circuits applicable to the type of equipment specified. Control circuits may vary with different manufacturer's equipment. Verify all control circuits with the suppliers of the equipment and make any corrections to the control wiring diagrams that may be required.
- .3 Provide power disconnect terminals in the marshalling panels for all devices or PLC/DCS input/outputs sourced from the panel. Provide local power disconnect switches for all 120 VAC power instruments. Mount adjacent to the instrument.
- .4 Provide a disconnecting means in the cable connecting each ultrasonic transponder to the transmitter. This disconnect shall consist of a terminal strip in a local WP junction box within approximately 3 m of cable from the transponder.

3.7 Wiring To Equipment Supplied By Others

- .1 Equipment supplied by the City or by other Divisions, that have external or field mounted control devices, are to be installed, wired and commissioned by this Division.

INSTRUMENTATION AND CONTROL GENERAL REQUIREMENTS

3.8 Access Panels

- .1 Provide access panels where instrumentation and control system junction boxes are concealed. Panels to be of adequate size for servicing of the concealed junction box and complete with necessary frames and hinged doors held closed with captive fasteners. The type and size of panels are to be coordinated with the Contract Administrator.
- .2 In removable ceiling areas provide markers on ceiling tile to locate equipment requiring access. Use a 25 mm diameter blue circle painted on the access panel to indicate that it is for instrumentation and control system access.

3.9 Instrument Mounting Stands

- .1 Supply and install instrumentation mounting stands as required. Stands are to be either floor or wall mounted. The mounting stands are to be fabricated from aluminum or galvanized steel.
- .2 Supply and install protective drip shields for any exterior stand-mounted instrumentation equipment. Drip shields are to extend 50 mm past the front and side faces of the equipment. Drip shields are to be fabricated from aluminum.

3.10 Sealing of Wall and Floor Openings

- .1 Seal all conduit and cable entries passing through outside walls of buildings, through partition walls separating electrical rooms from other areas, through fire separations, and through floors above grade.
- .2 Seal openings after all wiring entries have been completed.
- .3 Sealing material shall be fire resistant and shall not contain any compounds that could chemically affect the wiring jacket or insulating material. Cable penetrations through fire separations, if required, are to be sealed. Acceptable methods are Canstrut "Fire Stop", Electrovert "Multi-Cable Transit" or Dow Corning RTV Silicone Foam.

3.11 Sleeves

- .1 Provide sleeves of galvanized steel pipe with machine cut ends of ample size to accommodate conduits passing through walls, partitions, ceilings, floors, etc.
- .2 For walls, partitions and ceilings the ends shall be flush with the finish on both sides. For floors the ends shall extend 100 mm above finished floor level.
- .3 Fill the space between the sleeve and the conduit with fire stop material. Caulked around the top and bottom with approved permanently resilient, non-flammable and weatherproof silicone base compound. Ensure that the seal is compatible with the floor and ceiling finishes.
- .4 Locate the sleeves and position exactly prior to construction of the walls and floors.

INSTRUMENTATION AND CONTROL GENERAL REQUIREMENTS

- .5 Failure to comply with the above requirements shall be remedied at the Contractor's expense.

3.12 Connections to Mechanical, Electrical and Existing Systems

- .1 Refer to Division 16 for the required tie-in procedures.

3.13 Testing of Instrumentation Loops

- .1 After all devices within a loop have been connected, check the loop for correct functioning and interaction with other loops, where applicable. Provide written notice to the Contract Administrator when the loops are going to be tested so that the tests may be witnessed at the Contract Administrator's discretion.
- .2 Check the operation of final control elements such as solenoid valves, actuators, etc., by manual control before checking with automatic control.
- .3 Test all tubing for leaks in compliance with ISA RP7.1. Isolate all instruments when tubing is being tested to protect against over pressure.
- .4 Perform tests and record results on test data forms, which are included in this Section. Develop additional and/or more detailed test forms as necessary to suit more complex instrumentation.
- .5 Sign and date all test reports. Submit the test reports to the Contract Administrator within five working days of testing.
- .6 Coordinate and cooperate with City staff, equipment suppliers, and other contractors to test Control system I/O points during loop testing.

3.14 Calibration

- .1 Instruments to be factory pre-calibrated and the calibration verified in-place after installation. Provide a printed record of the factory calibration parameters for "smart" devices.
- .2 Prior to calibration completely program all "smart" transmitters including entries of the appropriate range and tag number. Provide a printed record of smart device serial numbers against their assigned tag number.
- .3 Instruments to be set up and calibrated by an accredited instrument technician working under the approval of the instrument manufacturer.
- .4 Calibrate all instruments to an accuracy of half of 1 percent of full range, or to the manufacturer's stated accuracy of the instrument whenever an accuracy of half of 1 percent is not achievable.
- .5 Prior to instrument installation perform the following applicable calibration for each instrument and its associated signal conditioning equipment:

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- .1 Calibrate all inline flowmeters by a draw-down test.
- .2 Calibrate all density meters by lab samples.
- .3 Calibrate all vacuum and pressure instruments by manometer or accurate test instrument and hand test pump.
- .4 Calibrate gas detectors using standard gas sample.
- .5 Calibrate temperature instruments against a standard lab thermometer.

3.15 Commissioning

- .1 Refer to the requirements of Division 1 for additional Commissioning requirements.
- .2 Inspections
 - .1 Provide two weeks' written notice to the Contract Administrator prior to energizing any system to allow for inspection by the Contract Administrator of the following:
 - .1 Proper mounting
 - .2 Proper connections
 - .2 During Commissioning demonstrate to the Contract Administrator proper calibration and correct operation of instruments and gauges.
- .3 Commissioning of the instrumentation and control system to include but not be limited to the following.
 - .1 Supervise installation of components, wiring connections and piping connections.
 - .2 Supervise wiring continuity and pipe leak tests.
 - .3 Verify instrument calibration and provide written report.
 - .4 Function check and adjust under operational conditions the instruments and control equipment.
 - .5 Coordinate instruments and control equipment supplier's service personnel as required for complete system testing.
 - .6 Instruct plant personnel in correct method of operation of instruments and control equipment.
 - .7 Direct plant personnel at hand-over as to final adjustment of the system for correct operation of plant.

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- .8 Ensure that the instrumentation and control equipment suppliers cooperate to complete the Work of this Section.
- .9 Verify signal levels and wiring connections to all instrumentation and control equipment.
- .10 Coordinate and cooperate with City staff, equipment suppliers, and other contractors to commission Control system I/O points during equipment Commissioning.

3.16 Training

- .1 Provide training, described in detail in Division 1, as required by the plant's personnel to become fully competent in the proper operation and maintenance of all control devices, control valves, and ancillary instrumentation described under this Section of the Specification.

3.17 Test Forms

<u>Form No.</u>	<u>Title</u>
.1 ITR	Instrument Test Report
.2 LCR	Loop Check Report

INSTRUMENTATION AND CONTROL GENERAL REQUIREMENTS

LOOP CHECK REPORT

- CHECKED OUT OK
- NOT APPLICABLE
- FURTHER ACTION REQUIRED

	INSTRUMENT TAG NO.									
LOOP NO. _____ SHEET NO. _____ P & I DWG. NO. _____										
INSTALLATION COMPLETE										
Primary Element										
Impulse Lines										
Block and Drain Valves										
Air Supply/Filter/Reg.										
Wiring										
Tracing/Insulation/Housing										
Mounting and Location										
PLC/SCADA I/O & Status										
CALIBRATED										
Impulse Lines Press. Tested										
LOOP CHECKED										
Element To Receiver										
X Mtr. to Receiver										
X Mtr./Trans. to Receiver										
X Mtr./Trans. to Switches										
Switches to Annunciator										
Interlocking Circuit										
Controller to Valve										
Controller Action D or R										

REMARKS:

READY FOR START-UP

DATE: _____

Installed by: _____

Checked by _____

INSTRUMENTATION AND CONTROL GENERAL REQUIREMENTS

INSTRUMENT TEST REPORT

SYSTEM: _____

SERVICE: _____ TAG NO. _____

LOCATION: _____

MAKE: _____ MODEL: _____

SERIAL NO.: _____ CSA: _____

ELEMENT: _____ RANGE: _____

DESIGN SETTING/RANGE: _____ CONTACT TO: _____ ON: _____

SIGNAL IN: _____ OUT: _____ ASSOCIATED INSTRUMENT: _____

INSTRUMENT CONDITION: _____ CONFORM TO SPEC: _____

PROJECT NO.: _____ DATA SHEET: _____

TEST METHOD	TEST 1				TEST 2			
	INPUT		OUTPUT		INPUT		OUTPUT	
	INC.	DEC.	INC.	DEC.	INC.	DEC.	INC.	DEC.
TEST POINT 1								
TEST POINT 2								
TEST POINT 3								
TEST POINT 4								
TEST POINT 5								
COMMENTS								
GRAPHS								

TESTED BY: _____

CHECKED BY: _____

DATE: _____

DATE: _____

ENCLOSURES

1. GENERAL

1.1 References – General

- .1 Suppliers, Equipment, Products, and Execution must meet all requirements detailed in Section 17010.

2. PRODUCTS

2.1 General

- .1 Unless otherwise specified, provide outside finishes on all enclosures in ANSI 61 Grey as specified in Division 9.
- .2 The enclosures must be suitable for carrying the weight of the equipment mounted inside the panel and on the doors without any warpage.

2.2 Enclosures

- .1 Provide EEMAC Type 1A gasketed enclosures in MCC rooms and control rooms.
- .2 All enclosures for mounting outside of MCC rooms and control rooms to be EEMAC Type 4, watertight except where otherwise specified.
- .3 Provide EEMAC 7/3R enclosures for equipment in and around classified areas such as sumps.
- .4 Enclosures for certain equipment in corrosive atmospheres to be EEMAC 4X approved for the classification (e.g., chemical cleaning).
- .5 Enclosures for mounting field control indicator lamps and switches in unclassified areas to be Allen Bradley model 800T-xTZ die cast enclosures.
- .6 Enclosures for mounting field control indicator lamps and switches in classified areas to be Allen Bradley model 800H-xHHX7 cast aluminum enclosures.
- .7 All enclosures and field accessories shall be weather proof if installed outdoors.

2.3 Panel Enclosures

- .1 Fabricate panel enclosures from 11 gauge steel panels complete with necessary stiffening to form a rigid free-standing lineup. The structures must be suitable for carrying the weight of the equipment mounted inside the panel and on the doors. Provide removable top and bottom cable entry plates.

ENCLOSURES

- .2 Provide panels with front access only. Doors shall be key lockable and fitted with 3-point heavy duty latching assemblies. Provide a continuous piano hinge and a pneumatic hold open device on each door.
- .3 Finish the interior of the enclosure with white paint. Provide a switched fluorescent light fixture and 120 VAC duplex convenience receptacle inside the enclosure.

2.4 Marshaling and Control Panels

- .1 Supply, fabricate, checkout, layout, document and deliver to Site fully equipped and functional panels.
- .2 Supply all components contained on or within the panels fully wired under this Section of the Specification.
- .3 The Selection of all accessories, materials and methods for fabrication not covered by this Specification, but which are necessary to complete the fabrication of the control panels, is the responsibility of the panel fabricator.
- .4 Marshaling and control panels shall be adequately sized to facilitate a professional, uncluttered arrangement. Provide adequate internal and external space to accommodate a 20 percent increase in each type of component used. Allow space for future installation of at least one (1) additional PLC or DCS rack as appropriate.

2.5 Wiring and Accessories

- .1 Provide wiring inside the panels according to the following Specifications:
 - .1 Control wiring to be a minimum of #16 AWG tinned stranded copper; insulation rated at 600 V.
 - .2 Wiring for power distribution shall be a minimum of #14 AWG tinned stranded copper; insulation rated at 600 V.
 - .3 Refer to Division 16 for cable routing requirements.
- .2 Tag each wire at both ends with a heat shrink sleeve that is machine printed.
- .3 Wiring systems with different voltage levels or types shall be suitably segregated within the panel, according to relevant electrical codes.
- .4 Run all wiring in enclosed plastic wireways such as Panduit. Size all wireways so that the total cross sectional area of the insulated wire and cable does not exceed 40 percent of the cross sectional area of the wireway.
- .5 Provide a minimum clearance of 40 mm between wireways and any point of wire termination.

ENCLOSURES

- .6 Terminate all wiring, incoming and outgoing, at terminal strips mounted inside the panels. Identify each terminal strip with a terminal strip number, defined as follows:
 - .1 Wire identification to use the connected field device tag name with the wire's corresponding terminal number appended to it.
 - .2 Identify every joint and/or terminal of the above wire run with the same identifier until the wire meets another tagged device, at which point the wire identifier will change to use the new device name and terminal number.
 - .3 For example, pressure transmitter K4-PT-100A located in the field has a 2CTPSH cable connected to it. The cable runs through a junction box to a marshaling panel. The wire identifiers for the pair of wires would be K4-PT-100A all the way to the marshaling panel.
 - .4 Identify spare wires by using the destination identifier, i.e., the location and terminal identifier of the opposite end of the wire are combined to form the wire tag.
- .7 Provide a 120 VAC panel power distribution system and a 24 VDC power distribution system in each panel. Provide 12 VAC power for the CCTV fiber converters as required. Provide a thermal magnetic circuit breaker on each main power circuit and a fused terminal block for each branched circuit off the main.
- .8 Provide disconnect type terminal blocks Wieland WK4TSK/U type to isolate field wiring that is powered sourced from the panel.
- .9 Provide sufficient terminals so that not more than two (2) wires are connected under the same terminal. Provide 20 percent spare terminal capacity at each terminal block assembly.
- .10 Provide nameplates for each device on or within the panels and enclosures. Nameplates shall be black lamicoïd with white lettering, a minimum of 25 mm x 75 mm in size with up to three lines of 3 mm lettering. Securely fasten nameplates in and situate them in a visible location.

2.6 Panel Grounding

- .1 Provide a ground system for the instrumentation circuits, isolated from the main power system ground to each marshaling panel.
- .2 Provide grounding lugs for each panel, suitable for termination of up to #2 AWG copper grounding conductor.
- .3 Provide in each marshaling panel an isolated grounding bus bar 6 x 25 x 600 mm, equipped with necessary lugs for accepting two (2) #2 AWG grounding conductors.
- .4 Firmly bond all panel-mounted devices on or within the panels to ground. Provide supplementary bonding conductors for backpanels and doors. Attach a separate bonding conductor to all devices that are not firmly fastened to the panels with screws for such devices as case mounted instruments, meters, etc.

ENCLOSURES

3. EXECUTION

3.1. References – General

- .1 Refer to Section 17010, Part 3.

3.2 Mounting Heights

- .1 Unless otherwise specified or a conflict exists, mount all panels, starters and disconnects 2000 mm to top of cover.

END OF SECTION

INSTRUMENTATION CABLE

1. GENERAL

1.1 Product Data

- .1 Submit product data in accordance with Division 1 and Division 16.

1.2 Related Work

- .1 Refer to Division 16.

1.3 Inspection

- .1 Provide adequate notice to the Contract Administrator so that all cable installations can be inspected prior to connecting equipment.

1.4 Standards

- .1 All wire and cable shall be CSA approved.

2. PRODUCTS

2.1 Twisted Pair Shielded Cables (TPSH)

- .1 TPSH shall be constructed as follows:
 - .1 Two (2) copper conductors, stranded, minimum #18 AWG, PVC insulated, twisted in nominal intervals of 50 mm
 - .2 Insulated for 600 V, 90°C
 - .3 100 percent coverage aluminum foil or tape shield
 - .4 Separate bare stranded copper drain wire, minimum #18 AWG
 - .5 Overall flame retardant PVC jacket to CSA-C22.2
 - .6 The entire cable assembly to be suitable for pulling in conduit or laying in cable tray
 - .7 Shaw Type 1751-CSA or Beldon equivalent
- .2 Where multiconductor TPSH cables are called for, each pair shall be individually shielded, continuous number coded, and the cable assembly shall have an overall shield and overall flame retardant PVC jacket.

2.2 RTD And Multi Conductor Shielded Cable

- .1 RTD cables shall be CSA approved and shall be constructed as follows:

INSTRUMENTATION CABLE

- .1 Three (3) or more copper conductors, stranded, minimum #18 AWG
- .2 PVC insulated for 600 V
- .3 100 percent coverage aluminum foil or tape shield
- .4 Separate bare stranded copper drain wire
- .5 Overall flame retardant PVC jacket to CAS-C22.2

2.3 Teck Cables

- .1 As per Division 16.

2.4 Wire

- .1 As per Division 16.

2.5 Fiber Optic Cables

- .1 Provide fiber optic cable assemblies where indicated in the Specification and Drawings.
- .2 Fiber optic cables shall be constructed with specified quantity of 62.5/125 μm multi-mode glass fibers with individual and overall PVC jacket, spiral interlocked armour, and outer PVC jacket FT4 rated.
- .3 Provide terminations for fiber optic cables including; buffer tube fan out kits, connectors, termination panels, and wall mount enclosure.
- .4 Provide fiber optic jumpers 62.5/125 μm multi-mode for inter-cabinet connections.

3. EXECUTION

3.1 Analog Signals

- .1 Use TPSH cable for all low level analog signals such as 4-20 mA, 1-5 VDC, 0-10 VDC, pulse type circuits 24 VDC and under, and other signals of a similar nature.
- .2 Use RTD cable for connections between RTDs and transmitters or control system RTD inputs.

3.2 Digital Signals

- .1 Use TPSH cable for all low level input (24 V and below) and output signals to the control system.

INSTRUMENTATION CABLE

- .2 Use Teck cable or wire and conduit for power to instruments, for 120 V signals other than those mentioned above and as otherwise indicated on the Drawings. Use stranded wire and cable to supply power to instruments.

3.3 Installation

- .1 Install instrumentation cables in conduit systems or in cable trays. Use a minimum of 300 mm length of liquid tight flexible conduit to connect the field sensors to the conduit.
- .2 Where non-armoured instrumentation cables are installed in cable trays, provide barriers in the tray to separate instrumentation cables from power cables.
- .3 At each end of the run leave sufficient cable length for termination.
- .4 Do not make splices in any of the instrumentation cable runs. Where splices are required, obtain approval from the Contract Administrator prior to installing the cable.
- .5 Where splices are necessary in instrumentation cables other than coaxial cables, perform such splices on terminal blocks in terminal boxes. Keep splices in instrumentation cable to a minimum and separated physically from power circuits. Cable shields shall be terminated on insulated terminals and carried through to the extent of the cable.
- .6 Where splices are made to coaxial cables, use standard coaxial cable connectors
- .7 Ground cable shields at one end only. Unless otherwise specified, ground the shields at the marshalling panel.
- .8 Protect all conductors against moisture during and after installation.

3.4 Conductor Terminations

- .1 All equipment supplied shall be equipped with terminal blocks to accept conductor connections.
- .2 Instrumentation conductors, where terminated at equipment terminals other than clamping type terminal blocks, shall be equipped with Burndy-YAE-2 or STA-KON, self-insulated, locking type terminators, sized as required to fit conductors and screw terminals.
- .3 Terminations of fiber optic cables shall be performed by factory trained technicians with appropriate tools and testing equipment.

3.5 Testing

- .1 Test all conductors for opens, shorts, or grounds. Resistance values shall not be less than those recommended by the cable manufacturer.
- .2 Test all fiber optic cables and terminations for signal integrity and manufacturer's specifications.

INSTRUMENTATION CABLE

3.6 Identification

- .1 Identify all instrumentation cables.
- .2 Identify each conductor with wire numbers using a machine printed heat shrink wire marker, similar to Raychem TMS or equivalent.

END OF SECTION

POWER SUPPLIES

1. GENERAL

1.1 References – General

- .1 Refer to Section 17010.

2. PRODUCTS

2.1 Power Supply and Conditioning Equipment

- .1 General
 - .1 Provide all DC power supplies as required for all instrument circuits. All circuits to be powered from the marshalling panels. Power supplies to be equal to Hammond or G.F.C., complete with an overvoltage protection module.
 - .2 Provide redundant configurations for power supply equipment serving more than one (1) instrument loop, so that failure of a single unit will not disable all or any shared part of the instrumentation and communication system. Provide diode isolation for redundant direct current supply units, and ground the negative terminal of the power supply.
 - .3 Power supplies and transmitters feeding circuits that run in non-armoured cable in cable tray shall meet the requirements for Class 2 circuits as defined under Section 16 of the CEC Part I.
 - .4 Unless otherwise required, all DC power supplies to be rated 28 VDC, adjustable ± 5 percent, and set to provide 26.4 V on the panel direct current bus. Size the power supply for two (2) times the connected load, minimum size is 2 amps.

2.2 Noise Suppression

- .1 Provide power conditioners in each panel to power AC instrumentation and control loads. Power conditioners are Oneac Series CX.

2.3 UPS Power Supply

- .1 Provide an UPS for each marshalling panel to power the control system equipment and all I/O systems.
- .2 Provide a UPS for each computer workstation. Connect the workstation and its associated peripherals such as network concentrators, printers, etc., to the UPS.
- .3 Size UPS standby capacity for 30 minutes at full load rating.
- .4 Provide true on-line units from Exide, Oneac, Toshiba or Best.

POWER SUPPLIES

3. EXECUTION

3.1 References – General

- .1 Refer to Section 17010, Part 3.

END OF SECTION

SWITCHES AND RELAYS

1. GENERAL

1.1 References – General

- .1 Refer to Section 17010.

2. PRODUCTS

2.1 General

- .1 Use normally closed contacts for alarm actuation which open to initiate the alarm.
- .2 Use normally open contacts to control equipment. The contacts close to start the equipment.
- .3 Contacts monitored by solid state equipment to be hermetically sealed and adequately rated for the connected load.
- .4 Contacts monitored by electro-magnetic devices such as mechanical relays to be rated NEMA ICS 2, designation B300.
- .5 Provide double barriers between switch elements and process fluids such that failure of one (1) barrier will not permit process fluids into electrical enclosures.
- .6 Switch electrical enclosures to be rated EEMAC 4, minimum.

2.2 Indicators, Pushbuttons and Selector Switches

- .1 All control indicator lamps, pushbutton switches and selector switches in unclassified or non-corrosive areas to be Allen Bradley 800T or 800E series items.
- .2 All control indicator lamps, pushbutton switches and selector switches in classified or corrosive (includes outdoors) areas to be Allen Bradley 800H series items.
- .3 Enclosures to be as specified under Section 17110.

2.3 Relays

- .1 The Quality and type of relays shall be based on Omron types.
- .2 120 VAC relays to be Model LY 4PDT, plug-in, complete with test button and operation indicator, and surge suppressor.
- .3 24 VDC relays to be Model MY 2PDT plug-in, complete with test button and operation indicator, and surge suppressor diode.
- .4 Time delay relays for behind panel mounting to be Model H3BA, 2PDT, plug-in, and programmable for sixteen (16) time ranges and four (4) operation modes.

SWITCHES AND RELAYS

- .5 Time delay relays for flush panel mounting and operator accessible timing range modifications to be Model H5BR, SPDT, screw terminals, programmable for five (5) timing ranges and eight (8) operation modes, complete with digital display, module for time settings and flexible protective cover.
- .6 Where the contact ratings of the relays listed are insufficient for the application select an appropriate type from an approved manufacturer with the same quantity of contacts as was originally specified.
- .7 Provide relay plug-in sockets for DIN mounting complete with stacked screw clamp terminals.

3. EXECUTION

3.1 References – General

- .1 Refer to Section 17010.

END OF SECTION

SIGNAL CONDITIONING MODULES

1. GENERAL

1.1 References – General

- .1 Refer to Section 17010.

2. PRODUCTS

2.1 Signal Conditioning Modules

- .1 Where required, provide signal conditioning modules which comply with the following requirements, unless otherwise specified:
 - .1 Analog signal inputs: 4-20 mA DC into 500 ohms
 - .2 Analog signal outputs: 4-20 mA DC into 500 ohms
 - .3 Discrete output contacts: SPDT rated 5A
 - .4 Arrange electronic trips so that output contact opens in case of loss of signal or loss of power supply.
 - .5 Modules to be rated for continuous operation in an ambient temperature of 0 to 80°C. Ambient temperature effect not to exceed plus or minus 0.01 percent per degree Celsius within that range.
 - .6 Span and zero adjustments to be made by front accessible multi-turn potentiometers or keypad.
 - .7 Provide electronic trip modules with LED indicators for relay status.
 - .8 Modules to withstand 30 V per meter radio frequency radiation between 200 and 500 MHz with not more than 0.25 percent calibration effect. Provide modules with traps on the terminals to shunt conducted radio frequency interference to ground.
 - .9 Galvanically isolate signal and power supply terminals from the case.
- .2 All modules specified in this Section to be the product of a single manufacturer.

2.3 Current to Pneumatic (I/P) Converters

- .1 Not used

SIGNAL CONDITIONING MODULES

3. EXECUTION

3.1 References – General

- .1 Refer to Section 17010, Part 3.

END OF SECTION

PANEL INSTRUMENTS

1. GENERAL

1.1 References – General

- .1 Equipment, Products and Execution must meet all requirements detailed in Section 17010.

2. PRODUCTS

2.1 Electronic Panel Instruments

- .1 Provide panel instruments with the following requirements, unless otherwise specified:
 - .1 Analog instruments to be miniature-case drawout type nominally 150 mm high by 75 mm wide by not more than 350 mm deep.
 - .2 Make the operator, tuning and configuration adjustments accessible without disconnecting the instrument from the process.
 - .3 Analog signal indicators to be solid-state, LED or gas-discharge type, including bar-graph displays with not less than 200 segments. Backlit LCD indication is also acceptable.
 - .4 Analog signal inputs to be 4-20 mA VDC.
 - .5 Analog signal outputs to be 4-20 mA VDC into 500 ohms.
 - .6 Galvanically isolate the signal and power supply from the instrument case.
- .2 Panel instruments specified in this Section are to be the product of a single manufacturer, and to match and line up to form an integrated appearance and operator interface strategy.

3. EXECUTION

3.1 References – General

- .1 Refer to Section 17010.

END OF SECTION

MISCELLANEOUS PANEL DEVICES

1. GENERAL

1.1 References – General

- .1 Equipment, Products and Execution must meet all requirements detailed in Section 17010.

2. PRODUCTS

2.1 Miscellaneous Panel Devices

.1 Pilot Lights

- .1 Provide pilot lights of the LED transformer type for extended lamp life, oil tight, push to test, complete with appropriate colour lenses. Normal colours used are run=red, stop=green unless otherwise depicted elsewhere. Refer to Division 16 for additional information

.2 Terminals

- .1 Provide strap screw type terminal blocks rated for 600 V.
- .2 Identify each terminal block within an enclosure with a unique machine printed terminal block number. Cabinet chassis grounding terminal blocks to be identified by the electrical ground symbol.
- .3 Connections to screw terminals to be locking fork tongue insulated crimp type wire connectors.
- .4 Terminals to be Wieland or approved equal.
- .5 Provide a group of terminals for each of 120 VAC hot and neutral and 24 VDC positive and negative power. Distribution wiring to have a thermal magnetic circuit breaker upstream of all major blocks of loads, adequately sized to protect the connected load while not causing nuisance tripping.
- .6 Provide Wieland disconnect type terminal blocks for each load or loop powered from the marshalling panels.

.3 Nameplates

- .1 Refer to Section 17010 for nameplate Specification.

2.2 Signal Current Isolator

- .1 Isolator to provide galvanic isolation of milliampere transmission signals from transmitters with inadequately isolated output circuits.

MISCELLANEOUS PANEL DEVICES

- .2 Isolator to be housed in a National Electrical Manufacturers Association (NEMA) 250, Type 4/7 conduit body and derive its operating power from the signal input circuit.
- .3 Input and output signals to be 4 to 20 mA, with an error not exceeding 0.1 percent of span. Input resistance will not exceed 550 ohms with an output load of 250 ohms.
- .4 Isolator to be Moore Industries.

2.3 Intrinsic Safety Barriers and Relays

- .1 Provide intrinsic safety barriers where required for two-wire transmitters of the active, isolating, loop powered type; MTL Type MT3042, Stahl 9005/01-252/100/00, P+F ZG series, or equal.
- .2 Provide dual type intrinsic safety barriers for process switches; MTL 787, Panalarm 201-BR2.
- .3 Intrinsic safety relays to be Gems, or Warrick.

2.4 Industrial Ethernet Switches

- .1 Switches shall comply with IEEE 802.3, 802.3u, 802.3x, 802.1D.
- .2 Switches shall include a minimum of six 10/100 Base T(x) RJ45 Ports and two multimode 100 Base FX Fiber ports.
- .3 Switches shall include one (1) relay output alarm contact rated for 1A at 24 VDC.
- .4 Input power shall be capable of ranging from 9 to 32 VDC with redundant inputs.
- .5 Switches shall be fast spanning for a sub-second recovery in a ring configuration.
- .6 Switches shall be Moxa Technology ED6008 Series or approved equal.

2.5 NTSC Fiber Transmitters/Receivers

- .1 Models shall have a minimum of four (4) NTSC compliant channels and one (1) multimode fiber channel.
- .2 Transmitters and receivers shall be supplied with a regulated switching power supply with a 120 VAC input.
- .3 Transmitters and receivers shall be Pelco FT8304MSTR and FR8304MSTR respectively.

MISCELLANEOUS PANEL DEVICES

3. EXECUTION

3.1 References – General

- .1 Refer to Section 17010, Part 3.

END OF SECTION

CONTROL AND OPERATOR INTERFACE REQUIREMENTS

1. GENERAL

1.1 General Requirements

- .1 Design, supply, and installation of an ABB Harmony based control system for the Nitrogen Removal facility that will control and monitor the system in accordance with the requirements defined by the Contract Documents.
- .2 The ABB Harmony system shall be housed in a central free standing multiple cabinet assembly to be located in the nitrogen removal building control room.
- .3 Design, supply, and installation of a control and communication network complete with all necessary interface devices, and network hardware as indicated on the drawings.
- .4 Cooperation with the process equipment vendors, other contractors, and City staff to interface and test the DCS components.
- .5 Start-up and Commissioning of the complete control system and associated field devices and wiring.

2. PRODUCTS

2.1 ABB Harmony System

- .1 General
 - .1 All new control system equipment to be based on the ABB Harmony family as applicable (no substitutions allowed).
 - .2 Control system logic configuration shall be done on the existing Plant DCS system by City personnel.
 - .3 All communication equipment required to interface to the existing Plant DCS system shall be supplied and installed. (Refer to Drawing I2.03 for details).
 - .4 Provide at least 20 percent spare I/O of each type in each panel assembly.
 - .5 Provide all necessary din rail, mounting bases, power supplies, cables, communication cards, and accessories.
 - .6 Provide spares of all ABB system components (minimum of one of each exact type) supplied including: power supplies, communication modules, and input/output modules.
 - .7 Provide redundant power supplies and 25 percent spare power supply capacity for each ABB panel assembly.

CONTROL AND OPERATOR INTERFACE REQUIREMENTS

- .8 Each new control panel assembly is to include a true on-line UPS system suitably sized to maintain the panel load for at least sixty minutes and; incoming power transient surge suppression equal to Sola Hevi-Duty STV100K series. Connect the surge suppressor dry contacts to a discrete input point and configure as an alarm on the control system at each panel.
- .9 Supply of ABB Harmony Equipment is expected to include:
 - .1 The system shall be housed in a multiple cabinet assembly with one cabinet reserved for power, control, and I/O modules, and three or more additional cabinets for standard Harmony termination units. I/O shall be grouped in four groups of DI, DO, AI and AO, and provide substantial spare unused cabinet space for future additions.
 - .2 Dual redundant power supply system
 - .3 One redundant set of INFINET communication modules
 - .4 One redundant set of Bridge Controllers
 - .5 One non-redundant SCSI computer interface for a standalone PCV operator station
 - .6 One set of non-redundant I/O modules, partitioned in four groups by I/O type
 - .7 One standalone 5000 tag PCV operator station with PC and monitor
 - .8 The system shall be sized to provide approximately 25 percent spare installed I/O capacity based on the I/O list provided, including Discrete Inputs, Discrete Outputs, Analog Inputs, Analog Inputs (RTD), and Analog Outputs.
 - .9 The system shall be shipped pre-assembled and pre-wired to the extent possible and shall include all required wiring, raceways, fuses, relays, and incidental items to form a complete and functional system ready for customer's power, communication, and I/O field wiring.
- .10 ABB Harmony Equipment shall match the detailed technical parameters of the recently supplied equipment currently installed at the NEWPCC.

2.2 System Integration Requirements

- .1 Cooperate and coordinate activities with other contractors, City of Winnipeg (City) staff, and consultants to facilitate installation, testing, validation, and commissioning of the Nitrogen Removal Facility.
- .2 Supply, install, test and commission the central control system equipment as specified in this Division and as shown on the Drawings.

CONTROL AND OPERATOR INTERFACE REQUIREMENTS

- .3 Extend the existing plant DCS network to the new ABB Harmony system and PCV workstation and assist the City and other contractors to establish communication between the new ABB Harmony system and the Plant DCS. Test data exchange as defined in this Division and the process description.
- .4 All equipment testing and commissioning responsibilities must be carried out while at the same time maintaining availability of the main Plant DCS. Any equipment outage requirements are to be kept to a minimum and are to be scheduled with the Contract Administrator prior to implementation.

3. EXECUTION

3.1 Performance – General

- .1 Refer to Section 17010, Part 3.

3.2 Installation

- .1 Provide hardware in accordance with the foregoing requirements in sufficient quantity to satisfy the performance requirements defined in this and other Divisions of the Specification.
- .2 Provide all necessary documentation to define the control system including details for all hardware.
- .3 Commission and start up the system as defined herein.
- .4 Provide all documentation and training as defined herein.
- .5 Maintain existing plant operation during entire Construction Period. Refer to the requirements of Division 1.

END OF SECTION

DCS INPUT/OUTPUT INDEX

1. GENERAL

1.1 References – General

- .1 Refer to Section 17010.

1.2 PLC I/O Index

- .1 The following spreadsheet gives an itemized list of the I/O between the DCS and the field devices. It is intended to serve as an aid for determining the cabling requirements for the Work specified in this Division.
- .2 Refer to Division 17 Section 17500 for required I/O spare requirements for each type of I/O.
- .3 All control circuits and I/O points shall be individually fused.

2. PRODUCTS

- .1 Not used

3. EXECUTION

- .1 Not used

CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE				FUNCTION	SERVICE		ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.						LO/0	HI/1		
1	0	C	A	C	010	YS		Remote status	Mixed centrate flow split gate WG-010	P5.01					DI	
2	0	C	A	C	010	ZD		Gate open status	Mixed centrate flow split gate WG-010	P5.01			Off	Open	DI	
3	0	C	A	C	010	ZB		Gate closed status	Mixed centrate flow split gate WG-010	P5.01			Off	Closed	DI	
4	0	C	A	C	010	ZC		Gate control output	Mixed centrate flow split gate WG-010	P5.01	%	0-100			AO	
5	0	C	A	C	010	ZT		Gate position feedback	Mixed centrate flow split gate WG-010	P5.01	%	0-100			AI	
6	0	C	A	C	020	YS		Remote status	Mixed centrate flow split gate WG-020	P5.01					DI	
7	0	C	A	C	020	ZD		Gate open status	Mixed centrate flow split gate WG-020	P5.01			Off	Open	DI	
8	0	C	A	C	020	ZB		Gate closed status	Mixed centrate flow split gate WG-020	P5.01			Off	Closed	DI	
9	0	C	A	C	020	ZC		Gate control output	Mixed centrate flow split gate WG-020	P5.01	%	0-100			AO	
10	0	C	A	C	020	ZT		Gate position feedback	Mixed centrate flow split gate WG-020	P5.01	%	0-100			AI	
11	0	C	A	C	005	LT		Liquid level transmitter	Mixed centrate distribution chamber	P5.01	Meter	0-10			AI	
12	0	C	A	C	005	LH		Float switch	Mixed centrate distribution chamber	P5.01				1	DI	
13																
14	0	C	A	C	100	LT	1	Liquid level transmitter	SBR-1	P6.01	Meter	0-10			AI	
15	0	C	A	C	100	LT	2	Liquid level transmitter	SBR-1	P6.01	Meter	0-10			AI	
16	0	C	A	C	106	YS		Computer status	SBR-1 water spray control valve 106	P6.01					DI	
17	0	C	A	C	106	VD		Valve open command	SBR-1 water spray control valve 106	P6.01					DO	
18	0	C	A	C	160	MM	1	Decanter running forward	SBR-1 decanter #160	P6.01					DI	
19	0	C	A	C	160	MM	2	Decanter running reverse	SBR-1 decanter #160	P6.01					DI	
20	0	C	A	C	160	YS		Computer status	SBR-1 decanter #160	P6.01					DI	
21	0	C	A	C	160	MN	1	Call to Raise	SBR-1 decanter #160	P6.01					DO	
22	0	C	A	C	160	MN	2	Call to Lower	SBR-1 decanter #160	P6.01					DO	
23	0	C	A	C	160	MF		Decanter fault	SBR-1 decanter #160	P6.01			Failed	Normal	DI	
24	0	C	A	C	160	SC		Speed control	SBR-1 decanter #160	P6.01	%	0-100			AO	
25	0	C	A	C	160	ST		Speed indication	SBR-1 decanter #160	P6.01	%	0-100			AI	
26	0	C	A	C	160	UA	1	Minor Alarm	SBR-1 decanter #160	P6.01			Failed	Normal	DI	
27	0	C	A	C	160	UA	2	Major Alarm	SBR-1 decanter #160	P6.01			Failed	Normal	DI	
28	0	C	A	C	160	ZS	1	Decanter raised limit	SBR-1 decanter #160	P6.01					DI	
29	0	C	A	C	160	ZS	2	Decanter lower limit	SBR-1 decanter #160	P6.01					DI	
30	0	C	A	C	160	ZS	3	Decanter raised backup limit	SBR-1 decanter #160	P6.01					DI	
31	0	C	A	C	160	ZS	4	Decanter lower backup limit	SBR-1 decanter #160	P6.01					DI	
32	0	C	A	C	184	ZD		Damper open status	Motorized Damper CV-184	P6.01			Off	Open	DI	
33	0	C	A	C	184	ZB		Damper closed status	Motorized Damper CV-184	P6.01			Off	Closed	DI	

I/O POINT TYPES: AI = Analog, AO = Analog Output, DI = Discrete Input, DO = Discrete Output, MB = Modbus, TCP/IP = Ethernet

CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						FUNCTION	DESCRIPTION	P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE							ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.						LO/0	HI/1		
34	0	C	A	C	184	ZC		Damper control output	Motorized Damper CV-184	P6.01	%	0-100			AO	
35																
36	0	C	A	C	200	LT	1	Liquid level transmitter	SBR-2	P6.02	Meter	0-10			AI	
37	0	C	A	C	200	LT	2	Liquid level transmitter	SBR-2	P6.02	Meter	0-10			AI	
38	0	C	A	C	206	YS		Computer status	SBR-2 water spray control valve 206	P6.02					DI	
39	0	C	A	C	206	VD		Valve open command	SBR-2 water spray control valve 206	P6.02					DO	
40	0	C	A	C	260	MM	1	Decanter running forward	SBR-2 decanter #260	P6.02					DI	
41	0	C	A	C	260	MM	2	Decanter running reverse	SBR-2 decanter #260	P6.02					DI	
42	0	C	A	C	260	YS		Computer status	SBR-2 decanter #260	P6.02					DI	
43	0	C	A	C	260	MN	1	Forward command	SBR-2 decanter #260	P6.02					DO	
44	0	C	A	C	260	MN	2	Reverse command	SBR-2 decanter #260	P6.02					DO	
45	0	C	A	C	260	MF		Decanter fault	SBR-2 decanter #260	P6.02			Failed	Normal	DI	
46	0	C	A	C	260	SC		Speed control	SBR-2 decanter #260	P6.02	%	0-100			AO	
47	0	C	A	C	260	ST		Speed indication	SBR-2 decanter #260	P6.02	%	0-100			AI	
48	0	C	A	C	260	UA	1	Minor Alarm	SBR-2 decanter #260	P6.02			Failed	Normal	DI	
49	0	C	A	C	260	UA	2	Major Alarm	SBR-2 decanter #260	P6.02			Failed	Normal	DI	
50	0	C	A	C	260	ZS	1	Decanter raised limit	SBR-2 decanter #260	P6.02					DI	
51	0	C	A	C	260	ZS	2	Decanter lower limit	SBR-2 decanter #260	P6.02					DI	
52	0	C	A	C	260	ZS	3	Decanter raised backup limit	SBR-2 decanter #260	P6.02					DI	
53	0	C	A	C	260	ZS	4	Decanter lower backup limit	SBR-2 decanter #260	P6.02					DI	
54	0	C	A	C	284	ZD		Damper open status	Motorized Damper CV-284	P6.02			Off	Open	DI	
55	0	C	A	C	284	ZB		Damper closed status	Motorized Damper CV-284	P6.02			Off	Closed	DI	
56	0	C	A	C	284	ZC		Damper control output	Motorized Damper CV-284	P6.02	%	0-100			AO	
57																
58	0	C	A	C	040	AT	1	Sample 1 NH3 indication	SBR online chemical analyzer	P6.03	ppm	0-100			TCP/IP	
59	0	C	A	C	040	AT	2	Sample 1 NO3 indication	SBR online chemical analyzer	P6.03	ppm	0-100			TCP/IP	
60	0	C	A	C	040	AT	3	Sample 1 NO2 indication	SBR online chemical analyzer	P6.03	ppm	0-100			TCP/IP	
61	0	C	A	C	040	AT	4	Sample 1 PO4 indication	SBR online chemical analyzer	P6.03	ppm	0-100			TCP/IP	
62	0	C	A	C	040	AT	5	Sample 2 NH3 indication	SBR online chemical analyzer	P6.03	ppm	0-100			TCP/IP	
63	0	C	A	C	040	AT	6	Sample 2 NO3 indication	SBR online chemical analyzer	P6.03	ppm	0-100			TCP/IP	
64	0	C	A	C	040	AT	7	Sample 2 NO2 indication	SBR online chemical analyzer	P6.03	ppm	0-100			TCP/IP	
65	0	C	A	C	040	AT	8	Sample 2 PO4 indication	SBR online chemical analyzer	P6.03	ppm	0-100			TCP/IP	
66	0	C	A	C	040	UA		Maintenance Required	SBR online chemical analyzer	P6.03			Alarm	Normal	TCP/IP	

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CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE				FUNCTION	SERVICE		ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.						LO/0	HI/1		
67	0	C	A	C	040	MM		System On-line	SBR online chemical analyzer	P6.03					TCP/IP	
68	0	C	A	C	040	AN	1	Sample 1 Disabled	SBR online chemical analyzer	P6.03					TCP/IP	
69	0	C	A	C	040	AN	2	Sample 2 Disabled	SBR online chemical analyzer	P6.03					TCP/IP	
70	0	C	A	C	185	AT	1	Dissolved oxygen indication	SBR-1	P6.03	ppm	0-100			AI	
71	0	C	A	C	185	AF	1	Transmitter Failed	SBR-1	P6.03			Failed	Normal	DI	
72	0	C	A	C	185	AT	2	PH indication	SBR-1	P6.03	ppm	0-100			AI	
73	0	C	A	C	185	AF	2	Transmitter Failed	SBR-1	P6.03			Failed	Normal	DI	
74	0	C	A	C	185	TT		Temperature indication	SBR-1	P6.03	Deg. C	0-50			AI	
75	0	C	A	C	190	YS		Computer status	SBR-1 sampling pump	P6.03					DI	
76	0	C	A	C	190	MN		Start control output	SBR-1 sampling pump	P6.03					DO	
77	0	C	A	C	190	MM		Pump running	SBR-1 sampling pump	P6.03					DI	
78	0	C	A	C	190	MF		Pump Fault	SBR-1 sampling pump	P6.03					DI	
79	0	C	A	C	285	AT	1	Dissolved oxygen indication	SBR-2	P6.03	ppm	0-100			AI	
80	0	C	A	C	285	AF	1	Transmitter Failed	SBR-2	P6.03			Failed	Normal	DI	
81	0	C	A	C	285	AT	2	PH indication	SBR-2	P6.03	ppm	0-100			AI	
82	0	C	A	C	285	AF	2	Transmitter Failed	SBR-2	P6.03			Failed	Normal	DI	
83	0	C	A	C	285	TT		Temperature indication	SBR-2	P6.03	Deg. C	0-50			AI	
84	0	C	A	C	290	YS		Computer status	SBR-2 sampling pump	P6.03					DI	
85	0	C	A	C	290	MN		Start control output	SBR-2 sampling pump	P6.03					DO	
86	0	C	A	C	290	MM		Pump running	SBR-2 sampling pump	P6.03					DI	
87	0	C	A	C	290	MF		Pump Fault	SBR-2 sampling pump	P6.03					DI	
88																
89	0	C	A	C	110	YS		Computer status	SBR-1 submersible mixer #110	P6.04					DI	
90	0	C	A	C	110	MN		Start/Stop control output	SBR-1 submersible mixer #110	P6.04					DO	
91	0	C	A	C	110	MM		Pump motor run status	SBR-1 submersible mixer #110	P6.04					DI	
92	0	C	A	C	110	MF		Pump motor overload	SBR-1 submersible mixer #110	P6.04			Failed	Normal	DI	
93	0	C	A	C	110	TH		High Temperature Alarm	SBR-1 submersible mixer #110	P6.04			Failed	Normal	DI	
94	0	C	A	C	110	NH		High Moisture Alarm	SBR-1 submersible mixer #110	P6.04			Failed	Normal	DI	
95	0	C	A	C	120	YS		Computer status	SBR-1 submersible mixer #120	P6.04					DI	
96	0	C	A	C	120	MN		Start/Stop control output	SBR-1 submersible mixer #120	P6.04					DO	
97	0	C	A	C	120	MM		Pump motor run status	SBR-1 submersible mixer #120	P6.04					DI	
98	0	C	A	C	120	MF		Pump motor overload	SBR-1 submersible mixer #120	P6.04			Failed	Normal	DI	
99	0	C	A	C	120	TH		High Temperature Alarm	SBR-1 submersible mixer #120	P6.04			Failed	Normal	DI	

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NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE				FUNCTION	SERVICE		ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.						LO/0	HI/1		
100	0	C	A	C	120	NH		High Moisture Alarm	SBR-1 submersible mixer #120	P6.04			Failed	Normal	DI	
101	0	C	A	C	130	YS		Computer status	SBR-1 submersible mixer #130	P6.04					DI	
102	0	C	A	C	130	MN		Start/Stop control output	SBR-1 submersible mixer #130	P6.04					DO	
103	0	C	A	C	130	MM		Pump motor run status	SBR-1 submersible mixer #130	P6.04					DI	
104	0	C	A	C	130	MF		Pump motor overload	SBR-1 submersible mixer #130	P6.04			Failed	Normal	DI	
105	0	C	A	C	130	TH		High Temperature Alarm	SBR-1 submersible mixer #130	P6.04			Failed	Normal	DI	
106	0	C	A	C	130	NH		High Moisture Alarm	SBR-1 submersible mixer #130	P6.04			Failed	Normal	DI	
107	0	C	A	C	210	YS		Computer status	SBR-2 submersible mixer #210	P6.04					DI	
108	0	C	A	C	210	MN		Start/Stop control output	SBR-2 submersible mixer #210	P6.04					DO	
109	0	C	A	C	210	MM		Pump motor run status	SBR-2 submersible mixer #210	P6.04					DI	
110	0	C	A	C	210	MF		Pump motor overload	SBR-2 submersible mixer #210	P6.04			Failed	Normal	DI	
111	0	C	A	C	210	TH		High Temperature Alarm	SBR-2 submersible mixer #210	P6.04			Failed	Normal	DI	
112	0	C	A	C	210	NH		High Moisture Alarm	SBR-2 submersible mixer #210	P6.04			Failed	Normal	DI	
113	0	C	A	C	220	YS		Computer status	SBR-2 submersible mixer #220	P6.04					DI	
114	0	C	A	C	220	MN		Start/Stop control output	SBR-2 submersible mixer #220	P6.04					DO	
115	0	C	A	C	220	MM		Pump motor run status	SBR-2 submersible mixer #220	P6.04					DI	
116	0	C	A	C	220	TH		High Temperature Alarm	SBR-2 submersible mixer #220	P6.04			Failed	Normal	DI	
117	0	C	A	C	220	NH		High Moisture Alarm	SBR-2 submersible mixer #220	P6.04			Failed	Normal	DI	
118	0	C	A	C	220	MF		Pump motor overload	SBR-2 submersible mixer #220	P6.04			Failed	Normal	DI	
119	0	C	A	C	230	YS		Computer status	SBR-2 submersible mixer #230	P6.04					DI	
120	0	C	A	C	230	MN		Start/Stop control output	SBR-2 submersible mixer #230	P6.04					DO	
121	0	C	A	C	230	MM		Pump motor run status	SBR-2 submersible mixer #230	P6.04					DI	
122	0	C	A	C	230	MF		Pump motor overload	SBR-2 submersible mixer #230	P6.04			Failed	Normal	DI	
123	0	C	A	C	230	TH		High Temperature Alarm	SBR-2 submersible mixer #230	P6.04			Failed	Normal	DI	
124	0	C	A	C	230	NH		High Moisture Alarm	SBR-2 submersible mixer #230	P6.04			Failed	Normal	DI	
125																
126	0	C	A	C	140	YS		Computer status	SBR-1 mixed liquor pump #140	P6.05					DI	
127	0	C	A	C	140	MN		Start/Stop control output	SBR-1 mixed liquor pump #140	P6.05					DO	
128	0	C	A	C	140	MM		Pump motor run status	SBR-1 mixed liquor pump #140	P6.05					DI	
129	0	C	A	C	140	MF		Pump motor overload	SBR-1 mixed liquor pump #140	P6.05			Failed	Normal	DI	
130	0	C	A	C	140	TH		High Temperature Alarm	SBR-1 mixed liquor pump #140	P6.05			Failed	Normal	DI	
131	0	C	A	C	150	YS		Computer status	SBR-1 WAS pump #150	P6.05					DI	
132	0	C	A	C	150	MN		Start/Stop control output	SBR-1 WAS pump #150	P6.05					DO	

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NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						FUNCTION	DESCRIPTION	P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE							ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.						LO/0	HI/1		
133	0	C	A	C	150	MM		Pump motor run status	SBR-1 WAS pump #150	P6.05				DI		
134	0	C	A	C	150	MF		Pump motor overload	SBR-1 WAS pump #150	P6.05			Failed	Normal	DI	
135	0	C	A	C	150	TH		High Temperature Alarm	SBR-1 WAS pump #150	P6.05			Failed	Normal	DI	
136	0	C	A	C	150	NH		High Moisture Alarm	SBR-1 WAS pump #150	P6.05			Failed	Normal	DI	
137	0	C	A	C	240	YS		Computer status	SBR-2 mixed liquor pump #240	P6.05					DI	
138	0	C	A	C	240	MN		Start/Stop control output	SBR-2 mixed liquor pump #240	P6.05					DO	
139	0	C	A	C	240	MM		Pump motor run status	SBR-2 mixed liquor pump #240	P6.05					DI	
140	0	C	A	C	240	MF		Pump motor overload	SBR-2 mixed liquor pump #240	P6.05			Failed	Normal	DI	
141	0	C	A	C	240	TH		High Temperature Alarm	SBR-2 mixed liquor pump #240	P6.05			Failed	Normal	DI	
142	0	C	A	C	240	NH		High Moisture Alarm	SBR-2 mixed liquor pump #240	P6.05			Failed	Normal	DI	
143	0	C	A	C	250	YS		Computer status	SBR-2 WAS pump #250	P6.05					DI	
144	0	C	A	C	250	MN		Start/Stop control output	SBR-2 WAS pump #250	P6.05					DO	
145	0	C	A	C	250	MM		Pump motor run status	SBR-2 WAS pump #250	P6.05					DI	
146	0	C	A	C	250	MF		Pump motor overload	SBR-2 WAS pump #250	P6.05			Failed	Normal	DI	
147	0	C	A	C	250	TH		High Temperature Alarm	SBR-2 WAS pump #250	P6.05			Failed	Normal	DI	
148	0	C	A	C	250	NH		High Moisture Alarm	SBR-2 WAS pump #250	P6.05			Failed	Normal	DI	
149																
150	0	C	A	C	300	LT	1	Liquid level transmitter	Equalization Tank	P7.01	Meter	0-10			AI	
151	0	C	A	C	300	LT	2	Liquid level transmitter	Equalization Tank	P7.01	Meter	0-10			AI	
152	0	C	A	C	330	YS		Computer status	Treated centrate pump #330	P7.01					DI	
153	0	C	A	C	330	MN		Start/Stop control output	Treated centrate pump #330	P7.01					DO	
154	0	C	A	C	330	MM		Pump motor run status	Treated centrate pump #330	P7.01					DI	
155	0	C	A	C	330	MF		Pump motor overload	Treated centrate pump #330	P7.01			Failed	Normal	DI	
156	0	C	A	C	330	SC		Speed control	Treated centrate pump #330	P7.01	%	0-100			AO	
157	0	C	A	C	330	ST		Speed indication	Treated centrate pump #330	P7.01	%	0-100			AI	
158	0	C	A	C	330	UA		General Alarm	Treated centrate pump #330	P7.01				1	DI	
159	0	C	A	C	330	TH		HighTemperature Alarm	Treated centrate pump #330	P7.01				1	DI	
160	0	C	A	C	330	NH		High Moisture Alarm	Treated centrate pump #330	P7.01				1	DI	
161	0	C	A	C	330	UY		Run Permissive	Treated centrate pump #330	P7.01					DO	
162	0	C	A	C	330	IT		Current indication	Treated centrate pump #330	P7.01	Amps				AI	
163	0	C	A	C	340	YS		Computer status	Treated centrate pump #340	P7.01					DI	
164	0	C	A	C	340	MN		Start/Stop control output	Treated centrate pump #340	P7.01					DO	
165	0	C	A	C	340	MM		Pump motor run status	Treated centrate pump #340	P7.01					DI	

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NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE							FUNCTION	SERVICE	ENG. UNITS	SCALE LOW-HIGH	ALARMS	
		AREA	PNL	AREA	LOOP	TAG	No.	LO/0	HI/1							
166	0	C	A	C	340	MF		Pump motor overload	Treated centrate pump #340	P7.01			Failed	Normal	DI	
167	0	C	A	C	340	SC		Speed control	Treated centrate pump #340	P7.01	%	0-100			AO	
168	0	C	A	C	340	ST		Speed indication	Treated centrate pump #340	P7.01	%	0-100			AI	
169	0	C	A	C	340	IT		Current indication	Treated centrate pump #340	P7.01	Amps				AI	
170	0	C	A	C	340	UA		General Alarm	Treated centrate pump #340	P7.01				1	DI	
171	0	C	A	C	340	UY		Run Permissive	Treated centrate pump #340	P7.01					DO	
172	0	C	A	C	340	TH		HighTemperature Alarm	Treated centrate pump #340	P7.01				1	DI	
173	0	C	A	C	340	NH		High Moisture Alarm	Treated centrate pump #340	P7.01				1	DI	
174	0	C	A	C	952	YS		Computer status	Equalization Tank sampling pump #952	P7.01					DI	
175	0	C	A	C	952	MN		Start control output	Equalization Tank sampling pump #952	P7.01					DO	
176	0	C	A	C	952	MM		Pump motor run status	Equalization Tank sampling pump #952	P7.01					DI	
177	0	C	A	C	952	MF		Pump Fault	Equalization Tank sampling pump #952	P7.01			Failed	Normal	DI	
178	0	C	A	C	952	TH		High Temperature Alarm	Equalization Tank sampling pump #952	P7.01			Failed	Normal	DI	
179	0	C	A	C	960	YS		Computer status	Bristol Sampler C960	P7.01					DI	
180	0	C	A	C	960	AN		Start/Stop control output	Bristol Sampler C960	P7.01					DO	
181	0	C	A	C	960	AM		Sampler run status	Bristol Sampler C960	P7.01					DI	
182	0	C	A	C	960	AF		Sampler Fault	Bristol Sampler C960	P7.01			Failed	Normal	DI	
183																
184	0	C	A	C	310	YS		Computer status	Equalization tank mixer #310	P7.02					DI	
185	0	C	A	C	310	MN		Start/Stop control output	Equalization tank mixer #310	P7.02					DO	
186	0	C	A	C	310	MM		Pump motor run status	Equalization tank mixer #310	P7.02					DI	
187	0	C	A	C	310	MF		Pump motor overload	Equalization tank mixer #310	P7.02			Failed	Normal	DI	
188	0	C	A	C	310	TH		High Temperature Alarm	Equalization tank mixer #310	P7.02			Failed	Normal	DI	
189	0	C	A	C	310	NH		High Moisture Alarm	Equalization tank mixer #310	P7.02			Failed	Normal	DI	
190	0	C	A	C	320	YS		Computer status	Equalization tank mixer #320	P7.02					DI	
191	0	C	A	C	320	MN		Start/Stop control output	Equalization tank mixer #320	P7.02					DO	
192	0	C	A	C	320	MM		Pump motor run status	Equalization tank mixer #320	P7.02					DI	
193	0	C	A	C	320	MF		Pump motor overload	Equalization tank mixer #320	P7.02			Failed	Normal	DI	
194	0	C	A	C	320	TH		High Temperature Alarm	Equalization tank mixer #320	P7.02			Failed	Normal	DI	
195	0	C	A	C	320	NH		High Moisture Alarm	Equalization tank mixer #320	P7.02			Failed	Normal	DI	
196																
197	0	C	A	C	410	TT		Temperature indication	Aeration blower #1A inlet plenum	P8.01	Deg. C				AI	
198	0	C	A	C	410	PDIT		Differential pressure indication	Aeration blower #1A inlet filter	P8.01	kPa				AI	

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DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE							FUNCTION	SERVICE	ENG. UNITS	SCALE LOW-HIGH	ALARMS	
		AREA	PNL	AREA	LOOP	TAG	No.	LO/0	HI/1							
199	0	C	A	C	410	PL		Pressure alarm low	Aeration blower #1A	P8.01			1		DI	
200	0	C	A	C	410	VH	1	Vibration alarm high	Aeration blower motor #1A	P8.01					AI	
201	0	C	A	C	410	VH	2	Vibration alarm high	Aeration blower #1A	P8.01					AI	
202	0	C	A	C	410	UY		Run Permissive	Aeration blower #1A	P8.01					DO	
203	0	C	A	C	410	MM		Blower motor run status	Aeration blower #1A	P8.01					DI	
204	0	C	A	C	410	YS		Computer status	Aeration blower #1A	P8.01					DI	
205	0	C	A	C	410	MN		Start/Stop control output	Aeration blower #1A	P8.01					DO	
206	0	C	A	C	410	MF		Drive fault	Aeration blower #1A	P8.01			Failed	Normal	DI	
207	0	C	A	C	410	ST		Speed indication	Aeration blower #1A	P8.01	%	0-100			AI	
208	0	C	A	C	410	IT		Current indication	Aeration blower #1A	P8.01	Amps				AI	
209	0	C	A	C	410	SC		Speed control	Aeration blower #1A	P8.01	%	0-100			AO	
210	0	C	A	C	410	TE	1A	Temperature indication	Aeration blower #1A motor phase A	P8.01					AI - RTD	
211	0	C	A	C	410	TE	2A	Temperature indication	Aeration blower #1A motor phase B	P8.01					AI - RTD	
212	0	C	A	C	410	TE	3A	Temperature indication	Aeration blower #1A motor phase C	P8.01					AI - RTD	
213	0	C	A	C	410	TE	1B	Temperature indication	Aeration blower #1A motor phase A	P8.01					AI - RTD	
214	0	C	A	C	410	TE	2B	Temperature indication	Aeration blower #1A motor phase B	P8.01					AI - RTD	
215	0	C	A	C	410	TE	3B	Temperature indication	Aeration blower #1A motor phase C	P8.01					AI - RTD	
216	0	C	A	C	410	TE	4	Temperature indication	Aeration blower #1A inboard bearing	P8.01					AI - RTD	
217	0	C	A	C	410	TE	5	Temperature indication	Aeration blower #1A outboard bearing	P8.01					AI - RTD	
218	0	C	A	C	410	TH		Temperature alarm high	Aeration blower #1A discharge	P8.01				1	DI	
219	0	C	A	C	410	PH		Pressure alarm high	Aeration blower #1A discharge	P8.01				1	DI	
220	0	C	A	C	411	TT		Temperature indication	Aeration blower #1A enclosure	P8.01	Deg. C				AI	
221	0	C	A	C	420	TT		Temperature indication	Aeration blower #1B inlet plenum	P8.01	Deg. C				AI	
222	0	C	A	C	420	PDIT		Differential pressure indication	Aeration blower #1B inlet filter	P8.01	kPa				AI	
223	0	C	A	C	420	PL		Pressure alarm low	Aeration blower #1B	P8.01			1		DI	
224	0	C	A	C	420	VH	1	Vibration alarm high	Aeration blower motor #1B	P8.01					AI	
225	0	C	A	C	420	VH	2	Vibration alarm high	Aeration blower #1B	P8.01					AI	
226	0	C	A	C	420	UY		Run Permissive	Aeration blower #1B	P8.01					DO	
227	0	C	A	C	420	MM		Blower motor run status	Aeration blower #1B	P8.01					DI	
228	0	C	A	C	420	YS		Computer status	Aeration blower #1B	P8.01					DI	
229	0	C	A	C	420	MN		Start/Stop control output	Aeration blower #1B	P8.01					DO	
230	0	C	A	C	420	MF		Drive fault	Aeration blower #1B	P8.01			Failed	Normal	DI	
231	0	C	A	C	420	ST		Speed indication	Aeration blower #1B	P8.01	%	0-100			AI	

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CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE							FUNCTION	SERVICE	ENG. UNITS	SCALE LOW-HIGH	ALARMS	
		AREA	PNL	AREA	LOOP	TAG	No.	LO/0	HI/1							
232	0	C	A	C	420	IT		Current indication	Aeration blower #1B	P8.01	Amps				AI	
233	0	C	A	C	420	SC		Speed control	Aeration blower #1B	P8.01	%	0-100			AO	
234	0	C	A	C	420	TE	1A	Temperature indication	Aeration blower #1B motor phase A	P8.01					AI - RTD	
235	0	C	A	C	420	TE	2A	Temperature indication	Aeration blower #1B motor phase B	P8.01					AI - RTD	
236	0	C	A	C	420	TE	3A	Temperature indication	Aeration blower #1B motor phase C	P8.01					AI - RTD	
237	0	C	A	C	420	TE	1B	Temperature indication	Aeration blower #1B motor phase A	P8.01					AI - RTD	
238	0	C	A	C	420	TE	2B	Temperature indication	Aeration blower #1B motor phase B	P8.01					AI - RTD	
239	0	C	A	C	420	TE	3B	Temperature indication	Aeration blower #1B motor phase C	P8.01					AI - RTD	
240	0	C	A	C	420	TE	4	Temperature indication	Aeration blower #1B inboard bearing	P8.01					AI - RTD	
241	0	C	A	C	420	TE	5	Temperature indication	Aeration blower #1B outboard bearing	P8.01					AI - RTD	
242	0	C	A	C	420	TH		Temperature alarm high	Aeration blower #1B discharge	P8.01				1	DI	
243	0	C	A	C	420	PH		Pressure alarm high	Aeration blower #1B discharge	P8.01				1	DI	
244	0	C	A	C	421	TT		Temperature indication	Aeration blower #1B enclosure	P8.01	Deg. C				AI	
245	0	C	A	C	427	PT		Pressure indication	SBR #1 aeration pressure	P8.01	kPa				AI	
246																
247	0	C	A	C	430	TT		Temperature indication	Aeration blower #2A inlet plenum	P8.02	Deg. C				AI	
248	0	C	A	C	430	PDIT		Differential pressure indication	Aeration blower #2A inlet filter	P8.02	kPa				AI	
249	0	C	A	C	430	PL		Pressure alarm low	Aeration blower #2A	P8.02			1		DI	
250	0	C	A	C	430	VH	1	Vibration alarm high	Aeration blower motor #2A	P8.02					AI	
251	0	C	A	C	430	VH	2	Vibration alarm high	Aeration blower #2A	P8.02					AI	
252	0	C	A	C	430	UY		Run Permissive	Aeration blower #2A	P8.02					DO	
253	0	C	A	C	430	MM		Blower motor run status	Aeration blower #2A	P8.02					DI	
254	0	C	A	C	430	YS		Computer status	Aeration blower #2A	P8.02					DI	
255	0	C	A	C	430	MN		Start/Stop control output	Aeration blower #2A	P8.02					DO	
256	0	C	A	C	430	MF		Drive fault	Aeration blower #2A	P8.02			Failed	Normal	DI	
257	0	C	A	C	430	ST		Speed indication	Aeration blower #2A	P8.02	%	0-100			AI	
258	0	C	A	C	430	IT		Current indication	Aeration blower #2A	P8.02	Amps				AI	
259	0	C	A	C	430	SC		Speed control	Aeration blower #2A	P8.02	%	0-100			AO	
260	0	C	A	C	430	TE	1A	Temperature indication	Aeration blower #2A motor phase A	P8.02					AI - RTD	
261	0	C	A	C	430	TE	2A	Temperature indication	Aeration blower #2A motor phase B	P8.02					AI - RTD	
262	0	C	A	C	430	TE	3A	Temperature indication	Aeration blower #2A motor phase C	P8.02					AI - RTD	
263	0	C	A	C	430	TE	1B	Temperature indication	Aeration blower #2A motor phase A	P8.02					AI - RTD	
264	0	C	A	C	430	TE	2B	Temperature indication	Aeration blower #2A motor phase B	P8.02					AI - RTD	

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NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION	P&ID DRAWING	I/O SPECIFICATION							
		PCU		DEVICE						FUNCTION	SERVICE	ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.							LO/0	HI/1		
265	0	C	A	C	430	TE	3B	Temperature indication	Aeration blower #2A motor phase C	P8.02					AI - RTD		
266	0	C	A	C	430	TE	4	Temperature indication	Aeration blower #2A inboard bearing	P8.02					AI - RTD		
267	0	C	A	C	430	TE	5	Temperature indication	Aeration blower #2A outboard bearing	P8.02					AI - RTD		
268	0	C	A	C	430	TH		Temperature alarm high	Aeration blower #2A discharge	P8.02				1	DI		
269	0	C	A	C	430	PH		Pressure alarm high	Aeration blower #2A discharge	P8.02				1	DI		
270	0	C	A	C	431	TT		Temperature indication	Aeration blower #2A enclosure	P8.02	Deg. C				AI		
271	0	C	A	C	437	PT		Pressure indication	SBR #2 aeration pressure	P8.02	kPa				AI		
272	0	C	A	C	440	TT		Temperature indication	Aeration blower #2B inlet plenum	P8.02	Deg. C				AI		
273	0	C	A	C	440	PDIT		Differential pressure indication	Aeration blower #2B inlet filter	P8.02	kPa				AI		
274	0	C	A	C	440	PL		Pressure alarm low	Aeration blower #2B	P8.02			1		DI		
275	0	C	A	C	440	VH	1	Vibration alarm high	Aeration blower motor #2B	P8.02					AI		
276	0	C	A	C	440	VH	2	Vibration alarm high	Aeration blower #2B	P8.02					AI		
277	0	C	A	C	440	UY		Run Permissive	Aeration blower #2B	P8.02					DO		
278	0	C	A	C	440	MM		Blower motor run status	Aeration blower #2B	P8.02					DI		
279	0	C	A	C	440	YS		Computer status	Aeration blower #2B	P8.02					DI		
280	0	C	A	C	440	MN		Start/Stop control output	Aeration blower #2B	P8.02					DO		
281	0	C	A	C	440	MF		Drive fault	Aeration blower #2B	P8.02			Failed	Normal	DI		
282	0	C	A	C	440	ST		Speed indication	Aeration blower #2B	P8.02	%	0-100			AI		
283	0	C	A	C	440	IT		Current indication	Aeration blower #2B	P8.02	Amps				AI		
284	0	C	A	C	440	SC		Speed control	Aeration blower #2B	P8.02	%	0-100			AO		
285	0	C	A	C	440	TE	1A	Temperature indication	Aeration blower #2B motor phase A	P8.02					AI - RTD		
286	0	C	A	C	440	TE	2A	Temperature indication	Aeration blower #2B motor phase B	P8.02					AI - RTD		
287	0	C	A	C	440	TE	3A	Temperature indication	Aeration blower #2B motor phase C	P8.02					AI - RTD		
288	0	C	A	C	440	TE	1B	Temperature indication	Aeration blower #2B motor phase A	P8.02					AI - RTD		
289	0	C	A	C	440	TE	2B	Temperature indication	Aeration blower #2B motor phase B	P8.02					AI - RTD		
290	0	C	A	C	440	TE	3B	Temperature indication	Aeration blower #2B motor phase C	P8.02					AI - RTD		
291	0	C	A	C	440	TE	4	Temperature indication	Aeration blower #2B inboard bearing	P8.02					AI - RTD		
292	0	C	A	C	440	TE	5	Temperature indication	Aeration blower #2B outboard bearing	P8.02					AI - RTD		
293	0	C	A	C	440	TH		Temperature alarm high	Aeration blower #2B discharge	P8.02				1	DI		
294	0	C	A	C	440	PH		Pressure alarm high	Aeration blower #2B discharge	P8.02				1	DI		
295	0	C	A	C	441	TT		Temperature indication	Aeration blower #2B enclosure	P8.02	Deg. C				AI		
296																	
297	0	C	A	C	300	PL		Low pressure alarm	Equalization Tank	P9.01			1		DI		

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NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE				FUNCTION	SERVICE		ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.						LO/0	HI/1		
298	0	C	A	C	300	PH		High pressure alarm	Equalization Tank	P9.01				1	DI	
299	0	C	A	C	300	PT		Pressure indication	Equalization Tank	P9.01	kPa				AI	
300	0	C	A	C	500	AF		Gas Transmitter Fault	Exhaust Fan Room	P9.01			Failed	Normal	DI	
301	0	C	A	C	500	AH		High H2S alarm	Exhaust Fan Room	P9.01				1	DI	
302	0	C	A	C	500	AHH		High High H2S alarm	Exhaust Fan Room	P9.01				1	AI	
303	0	C	A	C	501	AF		Gas Transmitter Fault	Exhaust Fan Room	P9.01			Failed	Normal	DI	
304	0	C	A	C	501	AH		High H2S alarm	Exhaust Fan Room	P9.01				1	DI	
305	0	C	A	C	501	AHH		High High H2S alarm	Exhaust Fan Room	P9.01				1	AI	
306	0	C	A	C	510	YS		Computer status	Odour control fan	P9.01					DI	
307	0	C	A	C	510	MN		Start/Stop control output	Odour control fan	P9.01					DO	
308	0	C	A	C	510	UY		Run Permissive	Odour control fan	P9.01					DO	
309	0	C	A	C	510	MM		Fan motor run status	Odour control fan	P9.01					DI	
310	0	C	A	C	510	MF		Drive fault	Odour control fan	P9.01			Failed	Normal	DI	
311	0	C	A	C	510	ST		Speed indication	Odour control fan	P9.01	%	0-100			AI	
312	0	C	A	C	510	SC		Speed control	Odour control fan	P9.01	%	0-100			AO	
313	0	C	A	C	510	IT		Current indication	Odour control fan	P9.01	Amps				AI	
314																
315	0	C	A	C	450	UA		Unloading malfunction	Truck Unloading Panel	P10.01					DO	
316	0	C	A	C	450	TT		Temperature indication	Acoustic Air Intake Box	P10.01	Deg. C				AI	
317	0	C	A	C	450	PDIT		Differential pressure indication	Aeration blower C450-AB inlet filter	P10.01	kPa				AI	
318	0	C	A	C	450	PL		Pressure alarm low	Aeration blower #5	P10.01			1		DI	
319	0	C	A	C	450	YS		Computer status	Aeration blower C450	P10.01					DI	
320	0	C	A	C	450	MN		Start/Stop control output	Aeration blower C450	P10.01					DO	
321	0	C	A	C	450	MM		Blower motor run status	Aeration blower C450	P10.01					DI	
322	0	C	A	C	450	MF		Blower motor overload	Aeration blower C450	P10.01			Failed	Normal	DI	
323	0	C	A	C	450	TE	1	Temperature indication	Aeration blower #5 motor phase A	P10.01					AI - RTD	
324	0	C	A	C	450	TE	2	Temperature indication	Aeration blower #5 motor phase B	P10.01					AI - RTD	
325	0	C	A	C	450	TE	3	Temperature indication	Aeration blower #5 motor phase C	P10.01					AI - RTD	
326	0	C	A	C	450	PH		Pressure alarm high	Pressure Switch Silencer	P10.01				1	DI	
327	0	C	A	C	450	TH		Temperature alarm high	Temperature Switch Silencer	P10.01				1	DI	
328	0	C	A	C	451	TE		Temperature indication	Aeration blower #5 enclosure	P10.01					AI - RTD	
329																
330	0	C	A	C	600	FS		Shower in Use	Emergency Shower	P10.02					DI	

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CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION	P&ID DRAWING	I/O SPECIFICATION							
		PCU		DEVICE						FUNCTION	SERVICE	ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.							LO/0	HI/1		
331	0	C	A	C	600	TT		Temperature transmitter	Soda Ash System C600	P10.02	Deg. C	0-50			AI		
332	0	C	A	C	610	LH		Level Alarm High	Soda Ash Silo C610	P10.02				1	DI		
333	0	C	A	C	610	LL		Level Alarm Low	Soda Ash Silo C610	P10.02			1		DI		
334	0	C	A	C	610	LT		Liquid level transmitter	Soda Ash Silo C610	P10.02	Meter				AI		
335	0	C	A	C	610	LF		Transmitter Failed	Soda Ash Silo C610	P10.02					DI		
336	0	C	A	C	615	YS		Computer status	Dust Filter Blower C615	P10.02					DI		
337	0	C	A	C	615	MN		Start/Stop control output	Dust Filter Blower C615	P10.02					DO		
338	0	C	A	C	615	MM		Pump motor run status	Dust Filter Blower C615	P10.02					DI		
339	0	C	A	C	615	MF		Pump motor overload	Dust Filter Blower C615	P10.02			Failed	Normal	DI		
340	0	C	A	C	620	YS		Computer status	Dust Filter Shaker C620	P10.02					DI		
341	0	C	A	C	620	MN		Start/Stop control output	Dust Filter Shaker C620	P10.02					DO		
342	0	C	A	C	620	MM		Pump motor run status	Dust Filter Shaker C620	P10.02					DI		
343	0	C	A	C	620	MF		Pump motor overload	Dust Filter Shaker C620	P10.02			Failed	Normal	DI		
344	0	C	A	C	625	YS		Computer status	Vibrator C625	P10.02					DI		
345	0	C	A	C	625	MN		Start/Stop control output	Vibrator C625	P10.02					DO		
346	0	C	A	C	625	MM		Pump motor run status	Vibrator C625	P10.02					DI		
347	0	C	A	C	625	MF		Pump motor overload	Vibrator C625	P10.02			Failed	Normal	DI		
348	0	C	A	C	630	YS		Computer status	Rotary valve CV-630	P10.02					DI		
349	0	C	A	C	630	ZD		Valve open status	Rotary valve CV-630	P10.02			Off	Open	DI		
350	0	C	A	C	630	ZB		Valve closed status	Rotary valve CV-630	P10.02			Off	Closed	DI		
351	0	C	A	C	630	ZC		Valve control output	Rotary valve CV-630	P10.02	%	0-100			AO		
352	0	C	A	C	630	ZT		Valve position feedback	Rotary valve CV-630	P10.02	%	0-100			AI		
353	0	C	A	C	635	LH		Level Alarm High	Supply Hopper C635	P10.02				1	DI		
354	0	C	A	C	635	LL		Level Alarm Low	Supply Hopper C635	P10.02			1		DI		
355	0	C	A	C	640	YS		Computer status	Dry Feeder C640 VFD	P10.02					DI		
356	0	C	A	C	640	MN		Start/Stop control output	Dry Feeder C640 VFD	P10.02					DO		
357	0	C	A	C	640	UY		Run Permissive	Dry Feeder C640 VFD	P10.02					DO		
358	0	C	A	C	640	MM		Pump motor run status	Dry Feeder C640 VFD	P10.02					DI		
359	0	C	A	C	640	MF		Drive fault	Dry Feeder C640 VFD	P10.02			Failed	Normal	DI		
360	0	C	A	C	640	ST		Speed indication	Dry Feeder C640 VFD	P10.02	%	0-100			AI		
361	0	C	A	C	640	SC		Speed control	Dry Feeder C640 VFD	P10.02	%	0-100			AO		
362	0	C	A	C	640	IT		Current indication	Dry Feeder C640 VFD	P10.02	Amps				AI		
363																	

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NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE				FUNCTION	SERVICE		ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.						LO/0	HI/1		
364	0	C	A	C	645	LH		Level Alarm High	Solution Tank C645	P10.03				1	DI	
365	0	C	A	C	645	LL		Level Alarm Low	Solution Tank C645	P10.03			1		DI	
366	0	C	A	C	645	PL		Pressure alarm Low	Solution Tank C645	P10.03			1		DI	
367	0	C	A	C	645	LT		Liquid level transmitter	Solution Tank C645	P10.03	Meter				AI	
368	0	C	A	C	645	LF		Liquid level transmitter fail	Solution Tank C645	P10.03				Alarm	DI	
369	0	C	A	C	650	YS		Computer status	Solution Tank Mixer C650	P10.03					DI	
370	0	C	A	C	650	MN		Start/Stop control output	Solution Tank Mixer C650	P10.03					DO	
371	0	C	A	C	650	MM		Pump motor run status	Solution Tank Mixer C650	P10.03					DI	
372	0	C	A	C	650	MF		Pump motor overload	Solution Tank Mixer C650	P10.03			Failed	Normal	DI	
373	0	C	A	C	660	YS		Computer status	Motorized flow control valve CV-660	P10.03					DI	
374	0	C	A	C	660	ZD		Valve open status	Motorized flow control valve CV-660	P10.03			Off	Open	DI	
375	0	C	A	C	660	ZB		Valve closed status	Motorized flow control valve CV-660	P10.03			Off	Closed	DI	
376	0	C	A	C	660	ZC		Valve control output	Motorized flow control valve CV-660	P10.03	%	0-100			AO	
377	0	C	A	C	660	ZT		Valve position feedback	Motorized flow control valve CV-660	P10.03	%	0-100			AI	
378	0	C	A	C	665	FT		Flow meter	Mixing Tank Potable Water	P10.03	L/s				AI	
379	0	C	A	C	670	FT		Flow meter	Motorized flow control valve CV-675 Outlet	P10.03	L/s				AI	
380	0	C	A	C	675	YS		Computer status	Motorized flow control valve CV-675	P10.03					DI	
381	0	C	A	C	675	ZD		Valve open status	Motorized flow control valve CV-675	P10.03			Off	Open	DI	
382	0	C	A	C	675	ZB		Valve closed status	Motorized flow control valve CV-675	P10.03			Off	Closed	DI	
383	0	C	A	C	675	ZC		Valve control output	Motorized flow control valve CV-675	P10.03	%	0-100			AO	
384	0	C	A	C	675	ZT		Valve position feedback	Motorized flow control valve CV-675	P10.03	%	0-100			AI	
385	0	C	A	C	680	FT		Flow meter	Motorized flow control valve CV-680 Outlet	P10.03	L/s				AI	
386	0	C	A	C	685	YS		Computer status	Motorized flow control valve CV-685	P10.03					DI	
387	0	C	A	C	685	ZD		Valve open status	Motorized flow control valve CV-685	P10.03			Off	Open	DI	
388	0	C	A	C	685	ZB		Valve closed status	Motorized flow control valve CV-685	P10.03			Off	Closed	DI	
389	0	C	A	C	685	ZC		Valve control output	Motorized flow control valve CV-685	P10.03	%	0-100			AO	
390	0	C	A	C	685	ZT		Valve position feedback	Motorized flow control valve CV-685	P10.03	%	0-100			AI	
391	0	C	A	C	690	YS		Computer status	Motorized flow control valve CV-690	P10.03					DI	
392	0	C	A	C	690	ZD		Valve open status	Motorized flow control valve CV-690	P10.03			Off	Open	DI	
393	0	C	A	C	690	ZB		Valve closed status	Motorized flow control valve CV-690	P10.03			Off	Closed	DI	
394	0	C	A	C	690	VB		Valve Close command	Motorized flow control valve CV-690	P10.03					DO	
395	0	C	A	C	690	VD		Valve Open command	Motorized flow control valve CV-690	P10.03					DO	
396	0	C	A	C	695	YS		Computer status	Motorized flow control valve CV-695	P10.03					DI	

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CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						FUNCTION	DESCRIPTION	P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE							ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.						LO/0	HI/1		
397	0	C	A	C	695	ZD		Valve open status	Motorized flow control valve CV-695	P10.03			Off	Open	DI	
398	0	C	A	C	695	ZB		Valve closed status	Motorized flow control valve CV-695	P10.03			Off	Closed	DI	
399	0	C	A	C	695	VB		Valve Close command	Motorized flow control valve CV-695	P10.03					DO	
400	0	C	A	C	695	VD		Valve Open command	Motorized flow control valve CV-695	P10.03					DO	
401																
402	0	C	A	C	700	CH		Conductivity High Alarm	Truck Unloading Station	P11.01					DI	
403	0	C	A	C	700	FS		Shower in Use	Emergency Shower	P11.01					DI	
404	0	C	A	C	705	PT		Pressure indication	Nitrogen Feed System	P11.01	kPa				AI	
405	0	C	A	C	705	YS		Computer status	Nitrogen Feed System	P11.01					DI	
406	0	C	A	C	705	VD		Valve open command	Nitrogen Feed System	P11.01					DO	
407	0	C	A	C	706	YS		Computer status	Nitrogen Feed System	P11.01					DI	
408	0	C	A	C	706	VD		Valve open command	Nitrogen Feed System	P11.01					DO	
409	0	C	A	C	722	PT		Pressure indication	Storage Tank 1 Nitrogen Feed	P11.01	kPa				AI	
410	0	C	A	C	752	PT		Pressure indication	Storage Tank 2 Nitrogen Feed	P11.01	kPa				AI	
411	0	C	A	C	705	WL		Weight Alarm Low	Nitrogen Gas Cyliner	P11.01	kPa				AI	
412																
413	0	C	A	C	710	YS		Computer status	Motorized flow control valve CV-710	P11.02					DI	
414	0	C	A	C	710	ZD		Valve open status	Motorized flow control valve CV-710	P11.02			Off	Open	DI	
415	0	C	A	C	710	ZB		Valve closed status	Motorized flow control valve CV-710	P11.02			Off	Closed	DI	
416	0	C	A	C	710	VB		Valve Close command	Motorized flow control valve CV-710	P11.02					DO	
417	0	C	A	C	710	VD		Valve Open command	Motorized flow control valve CV-710	P11.02					DO	
418	0	C	A	C	720	LS		Leakage Alarm	Methanol Storage Tank C720	P11.02				1	DI	
419	0	C	A	C	720	LT	1	Liquid level transmitter	Methanol Storage Tank C720	P11.02	Meter				AI	
420	0	C	A	C	720	LT	2	Liquid level transmitter	Methanol Storage Tank C720	P11.02	Meter				AI	
421	0	C	A	C	720	LY	1	High Level Alarm Relay	Methanol Storage Tank C720	P11.02					DO	
422	0	C	A	C	720	LY	2	Low Level Alarm Relay	Methanol Storage Tank C720	P11.02					DO	
423	0	C	A	C	730	LS		Leakage Alarm	Methanol Dosing Pump C730 Enclosure	P11.02				1	DI	
424	0	C	A	C	730	YS		Computer status	Methanol Dosing Pump C730	P11.02					DI	
425	0	C	A	C	730	MN		Start/Stop control output	Methanol Dosing Pump C730	P11.02					DO	
426	0	C	A	C	730	MM		Blower motor run status	Methanol Dosing Pump C730	P11.02					DI	
427	0	C	A	C	730	MF		Blower motor overload	Methanol Dosing Pump C730	P11.02			Failed	Normal	DI	
428	0	C	A	C	730	PT		Pressure indication	Methanol Dosing Pump Outlet	P11.02	kPa				AI	
429	0	C	A	C	730	PH		High pressure alarm	Methanol Dosing Pump Outlet	P11.02				1	AI	

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NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE				FUNCTION	SERVICE		ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.						LO/0	HI/1		
430	0	C	A	C	730	FL		Low flow alarm	Methanol Dosing Pump Outlet	P11.02			Alarm	Off	AI	
431	0	C	A	C	730	TT		Temperature indication	Methanol Dosing Pump Outlet	P11.02	Deg. C	0-50			AI	
432																
433	0	C	A	C	740	YS		Computer status	Motorized flow control valve CV-740	P11.03					DI	
434	0	C	A	C	740	ZD		Valve open status	Motorized flow control valve CV-740	P11.03			Off	Open	DI	
435	0	C	A	C	740	ZB		Valve closed status	Motorized flow control valve CV-740	P11.03			Off	Closed	DI	
436	0	C	A	C	710	VB		Valve Close command	Motorized flow control valve CV-740	P11.03					DO	
437	0	C	A	C	710	VD		Valve Open command	Motorized flow control valve CV-740	P11.03					DO	
438	0	C	A	C	750	LS		Leakage Alarm	Methanol Storage Tank C750	P11.03				1	DI	
439	0	C	A	C	750	LT	1	Liquid level transmitter	Methanol Storage Tank C750	P11.03	Meter				AI	
440	0	C	A	C	750	LT	2	Liquid level transmitter	Methanol Storage Tank C750	P11.03	Meter				AI	
441	0	C	A	C	750	LY	1	High Level Alarm Relay	Methanol Storage Tank C750	P11.03					DO	
442	0	C	A	C	750	LY	2	Low Level Alarm Relay	Methanol Storage Tank C750	P11.03					DO	
443	0	C	A	C	760	LS		Leakage Alarm	Methanol Dosing Pump C760 Enclosure	P11.03					DI	
444	0	C	A	C	760	YS		Computer status	Methanol Dosing Pump C760	P11.03					DI	
445	0	C	A	C	760	MN		Start/Stop control output	Methanol Dosing Pump C760	P11.03					DO	
446	0	C	A	C	760	MM		Blower motor run status	Methanol Dosing Pump C760	P11.03					DI	
447	0	C	A	C	760	MF		Blower motor overload	Methanol Dosing Pump C760	P11.03			Failed	Normal	DI	
448	0	C	A	C	760	PT		Pressure indication	Methanol Dosing Pump Outlet	P11.03	kPa				AI	
449	0	C	A	C	760	PH		High pressure alarm	Methanol Dosing Pump Outlet	P11.03				1	AI	
450	0	C	A	C	760	FL		Low flow alarm	Methanol Dosing Pump Outlet	P11.03			Alarm	Off	AI	
451	0	C	A	C	760	TT		Temperature indication	Methanol Dosing Pump Outlet	P11.03	Deg. C	0-50			AI	
452	0	C	A	C	720	LI		Level indication	Methanol Truck Unloading Panel	P11.03	Meter				AO	
453	0	C	A	C	720	LY		Level Alarm High	Methanol Truck Unloading Panel	P11.03				1	DO	
454	0	C	A	C	750	LI		Level indication	Methanol Truck Unloading Panel	P11.03	Meter				AO	
455	0	C	A	C	750	LY		Level Alarm High	Methanol Truck Unloading Panel	P11.03				1	DO	
456	0	C	A	C	700	UY	1	System Ready	Methanol Truck Unloading Panel	P11.03					DO	
457	0	C	A	C	700	UY	2	Alarm Horn	Methanol Truck Unloading Panel	P11.03					DO	
458	0	C	A	C	710	VB	1	CloseCommand	Methanol Truck Unloading Panel	P11.03					DI	
459	0	C	A	C	710	VD	1	CloseCommand	Methanol Truck Unloading Panel	P11.03					DI	
460	0	C	A	C	740	VB	1	Open/Close Command	Methanol Truck Unloading Panel	P11.03					DI	
461	0	C	A	C	740	VD	1	CloseCommand	Methanol Truck Unloading Panel	P11.03					DI	
462																

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CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE				FUNCTION	SERVICE		ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.						LO/0	HI/1		
463	0	C	A	C	900	UA		Alarm status	Fire Alarm Control Panel	I3.01					DI	
464	0	C	A	C	900	TA		Trouble Status	Fire Alarm Control Panel	I3.01					DI	
465	0	C	A	C	910	ZS		Security Door Switch	Intruder Security System -Electrical Room	I3.01					DI	
466	0	C	A	C	911	ZS		Security Motion Detector	Intruder Security System -Electrical Room	I3.01					DI	
467	0	C	A	C	912	ZS		Security Door Switch	Intruder Security System -Control Room	I3.01					DI	
468	0	C	A	C	913	ZS		Security Motion Detector	Intruder Security System -Control Room	I3.01					DI	
469	0	C	A	C	914	ZS		Security Door Switch	Intruder Security System -Blower Room	I3.01					DI	
470	0	C	A	C	915	ZS		Security Motion Detector	Intruder Security System -Blower Room	I3.01					DI	
471	0	C	A	C	916	ZS		Security Door Switch	Intruder Security System -Exhaust Fan Room	I3.01					DI	
472	0	C	A	C	917	ZS		Security Motion Detector	Intruder Security System -Exhaust Fan Room	I3.01					DI	

CITY OF WINNIPEG
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CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST - HVAC

Project No. 66303

NO.	REV. NO.	TAG NAME		DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION						
		PCU		DEVICE TAG	FUNCTION		SERVICE	ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	No.							LOW	HIGH		
1	0	C	A	C521-TT	Mixed air temperature	Blower Room Temperature	M4.01	4-20 ma				AI	
2	0	C	A	C521-ZC1	Damper position control	Motorized air damper 1 #521	M4.01	%				AO	
3	0	C	A	C521-ZB1	Damper closed status	Motorized air damper 1 #521	M4.01					DI	
4	0	C	A	C521-ZD1	Damper open status	Motorized air damper 1 #521	M4.01					DI	
5	0	C	A	C521-ZB2	Damper closed status	Motorized air damper 2 #521	M4.01					DI	
6	0	C	A	C521-ZD2	Damper open status	Motorized air damper 2 #521	M4.01					DI	
7	0	C	A	C521-VB2	Damper Close command	Motorized air damper 2 #521	M4.01					DI	
8	0	C	A	C521-VD2	Damper Open command	Motorized air damper 2 #521	M4.01					DI	
9	0	C	A	C521-YS	Computer Control Selected	Exhaust Fan 1 #521	M4.01					DI	
10	0	C	A	C521-MN	Start Command	Exhaust Fan 1 #521	M4.01					DO	
11	0	C	A	C521-MM	Motor running	Exhaust Fan 1 #521	M4.01					DI	
12	0	C	A	C521-MF	Fan or drive trouble	Exhaust Fan 1 #521	M4.01					DI	
13	0	C	A	C521-ST	Speed Indication	Exhaust Fan 1 #521	M4.01	%				AI	
14	0	C	A	C521-SC	Speed control output	Exhaust Fan 1 #521	M4.01	%				AO	
15	0	C	A	C522-TT	Mixed air temperature	Blower Room Temperature	M4.01	4-20 ma				AI	
16	0	C	A	C522-ZC1	Damper position control	Motorized air damper 1 #522	M4.01	%				AO	
17	0	C	A	C522-ZB1	Damper closed status	Motorized air damper 1 #522	M4.01					DI	
18	0	C	A	C522-ZD1	Damper open status	Motorized air damper 1 #522	M4.01					DI	
19	0	C	A	C522-ZB2	Damper closed status	Motorized air damper 2 #522	M4.01					DI	
20	0	C	A	C522-ZD2	Damper open status	Motorized air damper 2 #522	M4.01					DI	
21	0	C	A	C522-VB2	Damper Close command	Motorized air damper 2 #522	M4.01					DI	
22	0	C	A	C522-VD2	Damper Open command	Motorized air damper 2 #522	M4.01					DI	
23	0	C	A	C522-YS	Computer Control Selected	Exhaust Fan 2 #522	M4.01					DI	
24	0	C	A	C522-MN	Start Command	Exhaust Fan 2 #522	M4.01					DO	
25	0	C	A	C522-MM	Motor running	Exhaust Fan 2 #522	M4.01					DI	
26	0	C	A	C522-MF	Fan or drive trouble	Exhaust Fan 2 #522	M4.01					DI	
27	0	C	A	C522-ST	Speed Indication	Exhaust Fan 2 #522	M4.01	%				AI	
28	0	C	A	C522-SC	Speed control output	Exhaust Fan 2 #522	M4.01	%				AO	
29	0	C	A	C523-TT	Mixed air temperature	Blower Room Temperature	M4.01	4-20 ma				AI	
30	0	C	A	C523-ZC1	Damper position control	Motorized air damper 1 #523	M4.01	%				AO	
31	0	C	A	C523-ZB1	Damper closed status	Motorized air damper 1 #523	M4.01					DI	
32	0	C	A	C523-ZD1	Damper open status	Motorized air damper 1 #523	M4.01					DI	
33	0	C	A	C523-ZB2	Damper closed status	Motorized air damper 2 #523	M4.01					DI	

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NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST - HVAC

Project No. 66303

NO.	REV. NO.	TAG NAME		DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION						
		PCU		DEVICE TAG	FUNCTION		SERVICE	ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	No.							LOW	HIGH		
34	0	C	A	C523-ZD2	Damper open status	Motorized air damper 2 #523	M4.01					DI	
35	0	C	A	C523-VB2	Damper Close command	Motorized air damper 2 #523	M4.01					DI	
36	0	C	A	C523-VD2	Damper Open command	Motorized air damper 2 #523	M4.01					DI	
37	0	C	A	C523-YS	Computer Control Selected	Exhaust Fan 3 #523	M4.01					DI	
38	0	C	A	C523-MN	Start Command	Exhaust Fan 3 #523	M4.01					DO	
39	0	C	A	C523-MM	Motor running	Exhaust Fan 3 #523	M4.01					DI	
40	0	C	A	C523-MF	Fan or drive trouble	Exhaust Fan 3 #523	M4.01					DI	
41	0	C	A	C523-ST	Speed Indication	Exhaust Fan 3 #523	M4.01	%				AI	
42	0	C	A	C523-SC	Speed control output	Exhaust Fan 3 #523	M4.01	%				AO	
43	0	C	A	C524-TT	Mixed air temperature	Blower Room Temperature	M4.01	4-20 ma				AI	
44	0	C	A	C524-ZC1	Damper position control	Motorized air damper 1 #524	M4.01	%				AO	
45	0	C	A	C524-ZB1	Damper closed status	Motorized air damper 1 #524	M4.01					DI	
46	0	C	A	C524-ZD1	Damper open status	Motorized air damper 1 #524	M4.01					DI	
47	0	C	A	C524-ZB2	Damper closed status	Motorized air damper 2 #524	M4.01					DI	
48	0	C	A	C524-ZD2	Damper open status	Motorized air damper 2 #524	M4.01					DI	
49	0	C	A	C524-VB2	Damper Close command	Motorized air damper 2 #524	M4.01					DI	
50	0	C	A	C524-VD2	Damper Open command	Motorized air damper 2 #524	M4.01					DI	
51	0	C	A	C524-YS	Computer Control Selected	Exhaust Fan 4 #524	M4.01					DI	
52	0	C	A	C524-MN	Start Command	Exhaust Fan 4 #524	M4.01					DO	
53	0	C	A	C524-MM	Motor running	Exhaust Fan 4 #524	M4.01					DI	
54	0	C	A	C524-MF	Fan or drive trouble	Exhaust Fan 4 #524	M4.01					DI	
55	0	C	A	C524-ST	Speed Indication	Exhaust Fan 4 #524	M4.01	%				AI	
56	0	C	A	C524-SC	Speed control output	Exhaust Fan 4 #524	M4.01	%				AO	
57													
58	0	C	A	C530-TT	Mixed air temperature	Sample Room Temperature	M4.02	4-20 ma				AI	
59	0	C	A	C530-ZC1	Damper position control	Motorized air damper 1 #530	M4.02	%				AO	
60	0	C	A	C530-ZB1	Damper closed status	Motorized air damper 1 #530	M4.02					DI	
61	0	C	A	C530-ZD1	Damper open status	Motorized air damper 1 #530	M4.02					DI	
62	0	C	A	C530-ZB2	Damper closed status	Motorized air damper 2 #530	M4.02					DI	
63	0	C	A	C530-ZD2	Damper open status	Motorized air damper 2 #530	M4.02					DI	
64	0	C	A	C530-VB2	Damper Close command	Motorized air damper 2 #530	M4.02					DI	
65	0	C	A	C530-VD2	Damper Open command	Motorized air damper 2 #530	M4.02					DI	
66	0	C	A	C530-YS	Computer Control Selected	Exhaust Fan #530	M4.02					DI	

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DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST - HVAC

Project No. 66303

NO.	REV. NO.	TAG NAME		DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION						
		PCU		DEVICE TAG	FUNCTION		SERVICE	ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	No.							LOW	HIGH		
67	0	C	A	C530-MN	Start Command	Exhaust Fan #530	M4.02					DO	
68	0	C	A	C530-MM	Motor running	Exhaust Fan #530	M4.02					DI	
69	0	C	A	C530-MF	Fan or drive trouble	Exhaust Fan #530	M4.02					DI	
70	0	C	A	C530-ST	Speed Indication	Exhaust Fan #530	M4.02	%				AI	
71	0	C	A	C530-SC	Speed control output	Exhaust Fan #530	M4.02	%				AO	
72	0	C	A	C540-TT	Mixed air temperature	Exhaust Room Temperature	M4.02	4-20 ma				AI	
73	0	C	A	C540-ZC1	Damper position control	Motorized air damper 1 #540	M4.02	%				AO	
74	0	C	A	C540-ZB1	Damper closed status	Motorized air damper 1 #540	M4.02					DI	
75	0	C	A	C540-ZD1	Damper open status	Motorized air damper 1 #540	M4.02					DI	
76	0	C	A	C540-ZB2	Damper closed status	Motorized air damper 2 #540	M4.02					DI	
77	0	C	A	C540-ZD2	Damper open status	Motorized air damper 2 #540	M4.02					DI	
78	0	C	A	C540-VB2	Damper Close command	Motorized air damper 2 #540	M4.02					DI	
79	0	C	A	C540-VD2	Damper Open command	Motorized air damper 2 #540	M4.02					DI	
80	0	C	A	C540-YS	Computer Control Selected	Exhaust Fan #540	M4.02					DI	
81	0	C	A	C540-MN	Start Command	Exhaust Fan #540	M4.02					DO	
82	0	C	A	C540-MM	Motor running	Exhaust Fan #540	M4.02					DI	
83	0	C	A	C540-MF	Fan or drive trouble	Exhaust Fan #540	M4.02					DI	
84	0	C	A	C540-ST	Speed Indication	Exhaust Fan #540	M4.02	%				AI	
85	0	C	A	C540-SC	Speed control output	Exhaust Fan #540	M4.02	%				AO	
86	0	C	A	C550-TT	Mixed air temperature	Control Room Temperature	M4.02	4-20 ma				AI	
87	0	C	A	C550-ZC	Damper position control	Motorized air damper	M4.02	%				AO	
88	0	C	A	C550-ZB	Damper closed status	Motorized air damper	M4.02					DI	
89	0	C	A	C550-ZD	Damper open status	Motorized air damper	M4.02					DI	
90	0	C	A	C550-PDH	High Differential Pressure	Air Filter	M4.02					DI	
91	0	C	A	C551-ZC	SCR control	SCR	M4.02	%				AO	
92	0	C	A	C551-TL	Low Temperature Alarm	Heating Coil	M4.02					DI	
93	0	C	A	C552-MM	Motor running	Condensing Unit	M4.02					DI	
94	0	C	A	C552-MN	Start Command	Condensing Unit	M4.02					DO	
95	0	C	A	C552-UN	Interlock	Condensing Unit	M4.02					DO	
96	0	C	A	C550-MM	Motor running	Supply Fan	M4.02					DI	
97	0	C	A	C550-MN	Start Command	Supply Fan	M4.02					DO	
98	0	C	A	C550-MF	Fan or drive trouble	Supply Fan	M4.02					DI	
99	0	C	A	C550-YS	Computer Control Selected	Supply Fan	M4.02					DI	

I/O POINT TYPES: AI = Analog, AO = Analog Output, DI = Discrete Input, DO = Discrete Output, MB = Modbus, TCP/IP = Ethernet

CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST - HVAC

Project No. 66303

NO.	REV. NO.	TAG NAME		DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION						
		PCU		DEVICE TAG	FUNCTION		SERVICE	ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	No.							LOW	HIGH		
100													
101	0	C	A	C560-TT	Mixed air temperature	Electrical Room Temperature	M4.03	4-20 ma				AI	
102	0	C	A	C560-ZC	Damper position control	Motorized air damper 1 #560	M4.03	%				AO	
103	0	C	A	C560-ZB	Damper closed status	Motorized air damper 1 #560	M4.03					DI	
104	0	C	A	C560-ZD	Damper open status	Motorized air damper 1 #560	M4.03					DI	
105	0	C	A	C560-PDH	High Differential Pressure	Air Filter	M4.03					DI	
106	0	C	A	C560-YS	Computer Control Selected	Supply Fan #560	M4.03					DI	
107	0	C	A	C560-MN	Start Command	Supply Fan #560	M4.03					DO	
108	0	C	A	C560-MM	Motor running	Supply Fan #560	M4.03					DI	
109	0	C	A	C560-MF	Fan or drive trouble	Supply Fan #560	M4.03					DI	
110	0	C	A	C560-ST	Speed Indication	Supply Fan #560	M4.03	%				AI	
111	0	C	A	C560-SC	Speed control output	Supply Fan #560	M4.03	%				AO	
112	0	C	A	C580-TT	Mixed air temperature	Electrical Room Temperature	M4.03	4-20 ma				AI	
113	0	C	A	C580-VB	Damper Close command	Motorized air damper 1 #560	M4.03					DI	
114	0	C	A	C580-VD	Damper Open command	Motorized air damper 1 #560	M4.03					DI	
115	0	C	A	C580-ZB	Damper closed status	Motorized air damper 1 #560	M4.03					DI	
116	0	C	A	C580-ZD	Damper open status	Motorized air damper 1 #560	M4.03					DI	
117	0	C	A	C580-YS	Computer Control Selected	Exhaust Fan #580	M4.03					DI	
118	0	C	A	C580-MN	Start Command	Exhaust Fan #580	M4.03					DO	
119	0	C	A	C580-MM	Motor running	Exhaust Fan #580	M4.03					DI	
120	0	C	A	C580-MF	Fan or drive trouble	Exhaust Fan #580	M4.03					DI	
121	0	C	A	C580-ST	Speed Indication	Exhaust Fan #580	M4.03	%				AI	
122	0	C	A	C580-SC	Speed control output	Exhaust Fan #580	M4.03	%				AO	
123													
124	0	C	A	C570-LHH	High High Level Alarm	Sump Pit 1 #570	M4.04					DI	
125	0	C	A	C570-UA1	Minor Alarm	Sump Pump 1 #570	M4.04					DI	
126	0	C	A	C570-UA2	Major Alarm	Sump Pump 1 #570	M4.04					DI	
127	0	C	A	C572-UA1	Minor Alarm	Sump Pump 2 #572	M4.04					DI	
128	0	C	A	C572-UA2	Major Alarm	Sump Pump 2 #572	M4.04					DI	
129	0	C	A	C571-LHH	High High Level Alarm	Sump Pit 2 #571	M4.04					DI	
130	0	C	A	C571-UA1	Minor Alarm	Sump Pump 3 #570	M4.04					DI	
131	0	C	A	C571-UA2	Major Alarm	Sump Pump 3 #570	M4.04					DI	
132	0	C	A	C573-UA1	Minor Alarm	Sump Pump 4 #573	M4.04					DI	

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CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST - HVAC

Project No. 66303

NO.	REV. NO.	TAG NAME			DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE TAG	FUNCTION	SERVICE		ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	No.							LOW	HIGH		
133	0	C	A	C573-UA2	Major Alarm	Sump Pump 4 #573	M4.04					DI	

CITY OF WINNIPEG **Project No. 66303**

NORTH END WATER POLLUTION CONTROL CENTER

CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY

DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST - EXISTING SLUDGE DEWATERING BUILDING

NO.	REV. NO.	TAG NAME						DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE				FUNCTION	SERVICE		ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.						LO/0	HI/1		
1	0	W	A	W	350	FT		Flow rate indication	Treated centrate to sanitary interceptor	P7.01	L/s				AI	
2	0	W	A	W	350	PT		Pressure indication	Treated centrate to sanitary interceptor	P7.01	kPa				AI	
3																
4	0	W	A	W	914	YS		Computer status	Flushing water flow control valve	P20.01					DI	
5	0	W	A	W	914	ZD		Valve open status	Flushing water flow control valve	P20.01			Off	Open	DI	
6	0	W	A	W	914	ZB		Valve closed status	Flushing water flow control valve	P20.01			Off	Closed	DI	
7	0	W	A	W	914	ZC		Valve control output	Flushing water flow control valve	P20.01	%	0-100			AO	
8	0	W	A	W	914	ZT		Valve position feedback	Flushing water flow control valve	P20.01	%	0-100			AI	
9																
10	0	W	A	W	904	YS		Computer status	Mixed centrate valve #904	P22.01					DI	
11	0	W	A	W	904	ZD		Valve open status	Mixed centrate valve #904	P22.01			Off	Open	DI	
12	0	W	A	W	904	ZB		Valve closed status	Mixed centrate valve #904	P22.01			Off	Closed	DI	
13	0	W	A	W	904	ZC		Valve control output	Mixed centrate valve #904	P22.01	%	0-100			DO	
14	0	W	A	W	904	ZT		Valve position feedback	Mixed centrate valve #904	P22.01	%	0-100			DO	
15	0	W	A	W	905	TT		Temperature indication	Mixed centrate temperature to SBR	P22.01	Deg. C	0-50			AI	
16	0	W	A	W	905	FT		Flow meter	Mixed centrate flow to Distribution Chamber	P22.01	L/s	0-75			AI	
17	0	W	A	W	942	YS		Computer status	Sample Pump C942	P22.01					DI	
18	0	W	A	W	942	MN		Start control output	Sample Pump C942	P22.01					DO	
19	0	W	A	W	942	MM		Pump motor run status	Sample Pump C942	P22.01					DI	
20	0	W	A	W	942	MF		Pump motor overload	Sample Pump C942	P22.01			Failed	Normal	DI	
21	0	W	A	W	950	YS		Computer status	Bristol Sampler C950	P22.01					DI	
22	0	W	A	W	950	AN		Start/Stop control output	Bristol Sampler C950	P22.01					DO	
23	0	W	A	W	950	AM		Sampler run status	Bristol Sampler C950	P22.01					DI	
24	0	W	A	W	950	AF		Sampler Fault	Bristol Sampler C950	P22.01			Failed	Normal	DI	
25																

CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTER
CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY
DISTRIBUTED CONTROL SYSTEM INPUT/OUTPUT LIST - EXISTING OXYGEN REACTOR CONTROL ROOM

Project No. 66303

NO.	REV. NO.	TAG NAME						DESCRIPTION		P&ID DRAWING	I/O SPECIFICATION					
		PCU		DEVICE				FUNCTION	SERVICE		ENG. UNITS	SCALE LOW-HIGH	ALARMS		I/O POINT TYPE	I/O POINT NO.
		AREA	PNL	AREA	LOOP	TAG	No.						LO/0	HI/1		
1	0	R	A	R	256	FT		Flow rate indication	SBR-1 and SBR-2 WAS	P6.02	L/s	0-100			AI	
2																
3	0	R	A	R	923	FT		Flow meter	Secondary RAS flow to SBR tanks	P21.01	L/s	0-200			AI	
4																
5	0	R	A	R	970	YS		Computer status	Bristol Sampler C970	P24.01					DI	
6	0	R	A	R	970	AN		Start/Stop control output	Bristol Sampler C970	P24.01					DO	
7	0	R	A	R	970	AM		Sampler run status	Bristol Sampler C970	P24.01					DI	
8	0	R	A	R	970	AF		Sampler Fault	Bristol Sampler C970	P24.01			Failed	Normal	DI	
9																

I/O POINT TYPES: AI = Analog, AO = Analog Output, DI = Discrete Input, DO = Discrete Output, MB = Modbus, TCP/IP = Ethernet

INSTRUMENT INDEX

1. GENERAL

1.1 References – General

- .1 Refer to Section 17010.

1.2 Instrument Index

- .1 The following spreadsheet gives an itemized list of the instrumentation included as part of this Work.
- .2 All equipment supplied under this division and by other divisions shall be installed under Division 17.

2. PRODUCTS

- .1 Not used

3. EXECUTION

- .1 Not used

**CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTRE
NITROGEN REMOVAL FACILITY
INSTRUMENT INDEX**

Project No. 66303

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		REFERENCES					
			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE	
1	0	C 005	LT	Submersible Level Transmitter	Distribution Chamber	17701	P5.01	ILD-14	11.05	CON
2	0	C 005	LSH	High Level Switch	Distribution Chamber	17701	P5.01	ILD-05	11.05	CON
3	0	C 010	HS	Local/Off/Remote Selector Switch	Weir Gate #010	11125	P5.01	ILD-01	11.05	PKG
4	0	C 010	HS	Open/Close Selector Switch	Weir Gate #010	11125	P5.01	ILD-01	11.05	PKG
5	0	C 010	ZSB	Closed limit switch	Weir Gate #010	11125	P5.01	ILD-01	11.05	PKG
6	0	C 010	ZSD	Open limit switch	Weir Gate #010	11125	P5.01	ILD-01	11.05	PKG
7	0	C 010	ZIT	Position Indicating Transmitter	Weir Gate #010	11125	P5.01	ILD-01	11.05	PKG
8	0	C 010	ZC	Position Controller	Weir Gate #010	11125	P5.01	ILD-01	11.05	PKG
9	0	C 020	HS	Local/Off/Remote Selector Switch	Weir Gate #020	11125	P5.01	ILD-01	11.05	PKG
10	0	C 020	HS	Open/Close Selector Switch	Weir Gate #020	11125	P5.01	ILD-01	11.05	PKG
11	0	C 020	ZSB	Closed limit switch	Weir Gate #020	11125	P5.01	ILD-01	11.05	PKG
12	0	C 020	ZSD	Open limit switch	Weir Gate #020	11125	P5.01	ILD-01	11.05	PKG
13	0	C 020	ZIT	Position Indicating Transmitter	Weir Gate #020	11125	P5.01	ILD-01	11.05	PKG
14	0	C 020	ZC	Position Controller	Weir Gate #020	11125	P5.01	ILD-01	11.05	PKG
15										
16	0	C 100	LT	Level Transmitter	SBR Tank 1	17701	P6.01	ILD-14	11.05	CON
17	0	C 100	LT	Level Transmitter	SBR Tank 1	17701	P6.01	ILD-14	11.05	CON
18	0	C 106	FV	Solenoid Valve	SBR 1 Flushing Water Spray	17701	P6.01	ILD-06	11.02	CON
19	0	C 160	HS	Forward-Off-Reverse	Decanters Basin local control panel	11538	P6.01	NOTE 1	11.05	PKG
20	0	C 160	HK	Hand Controller	Decanters #160 VFD	11538	P6.01	NOTE 1	11.05	PKG
21	0	C 160	ZS	Parked Switch	Decanters #160	11538	P6.01	NOTE 1	11.04	PKG
22	0	C 160	ZS	Low limit Switch	Decanters #160	11538	P6.01	NOTE 1	11.04	PKG
23	0	C 160	ZS	Parked Backup Switch	Decanters #160	11538	P6.01	NOTE 1	11.04	PKG
24	0	C 160	ZS	Low limit Backup Switch	Decanters #160	11538	P6.01	NOTE 1	11.04	PKG
25	0	C 184	FCV	Motorized Damper	Motorized Damper #184	15835	P6.01	ILD-21	11.05	PKG
26										
27	0	C 200	LT	Level Transmitter	SBR Tank 2	17701	P6.02	ILD-14	11.05	CON
28	0	C 200	LT	Level Transmitter	SBR Tank 2	17701	P6.02	ILD-14	11.05	CON
29	0	C 206	FV	Solenoid Valve	SBR 2 Flushing Water Spray	17701	P6.02	ILD-06	11.02	CON
30	0	C 260	HS	Forward-Off-Reverse	Decanters Basin local control panel	11538	P6.02	NOTE 1	11.05	PKG
31	0	C 260	HK	Hand Controller	Decanters #260 VFD	11538	P6.02	NOTE 1	11.05	PKG
32	0	C 260	ZS	Parked Switch	Decanters #260	11538	P6.02	NOTE 1	11.04	PKG
33	0	C 260	ZS	Low limit switch	Decanters #260	11538	P6.02	NOTE 1	11.04	PKG
34	0	C 260	ZS	Parked Backup Switch	Decanters #260	11538	P6.02	NOTE 1	11.04	PKG
35	0	C 260	ZS	Low limit Backup Switch	Decanters #260	11538	P6.02	NOTE 1	11.04	PKG
36	0	C 284	FCV	Local/Off/Remote Selector Switch	Motorized Damper #284	15835	P6.02	ILD-21	11.05	PKG
37										
38	0	C 190	HS	Lock-Off Stop Pushbutton Switch	Sampling Pump #190	17216	P6.03	ILD-29	11.02	CON

SUPPLY CODES: CON = Contractor Supply, OWN = Owner Supply, PKG = Package Supply

NOTE 1 - For detailed wiring schematics refer to supplier docs.

**CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTRE
NITROGEN REMOVAL FACILITY
INSTRUMENT INDEX**

Project No. 66303

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			REFERENCES					
			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE		
39	0	C 190	HS	2	Computer-Off-Hand Selector Switch	Sampling Pump #190	17216		ILD-29	I1-02	CON
40	0	C 190	MM		Running Pilot Light	Sampling Pump #190	17216		ILD-29	I1-02	CON
41	0	C 190	MO		Stopped Pilot Light	Sampling Pump #190	17216		ILD-29	I1-02	CON
42	0	C 185	AE	1	DO Sensor	Chemical Sample #185	17701	I113	ILD-07	I1-02	CON
43	0	C 185	AIT	1	DO Analytical Transmitter	Chemical Sample #185	17701	I113	ILD-07	I1-02	CON
44	0	C 185	AY	1	Instrument Fault	Chemical Sample #185	17701	I113	ILD-07	I1-02	CON
45	0	C 185	AE	2	pH Sensor	Chemical Sample #185	17701	I114	ILD-08	I1-02	CON
46	0	C 185	AIT	2	pH Analytical Transmitter	Chemical Sample #185	17701	I114	ILD-08	I1-02	CON
47	0	C 185	AY	2	Instrument Fault	Chemical Sample #185	17701	I114	ILD-08	I1-02	CON
48	0	C 185	TE		Temperature Element	Chemical Sample #185	17701	I114	ILD-08	I1-02	CON
49	0	C 185	TIT		Temperature Transmitter	Chemical Sample #185	17701	I114	ILD-08	I1-02	CON
50	0	C 290	HS	1	Lock-Off Stop Pushbutton Switch	Sampling Pump #290	17216		ILD-29	I1-02	CON
51	0	C 290	HS	2	Computer-Off-Hand Selector Switch	Sampling Pump #290	17216		ILD-29	I1-02	CON
52	0	C 290	MM		Running Pilot Light	Sampling Pump #290	17216		ILD-29	I1-02	CON
53	0	C 290	MO		Stopped Pilot Light	Sampling Pump #290	17216		ILD-29	I1-02	CON
54	0	C 285	AE	1	DO Sensor	Chemical Sample #285	17701	I113	ILD-07	I1-02	CON
55	0	C 285	AIT	1	DO Analytical Transmitter	Chemical Sample #285	17701	I113	ILD-07	I1-02	CON
56	0	C 285	AY	1	Instrument Fault	Chemical Sample #285	17701	I113	ILD-07	I1-02	CON
57	0	C 285	AE	2	pH Sensor	Chemical Sample #285	17701	I114	ILD-08	I1-02	CON
58	0	C 285	AIT	2	pH Analytical Transmitter	Chemical Sample #285	17701	I114	ILD-08	I1-02	CON
59	0	C 285	AY	2	Instrument Fault	Chemical Sample #285	17701	I114	ILD-08	I1-02	CON
60	0	C 285	TE		Temperature Element	Chemical Sample #285	17701	I114	ILD-08	I1-02	CON
61	0	C 285	TIT		Temperature Transmitter	Chemical Sample #285	17701	I114	ILD-08	I1-02	CON
62	0	C 040	AK		Analyzer Hand Controller	Chemical Analyzer #040	11851		ILD-28	I1-02	PKG
63											
64	0	C 110	HS	1	Lock-Off Stop Pushbutton Switch	SBR Mixer #110	17216		ILD-32	I1-05	CON
65	0	C 110	HS	2	Computer-Off-Hand Selector Switch	SBR Mixer #110	17216		ILD-32	I1-05	CON
66	0	C 110	MM	1	Running Pilot Light	SBR Mixer #110	17216		ILD-32	I1-05	CON
67	0	C 110	MO	1	Stopped Pilot Light	SBR Mixer #110	17216		ILD-32	I1-05	CON
68	0	C 110	TE		Temperature Element	SBR Mixer #110	11207			I1-04	PKG
69	0	C 110	NE		Moisture Element	SBR Mixer #110	11207			I1-04	PKG
70	0	C 110	TY		Temperature Relay	SBR Mixer #110	11207		ILD-32		PKG
71	0	C 110	NY		Moisture Relay	SBR Mixer #110	11207		ILD-32		PKG
72	0	C 120	HS	1	Lock-Off Stop Pushbutton Switch	SBR Mixer #120	17216		ILD-32	I1-05	CON
73	0	C 120	HS	2	Computer-Off-Hand Selector Switch	SBR Mixer #120	17216		ILD-32	I1-05	CON
74	0	C 120	MM	1	Running Pilot Light	SBR Mixer #120	17216		ILD-32	I1-05	CON
75	0	C 120	MO	1	Stopped Pilot Light	SBR Mixer #120	17216		ILD-32	I1-05	CON
76	0	C 120	TE		Temperature Element	SBR Mixer #120	11207			I1-04	PKG

SUPPLY CODES: CON = Contractor Supply, OWN = Owner Supply, PKG = Package Supply

NOTE 1 - For detailed wiring schematics refer to supplier docs.

**CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTRE
NITROGEN REMOVAL FACILITY
INSTRUMENT INDEX**

Project No. 66303

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		REFERENCES					
			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE	
77	0	C 120 NE	Moisture Element	SBR Mixer #120	11207	P6.04			11.04	PKG
78	0	C 120 TY	Temperature Relay	SBR Mixer #120	11207	P6.04		ILD-32		PKG
79	0	C 120 NY	Moisture Relay	SBR Mixer #120	11207	P6.04		ILD-32		PKG
80	0	C 130 HS 1	Lock-Off Stop Pushbutton Switch	SBR Mixer #130	17216	P6.04		ILD-32	11.05	CON
81	0	C 130 HS 2	Computer-Off-Hand Selector Switch	SBR Mixer #130	17216	P6.04		ILD-32	11.05	CON
82	0	C 130 MM 1	Running Pilot Light	SBR Mixer #130	17216	P6.04		ILD-32	11.05	CON
83	0	C 130 MO 1	Stopped Pilot Light	SBR Mixer #130	17216	P6.04		ILD-32	11.05	CON
84	0	C 130 TE	Temperature Element	SBR Mixer #130	11207	P6.04			11.04	PKG
85	0	C 130 NE	Moisture Element	SBR Mixer #130	11207	P6.04			11.04	PKG
86	0	C 130 TY	Temperature Relay	SBR Mixer #130	11207	P6.04		ILD-32		PKG
87	0	C 130 NY	Moisture Relay	SBR Mixer #130	11207	P6.04		ILD-32		PKG
88	0	C 210 HS 1	Lock-Off Stop Pushbutton Switch	SBR Mixer #210	17216	P6.04		ILD-32	11.05	CON
89	0	C 210 HS 2	Computer-Off-Hand Selector Switch	SBR Mixer #210	17216	P6.04		ILD-32	11.05	CON
90	0	C 210 MM 1	Running Pilot Light	SBR Mixer #210	17216	P6.04		ILD-32	11.05	CON
91	0	C 210 MO 1	Stopped Pilot Light	SBR Mixer #210	17216	P6.04		ILD-32	11.05	CON
92	0	C 210 TE	Temperature Element	SBR Mixer #210	11207	P6.04			11.04	PKG
93	0	C 210 NE	Moisture Element	SBR Mixer #210	11207	P6.04			11.04	PKG
94	0	C 210 TY	Temperature Relay	SBR Mixer #210	11207	P6.04		ILD-32		PKG
95	0	C 210 NY	Moisture Relay	SBR Mixer #210	11207	P6.04		ILD-32		PKG
96	0	C 220 HS 1	Lock-Off Stop Pushbutton Switch	SBR Mixer #220	17216	P6.04		ILD-32	11.05	CON
97	0	C 220 HS 2	Computer-Off-Hand Selector Switch	SBR Mixer #220	17216	P6.04		ILD-32	11.05	CON
98	0	C 220 MM 1	Running Pilot Light	SBR Mixer #220	17216	P6.04		ILD-32	11.05	CON
99	0	C 220 MO 1	Stopped Pilot Light	SBR Mixer #220	17216	P6.04		ILD-32	11.05	CON
100	0	C 220 TE	Temperature Element	SBR Mixer #220	11207	P6.04			11.04	PKG
101	0	C 220 NE	Moisture Element	SBR Mixer #220	11207	P6.04			11.04	PKG
102	0	C 220 TY	Temperature Relay	SBR Mixer #220	11207	P6.04		ILD-32		PKG
103	0	C 220 NY	Moisture Relay	SBR Mixer #220	11207	P6.04		ILD-32		PKG
104	0	C 230 HS 1	Lock-Off Stop Pushbutton Switch	SBR Mixer #230	17216	P6.04		ILD-32	11.05	CON
105	0	C 230 HS 2	Computer-Off-Hand Selector Switch	SBR Mixer #230	17216	P6.04		ILD-32	11.05	CON
106	0	C 230 MM 1	Running Pilot Light	SBR Mixer #230	17216	P6.04		ILD-32	11.05	CON
107	0	C 230 MO 1	Stopped Pilot Light	SBR Mixer #230	17216	P6.04		ILD-32	11.05	CON
108	0	C 230 TE	Temperature Element	SBR Mixer #230	11207	P6.04			11.04	PKG
109	0	C 230 NE	Moisture Element	SBR Mixer #230	11207	P6.04			11.04	PKG
110	0	C 230 TY	Temperature Relay	SBR Mixer #230	11207	P6.04		ILD-32		PKG
111	0	C 230 NY	Moisture Relay	SBR Mixer #230	11207	P6.04		ILD-32		PKG
112										
113	0	C 140 HS 1	Lock-Off Stop Pushbutton Switch	SBR Mixed Liquor Pump #140	17216	P6.05		ILD-32	11.05	CON
114	0	C 140 HS 2	Computer-Off-Hand Selector Switch	SBR Mixed Liquor Pump #140	17216	P6.05		ILD-32	11.05	CON

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**CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTRE
NITROGEN REMOVAL FACILITY
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Project No. 66303

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			REFERENCES			
			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE
115	0	C 140 MM	Running Pilot Light	SBR Mixed Liquor Pump #140	17216	P6.05	ILD-32	11.05	CON
116	0	C 140 MO	Stopped Pilot Light	SBR Mixed Liquor Pump #140	17216	P6.05	ILD-32	11.05	CON
117	0	C 140 TE	Temperature Element	SBR Mixed Liquor Pump #140	11207	P6.05	ILD-32	11.04	PKG
118	0	C 140 TY	Temperature Relay	SBR Mixed Liquor Pump #140	11207	P6.05	ILD-32	11.05	PKG
119	0	C 150 HS	Lock-Off Stop Pushbutton Switch	SBR WAS Pump #150	17216	P6.05	ILD-32	11.05	CON
120	0	C 150 HS	Computer-Off-Hand Selector Switch	SBR WAS Pump #150	17216	P6.05	ILD-32	11.05	CON
121	0	C 150 MM	Running Pilot Light	SBR WAS Pump #150	17216	P6.05	ILD-32	11.05	CON
122	0	C 150 MO	Stopped Pilot Light	SBR WAS Pump #150	17216	P6.05	ILD-32	11.05	CON
123	0	C 150 TE	Temperature Element	SBR WAS Pump #150	11207	P6.05	ILD-32	11.04	PKG
124	0	C 150 NE	Moisture Element	SBR WAS Pump #150	11207	P6.05	ILD-32	11.04	PKG
125	0	C 150 TY	Temperature Relay	SBR WAS Pump #150	11207	P6.05	ILD-32	11.05	PKG
126	0	C 150 NY	Moisture Relay	SBR WAS Pump #150	11207	P6.05	ILD-32	11.05	PKG
127	0	C 240 HS	Lock-Off Stop Pushbutton Switch	SBR Mixed Liquor Pump #240	17216	P6.05	ILD-32	11.05	CON
128	0	C 240 HS	Computer-Off-Hand Selector Switch	SBR Mixed Liquor Pump #240	17216	P6.05	ILD-32	11.05	CON
129	0	C 240 MM	Running Pilot Light	SBR Mixed Liquor Pump #240	17216	P6.05	ILD-32	11.05	CON
130	0	C 240 MO	Stopped Pilot Light	SBR Mixed Liquor Pump #240	17216	P6.05	ILD-32	11.05	CON
131	0	C 240 TE	Temperature Element	SBR Mixed Liquor Pump #240	11207	P6.05	ILD-32	11.04	PKG
132	0	C 240 TY	Temperature Relay	SBR Mixed Liquor Pump #240	11207	P6.05	ILD-32	11.05	PKG
133	0	C 250 HS	Lock-Off Stop Pushbutton Switch	SBR WAS Pump #250	17216	P6.05	ILD-32	11.05	CON
134	0	C 250 HS	Computer-Off-Hand Selector Switch	SBR WAS Pump #250	17216	P6.05	ILD-32	11.05	CON
135	0	C 250 MM	Running Pilot Light	SBR WAS Pump #250	17216	P6.05	ILD-32	11.05	CON
136	0	C 250 MO	Stopped Pilot Light	SBR WAS Pump #250	17216	P6.05	ILD-32	11.05	CON
137	0	C 250 TE	Temperature Element	SBR WAS Pump #250	11207	P6.05	ILD-32	11.04	PKG
138	0	C 250 NE	Moisture Element	SBR WAS Pump #250	11207	P6.05	ILD-32	11.04	PKG
139	0	C 250 TY	Temperature Relay	SBR WAS Pump #250	11207	P6.05	ILD-32	11.05	PKG
140	0	C 250 NY	Moisture Relay	SBR WAS Pump #250	11207	P6.05	ILD-32	11.05	PKG
141									
142	0	C 300 LT	Level Transmitter	Equalization Tank	17701	P7.01	ILD-14	11.05	CON
143	0	C 300 LT	Level Transmitter	Equalization Tank	17701	P7.01	ILD-14	11.05	CON
144	0	C 330 HS	Lock-Off Stop Pushbutton Switch	Equalization Tank Pump #330	17216	P7.01	ILD-32	11.05	CON
145	0	C 330 HS	Computer-Off-Hand Selector Switch	Equalization Tank Pump #330	17216	P7.01	ILD-32	11.05	CON
146	0	C 330 HK	Hand Controller	Equalization Tank Pump #330 VFD	11538	P7.01	ILD-32	11.04	PKG
147	0	C 330 TE	Temperature Element	SBR WAS Pump #250	11207	P7.01	ILD-32	11.04	PKG
148	0	C 330 NE	Moisture Element	SBR WAS Pump #250	11207	P7.01	ILD-32	11.04	PKG
149	0	C 330 TY	Temperature Relay	SBR WAS Pump #250	11207	P7.01	ILD-32	11.05	PKG
150	0	C 330 NY	Moisture Relay	SBR WAS Pump #250	11207	P7.01	ILD-32	11.05	PKG
151	0	C 340 HS	Lock-Off Stop Pushbutton Switch	Equalization Tank Pump #340	17216	P7.01	ILD-30	11.05	CON
152	0	C 340 HS	Computer-Off-Hand Selector Switch	Equalization Tank Pump #340	17216	P7.01	ILD-30	11.05	CON

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**CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTRE
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Project No. 66303

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		REFERENCES					
			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE	
153	0	C 340	HK	Hand Controller	Equalization Tank Pump #340 VFD	11538	P7.01	ILD-30		PKG
154	0	C 340	TE	Temperature Element	Equalization Tank Pump #340	11207	P7.01		11.04	PKG
155	0	C 340	NE	Moisture Element	Equalization Tank Pump #340	11207	P7.01		11.04	PKG
156	0	C 340	TY	Temperature Relay	Equalization Tank Pump #340	11207	P7.01	ILD-30		PKG
157	0	C 340	NY	Moisture Relay	Equalization Tank Pump #340	11207	P7.01	ILD-30		PKG
158	0	C 952	HS 1	Lock-Off Stop Pushbutton Switch	Sampling Pump #952	17216	P7.01	ILD-29	11.02	CON
159	0	C 952	HS 2	Computer-Off-Hand Selector Switch	Sampling Pump #952	17216	P7.01	ILD-29	11.02	CON
160	0	C 952	MM	Running Pilot Light	Sampling Pump #952	17216	P7.01	ILD-29	11.02	CON
161	0	C 952	MO	Stopped Pilot Light	Sampling Pump #952	17216	P7.01	ILD-29	11.02	CON
162	0	C 952	TE	Temperature Element	Sampling Pump #952	11207	P7.01	ILD-29	11.04	PKG
163	0	C 952	TY	Temperature Relay	Sampling Pump #952	11207	P7.01	ILD-29	11.04	PKG
164	0	C 960	HS	Computer-Off-Hand Selector Switch	Bristol Sampler #960	11850	P7.01	ILD-27	11.02	OWN
165										
166	0	C 310	HS 1	Lock-Off Stop Pushbutton Switch	Equalization Tank Mixer #310	17216	P7.02	ILD-32	11.05	CON
167	0	C 310	HS 2	Computer-Off-Hand Selector Switch	Equalization Tank Mixer #310	17216	P7.02	ILD-32	11.05	CON
168	0	C 310	MM 1	Running Pilot Light	Equalization Tank Mixer #310	17216	P7.02	ILD-32	11.05	CON
169	0	C 310	MO 1	Stopped Pilot Light	Equalization Tank Mixer #310	17216	P7.02	ILD-32	11.05	CON
170	0	C 310	TE	Temperature Element	Equalization Tank Mixer #310	11207	P7.02		11.04	PKG
171	0	C 310	NE	Moisture Element	Equalization Tank Mixer #310	11207	P7.02		11.04	PKG
172	0	C 310	TY	Temperature Relay	Equalization Tank Mixer #310	11207	P7.02	ILD-32		PKG
173	0	C 310	NY	Moisture Relay	Equalization Tank Mixer #310	11207	P7.02	ILD-32		PKG
174	0	C 320	HS 1	Lock-Off Stop Pushbutton Switch	Equalization Tank Mixer #320	17216	P7.02	ILD-32	11.05	CON
175	0	C 320	HS 2	Computer-Off-Hand Selector Switch	Equalization Tank Mixer #320	17216	P7.02	ILD-32	11.05	CON
176	0	C 320	MM 1	Running Pilot Light	Equalization Tank Mixer #320	17216	P7.02	ILD-32	11.05	CON
177	0	C 320	MO 1	Stopped Pilot Light	Equalization Tank Mixer #320	17216	P7.02	ILD-32	11.05	CON
178	0	C 320	TE	Temperature Element	Equalization Tank Mixer #320	11207	P7.02		11.04	PKG
179	0	C 320	NE	Moisture Element	Equalization Tank Mixer #320	11207	P7.02		11.04	PKG
180	0	C 320	TY	Temperature Relay	Equalization Tank Mixer #320	11207	P7.02	ILD-32		PKG
181	0	C 320	NY	Moisture Relay	Equalization Tank Mixer #320	11207	P7.02	ILD-32		PKG
182										
183	0	C 410	TIT	Temperature Transmitter	Air Blower 1A #410 Inlet Temperature	17701	P8.01	ILD-15	11.02	CON
184	0	C 410	PDIT	Differential Pressure Transmitter	Air Blower 1A #410 Inlet Pressure	11455	P8.01	ILD-19	11.02	PKG
185	0	C 410	PSL	Low Pressure Switch	Air Blower 1A #410 Inlet Pressure	11455	P8.01	ILD-19	11.02	PKG
186	0	C 410	VS 1	Vibration Sensor	Air Blower 1A #410 Motor	11206	P8.01	ILD-19	11.02	PKG
187	0	C 410	VS 2	Vibration Sensor	Air Blower 1A #410	11206	P8.01	ILD-19	11.02	PKG
188	0	C 410	TE 1A	Temperature Element	Air Blower 1A #410	11206	P8.01	ILD-16	11.02	PKG
189	0	C 410	TE 2A	Temperature Element	Air Blower 1A #410	11206	P8.01	ILD-16	11.02	PKG
190	0	C 410	TE 3A	Temperature Element	Air Blower 1A #410	11206	P8.01	ILD-16	11.02	PKG

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**CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTRE
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Project No. 66303

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		REFERENCES					
			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE	
191	0	C 410	TE 1B	Temperature Element	Air Blower 1A #410	11206	P8.01	ILD-16	11-02	PKG
192	0	C 410	TE 2B	Temperature Element	Air Blower 1A #410	11206	P8.01	ILD-16	11-02	PKG
193	0	C 410	TE 3B	Temperature Element	Air Blower 1A #410	11206	P8.01	ILD-16	11-02	PKG
194	0	C 410	TE 4	Temperature Element	Air Blower 1A #410	11206	P8.01	ILD-16	11-02	PKG
195	0	C 410	TE 5	Temperature Element	Air Blower 1A #410	11206	P8.01	ILD-16	11-02	PKG
196	0	C 410	TSH	High Temperature Switch	Air Blower 1A #410 Discharge Flow	11455	P8.01	ILD-19	11-02	PKG
197	0	C 410	TI	Temperature Indicator	Air Blower 1A #410 Discharge Flow	11455	P8.01	ILD-19	11-02	PKG
198	0	C 410	PSH	High Pressure Switch	Air Blower 1A #410 Discharge Flow	11455	P8.01	ILD-19	11-02	PKG
199	0	C 410	PI	Pressure Gauge	Air Blower 1A #410 Discharge Flow	11455	P8.01	ILD-19	11-02	PKG
200	0	C 411	TE	Temperature Element	Air Blower 1A #410 Enclosure	11455	P8.01	ILD-19	11-02	PKG
201	0	C 411	TIT	Temperature Transmitter	Air Blower 1A #410 Enclosure	11455	P8.01	ILD-19	11-02	PKG
202	0	C 410	HS 1	Lock-Off Stop Pushbutton Switch	Air Blower 1A #410	17216	P8.01	ILD-30	11-02	CON
203	0	C 410	HS 2	Computer-Off-Hand Selector Switch	Air Blower 1A #410	17216	P8.01	ILD-30	11-02	CON
204	0	C 420	TIT	Temperature Transmitter	Air Blower 1B #420 Inlet Temperature	17701	P8.01	ILD-15	11-02	CON
205	0	C 420	PDIT	Differential Pressure Transmitter	Air Blower 1B #420 Inlet Pressure	11455	P8.01	ILD-19	11-02	PKG
206	0	C 420	PSL	Low Pressure Switch	Air Blower 1B #420 Inlet Pressure	11455	P8.01	ILD-19	11-02	PKG
207	0	C 420	VS 1	Vibration Sensor	Air Blower 1B #420 Motor	11206	P8.01	ILD-19	11-02	PKG
208	0	C 420	VS 2	Vibration Sensor	Air Blower 1B #420	11206	P8.01	ILD-19	11-02	PKG
209	0	C 420	TE 1A	Temperature Element	Air Blower 1B #420	11206	P8.01	ILD-16	11-02	PKG
210	0	C 420	TE 2A	Temperature Element	Air Blower 1B #420	11206	P8.01	ILD-16	11-02	PKG
211	0	C 420	TE 3A	Temperature Element	Air Blower 1B #420	11206	P8.01	ILD-16	11-02	PKG
212	0	C 420	TE 1B	Temperature Element	Air Blower 1B #420	11206	P8.01	ILD-16	11-02	PKG
213	0	C 420	TE 2B	Temperature Element	Air Blower 1B #420	11206	P8.01	ILD-16	11-02	PKG
214	0	C 420	TE 3B	Temperature Element	Air Blower 1B #420	11206	P8.01	ILD-16	11-02	PKG
215	0	C 420	TE 4	Temperature Element	Air Blower 1B #420	11206	P8.01	ILD-16	11-02	PKG
216	0	C 420	TE 5	Temperature Element	Air Blower 1B #420	11206	P8.01	ILD-16	11-02	PKG
217	0	C 420	TSH	High Temperature Switch	Air Blower 1B #420 Discharge Flow	11455	P8.01	ILD-19	11-02	PKG
218	0	C 420	TI	Temperature Indicator	Air Blower 1B #420 Discharge Flow	11455	P8.01	ILD-19	11-02	PKG
219	0	C 420	PSH	High Pressure Switch	Air Blower 1B #420 Discharge Flow	11455	P8.01	ILD-19	11-02	PKG
220	0	C 420	PI	Pressure Gauge	Air Blower 1B #420 Discharge Flow	11455	P8.01	ILD-19	11-02	PKG
221	0	C 421	TE	Temperature Element	Air Blower 1B #420 Enclosure	11455	P8.01	ILD-19	11-02	PKG
222	0	C 421	TIT	Temperature Transmitter	Air Blower 1B #420 Enclosure	11455	P8.01	ILD-19	11-02	PKG
223	0	C 420	HS 1	Lock-Off Stop Pushbutton Switch	Air Blower 1B #420	17216	P8.01	ILD-30	11-02	CON
224	0	C 420	HS 2	Computer-Off-Hand Selector Switch	Air Blower 1B #420	17216	P8.01	ILD-30	11-02	CON
225	0	C 427	PIT	Pressure Transmitter	SBR 1 Aeration Pressure	17701	P8.01	ILD-17	11-02	CON
226										
227	0	C 430	TIT	Temperature Transmitter	Air Blower 2A #430 Inlet Temperature	17701	P8.02	ILD-15	11-02	CON
228	0	C 430	PDIT	Differential Pressure Transmitter	Air Blower 2A #430 Inlet Pressure	11455	P8.02	ILD-19	11-02	PKG

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**CITY OF WINNIPEG
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Project No. 66303

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		REFERENCES					
			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE	
229	0	C 430	PSL	Low Pressure Switch	Air Blower 2A #430 Inlet Pressure	11455	P8.02	ILD-19	11-02	PKG
230	0	C 430	VS	Vibration Sensor	Air Blower 2A #430 Motor	11206	P8.02	ILD-19	11-02	PKG
231	0	C 430	VS	Vibration Sensor	Air Blower 2A #430	11206	P8.02	ILD-19	11-02	PKG
232	0	C 430	TE	Temperature Element	Air Blower 2A #430	11206	P8.02	ILD-16	11-02	PKG
233	0	C 430	TE	Temperature Element	Air Blower 2A #430	11206	P8.02	ILD-16	11-02	PKG
234	0	C 430	TE	Temperature Element	Air Blower 2A #430	11206	P8.02	ILD-16	11-02	PKG
235	0	C 430	TE	Temperature Element	Air Blower 2A #430	11206	P8.02	ILD-16	11-02	PKG
236	0	C 430	TE	Temperature Element	Air Blower 2A #430	11206	P8.02	ILD-16	11-02	PKG
237	0	C 430	TE	Temperature Element	Air Blower 2A #430	11206	P8.02	ILD-16	11-02	PKG
238	0	C 430	TE	Temperature Element	Air Blower 2A #430	11206	P8.02	ILD-16	11-02	PKG
239	0	C 430	TE	Temperature Element	Air Blower 2A #430	11206	P8.02	ILD-16	11-02	PKG
240	0	C 430	TSH	High Temperature Switch	Air Blower 2A #430 Discharge Flow	11455	P8.02	ILD-19	11-02	PKG
241	0	C 430	TI	Temperature Indicator	Air Blower 2A #430 Discharge Flow	11455	P8.02	ILD-19	11-02	PKG
242	0	C 430	PSH	High Pressure Switch	Air Blower 2A #430 Discharge Flow	11455	P8.02	ILD-19	11-02	PKG
243	0	C 430	PI	Pressure Gauge	Air Blower 2A #430 Discharge Flow	11455	P8.02	ILD-19	11-02	PKG
244	0	C 431	TE	Temperature Element	Air Blower 2A #430 Enclosure	11455	P8.02	ILD-19	11-02	PKG
245	0	C 431	TIT	Temperature Transmitter	Air Blower 2A #430 Enclosure	11455	P8.02	ILD-19	11-02	PKG
246	0	C 430	HS	Lock-Off Stop Pushbutton Switch	Air Blower 2A #430	17216	P8.02	ILD-30	11-02	CON
247	0	C 430	HS	Computer-Off-Hand Selector Switch	Air Blower 2A #430	17216	P8.02	ILD-30	11-02	CON
248	0	C 440	TIT	Temperature Transmitter	Air Blower 2B #440 Inlet Temperature	17701	P8.02	ILD-15	11-02	CON
249	0	C 440	PDIT	Differential Pressure Transmitter	Air Blower 2B #440 Inlet Pressure	11455	P8.02	ILD-19	11-02	PKG
250	0	C 440	PSL	Low Pressure Switch	Air Blower 2B #440 Inlet Pressure	11455	P8.02	ILD-19	11-02	PKG
251	0	C 440	VS	Vibration Sensor	Air Blower 2B #440 Motor	11206	P8.02	ILD-19	11-02	PKG
252	0	C 440	VS	Vibration Sensor	Air Blower 2B #440	11206	P8.02	ILD-19	11-02	PKG
253	0	C 440	TE	Temperature Element	Air Blower 2B #440	11206	P8.02	ILD-16	11-02	PKG
254	0	C 440	TE	Temperature Element	Air Blower 2B #440	11206	P8.02	ILD-16	11-02	PKG
255	0	C 440	TE	Temperature Element	Air Blower 2B #440	11206	P8.02	ILD-16	11-02	PKG
256	0	C 440	TE	Temperature Element	Air Blower 2B #440	11206	P8.02	ILD-16	11-02	PKG
257	0	C 440	TE	Temperature Element	Air Blower 2B #440	11206	P8.02	ILD-16	11-02	PKG
258	0	C 440	TE	Temperature Element	Air Blower 2B #440	11206	P8.02	ILD-16	11-02	PKG
259	0	C 440	TE	Temperature Element	Air Blower 2B #440	11206	P8.02	ILD-16	11-02	PKG
260	0	C 440	TE	Temperature Element	Air Blower 2B #440	11206	P8.02	ILD-16	11-02	PKG
261	0	C 440	TSH	High Temperature Switch	Air Blower 2B #440 Discharge Flow	11455	P8.02	ILD-19	11-02	PKG
262	0	C 440	TI	Temperature Indicator	Air Blower 2B #440 Discharge Flow	11455	P8.02	ILD-19	11-02	PKG
263	0	C 440	PSH	High Pressure Switch	Air Blower 2B #440 Discharge Flow	11455	P8.02	ILD-19	11-02	PKG
264	0	C 440	PI	Pressure Gauge	Air Blower 2B #440 Discharge Flow	11455	P8.02	ILD-19	11-02	PKG
265	0	C 441	TE	Temperature Element	Air Blower 2B #440 Enclosure	11455	P8.02	ILD-19	11-02	PKG
266	0	C 441	TIT	Temperature Transmitter	Air Blower 2B #440 Enclosure	11455	P8.02	ILD-19	11-02	PKG

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Project No. 66303

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			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE
267	0	C 440 HS 1	Lock-Off Stop Pushbutton Switch	Air Blower 2B #440	17216	P8.02	ILD-30	11.02	CON
268	0	C 440 HS 2	Computer-Off-Hand Selector Switch	Air Blower 2B #440	17216	P8.02	ILD-30	11.02	CON
269	0	C 437 PIT	Pressure Transmitter	SBR 2 Aeration Pressure	17701	P8.02	ILD-17	11.02	CON
270									
271	0	C 300 PSL	Low Pressure Switch	Equalization Tank	17701	P9.01	ILD-18	11.02	CON
272	0	C 300 PSH	High Pressure Switch	Equalization Tank	17701	P9.01	ILD-18	11.02	CON
273	0	C 300 PIT	Pressure Transmitter	Equalization Tank	17701	P9.01	ILD-17	11.02	CON
274	0	C 500 AE	H2S Gas Detector	Exhaust Fan Room Gas Detection	17701	P9.01	ILD-09	11.02	CON
275	0	C 500 AIT	Analytical Transmitter	Exhaust Fan Room Gas Detection	17701	P9.01	ILD-09	11.02	CON
276	0	C 500 AY 1	Instrument Fault	Exhaust Fan Room Gas Detection	17701	P9.01	ILD-09	11.02	CON
277	0	C 500 AY 2	High H2S switch	Exhaust Fan Room Gas Detection	17701	P9.01	ILD-09	11.02	CON
278	0	C 500 AY 3	High High H2S switch	Exhaust Fan Room Gas Detection	17701	P9.01	ILD-09	11.02	CON
279	0	C 500 HS	Silence/Acknowledge Pushbutton	Exhaust Fan Room Gas Detection	17216	P9.01	ILD-10	11.02	CON
280	0	C 500 XA 1	Strobe/Beacon	Exhaust Fan Room Gas Detection	17701	P9.01	ILD-10	11.02	CON
281	0	C 500 XA 2	Horn	Exhaust Fan Room Gas Detection	17701	P9.01	ILD-10	11.02	CON
282	0	C 501 AE	H2S Gas Detector	Exhaust Fan Room Gas Detection	17701	P9.01	ILD-09	11.02	CON
283	0	C 501 AIT	Analytical Transmitter	Exhaust Fan Room Gas Detection	17701	P9.01	ILD-09	11.02	CON
284	0	C 501 AY 1	Instrument Fault	Exhaust Fan Room Gas Detection	17701	P9.01	ILD-09	11.02	CON
285	0	C 501 AY 2	High H2S switch	Exhaust Fan Room Gas Detection	17701	P9.01	ILD-09	11.02	CON
286	0	C 501 AY 3	High High H2S switch	Exhaust Fan Room Gas Detection	17701	P9.01	ILD-09	11.02	CON
287	0	C 510 HS 1	Lock-Off Stop Pushbutton Switch	Exhaust Fan #510	17216	P9.01	ILD-30	11.02	CON
288	0	C 510 HS 2	Computer-Off-Hand Selector Switch	Exhaust Fan #510	17216	P9.01	ILD-30	11.02	CON
289	0	C 510 HK	Hand Controller	Exhaust Fan #510	11820	P9.01	ILD-30	11.02	PKG
290	0	C 510 PI 1	Pressure Gauge	Exhaust Fan #510	17701	P9.01	ILD-30	11.02	CON
291	0	C 510 PI 2	Pressure Gauge	Exhaust Fan #510	17701	P9.01	ILD-30	11.02	CON
292									
293	0	C 450 TIT	Temperature Transmitter	Air Blower 5 #450 Inlet Temperature	11315	P10.01	NOTE 1	11.02	PKG
294	0	C 450 PDIT	Differential Pressure Transmitter	Air Blower 5 #450 Inlet Pressure	11315	P10.01	NOTE 1	11.02	PKG
295	0	C 450 PSL	Low Pressure Switch	Air Blower 5 #450 Inlet Pressure	11315	P10.01	NOTE 1	11.02	PKG
296	0	C 450 TE 1	Temperature Element	Air Blower 5 #450	11205	P10.01	NOTE 1	11.02	PKG
297	0	C 450 TE 2	Temperature Element	Air Blower 5 #450	11205	P10.01	NOTE 1	11.02	PKG
298	0	C 450 TE 3	Temperature Element	Air Blower 5 #450	11205	P10.01	NOTE 1	11.02	PKG
299	0	C 450 TI	Temperature Indicator	Air Blower 5 #450 Discharge Flow	11315	P10.01	NOTE 1	11.02	PKG
300	0	C 450 TSH	High Temperature Switch	Air Blower 5 #450 Discharge Flow	11315	P10.01	NOTE 1	11.02	PKG
301	0	C 450 TAH	High Temperature Indicating Light	Air Blower Local Control Panel	11315	P10.01	NOTE 1	11.02	PKG
302	0	C 450 PI	Pressure Gauge	Air Blower 5 #450 Discharge Flow	11315	P10.01	NOTE 1	11.02	PKG
303	0	C 450 PSH	High Pressure Switch	Air Blower 5 #450 Discharge Flow	11315	P10.01	NOTE 1	11.02	PKG
304	0	C 450 PAH	High Pressure Indicating Light	Air Blower Local Control Panel	11315	P10.01	NOTE 1	11.02	PKG

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**CITY OF WINNIPEG
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Project No. 66303

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		REFERENCES					
			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE	
305	0	C 451	TE	Temperature Element	Air Blower 5 #450 Enclosure	11315	P10.01	NOTE 1	11.02	PKG
306	0	C 615	MM	Blower Running Indicating light	Truck Unloading Panel	11315	P10.01	NOTE 1	11.06	PKG
307	0	C 620	MM	Shaker Running Indicating light	Truck Unloading Panel	11315	P10.01	NOTE 1	11.06	PKG
308	0	C 450	MM	Blower Running Indicating light	Truck Unloading Panel	11315	P10.01	NOTE 1	11.06	PKG
309	0	C 610	LI	Silo Level Indicating light	Truck Unloading Panel	11315	P10.01	NOTE 1	11.06	PKG
310	0	C 450	HS 1	Start Unloading Pushbutton Switch	Truck Unloading Panel	11315	P10.01	NOTE 1	11.06	PKG
311	0	C 450	HS 2	Stop Unloading Pushbutton Switch	Truck Unloading Panel	11315	P10.01	NOTE 1	11.06	PKG
312										
313	0	C 600	FS	Flow Switch	Soda Ash Shower & Eye Wash	15420	P10.02	NOTE 1	11.06	PKG
314	0	C 600	TIT	Temperature Transmitter	Soda Ash Skirt Enclosure	11315	P10.02	NOTE 1	11.06	PKG
315	0	C 615	HS 1	Lock-Off Stop Pushbutton Switch	Dust Filter Blower #615	17216	P10.02	NOTE 1	11.06	PKG
316	0	C 615	HS 2	Computer-Off-Hand Selector Switch	Dust Filter Blower #615	17216	P10.02	NOTE 1	11.06	PKG
317	0	C 620	HS 1	Lock-Off Stop Pushbutton Switch	Dust Filter Shaker #620	17216	P10.02	NOTE 1	11.06	PKG
318	0	C 620	HS 2	Computer-Off-Hand Selector Switch	Dust Filter Shaker #620	17216	P10.02	NOTE 1	11.06	PKG
319	0	C 625	HS 1	Lock-Off Stop Pushbutton Switch	Soda Ash Silo Vibrator #625	17216	P10.02	NOTE 1	11.06	PKG
320	0	C 625	HS 2	Computer-Off-Hand Selector Switch	Soda Ash Silo Vibrator #625	17216	P10.02	NOTE 1	11.06	PKG
321	0	C 610	LE	Level Element	Soda Ash Silo #610	11315	P10.02	NOTE 1	11.06	PKG
322	0	C 610	LIT	Level Transmitter	Soda Ash Silo #610	11315	P10.02	NOTE 1	11.06	PKG
323	0	C 610	LSH	High Level Switch	Soda Ash Silo #610	11315	P10.02	NOTE 1	11.06	PKG
324	0	C 610	LSL	Low Level Switch	Soda Ash Silo #610	11315	P10.02	NOTE 1	11.06	PKG
325	0	C 630	FCV	Motorized Rotary Valve	Rotary Valve #630	17216	P10.02	NOTE 1	11.06	PKG
326	0	C 640	HS 1	Lock-Off Stop Pushbutton Switch	Soda Ash Dry Feeder #640	17216	P10.02	NOTE 1	11.06	PKG
327	0	C 640	HS 2	Computer-Off-Hand Selector Switch	Soda Ash Dry Feeder #640	17216	P10.02	NOTE 1	11.06	PKG
328	0	C 640	HK	Hand Controller	Soda Ash Dry Feeder #640	11315	P10.02	NOTE 1		PKG
329	0	C 635	LSH	High Level Switch	Supply Hopper #635	11315	P10.02	NOTE 1	11.06	PKG
330	0	C 635	LSL	Low Level Switch	Supply Hopper #635	11315	P10.02	NOTE 1	11.06	PKG
331										
332	0	C 645	PSL	Low Pressure Switch	Potable Water Feed System	11315	P10.03	NOTE 1	11.06	PKG
333	0	C 660	FCV	Motorized Valve Actuator	Potable Water Feed System	11315	P10.03	NOTE 1	11.06	PKG
334	0	C 645	PI	Pressure Gauge	Potable Water Feed System	11315	P10.03	NOTE 1	11.06	PKG
335	0	C 645	FIT	Flow Transmitter	Potable Water Feed System	11315	P10.03	NOTE 1	11.06	PKG
336	0	C 645	LE	Level Element	Solution Tank #645	11315	P10.03	NOTE 1	11.06	PKG
337	0	C 645	LIT	Level Transmitter	Solution Tank #645	11315	P10.03	NOTE 1	11.06	PKG
338	0	C 645	LSH	High Level Switch	Solution Tank #645	11315	P10.03	NOTE 1	11.06	PKG
339	0	C 645	LSL	Low Level Switch	Solution Tank #645	11315	P10.03	NOTE 1	11.06	PKG
340	0	C 675	FCV	Motorized Valve Actuator	Soda Ash Feed System	11315	P10.03	NOTE 1	11.06	PKG
341	0	C 685	FCV	Motorized Valve Actuator	Soda Ash Feed System	11315	P10.03	NOTE 1	11.06	PKG
342	0	C 690	FCV	Motorized Valve Actuator	Soda Ash Feed System	11315	P10.03	NOTE 1	11.06	PKG

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			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE	
343	0	C 695	FCV	Motorized Valve Actuator	Soda Ash Feed System	11315	P10.03	NOTE 1	11.06	PKG
344	0	C 670	FE	Magnetic Flow Element	Soda Ash Feed System	11315	P10.03	NOTE 1	11.06	PKG
345	0	C 670	FIT	Magnetic Flow Transmitter	Soda Ash Feed System	11315	P10.03	NOTE 1	11.06	PKG
346	0	C 680	FE	Magnetic Flow Element	Soda Ash Feed System	11315	P10.03	NOTE 1	11.06	PKG
347	0	C 680	FIT	Magnetic Flow Transmitter	Soda Ash Feed System	11315	P10.03	NOTE 1	11.06	PKG
348										
349	0	C 700	CSH	Ground Permissive Interlock	Truck Unloading Station	17701	P11.01	ILD-18	11.07	CON
350	0	C 700	CAH	Pilot Light	Truck Unloading Station	17701	P11.01		11.07	CON
351	0	C 700	FS	Flow Switch	Methanol Shower & Eye Wash	15420	P11.01	NOTE 1	11.07	PKG
352	0	C 705	PIT	Pressure Transmitter	Nitrogen Blanketing System	Div. 11	P11.01	NOTE 1	11.02	PKG
353	0	C 705	PI 1	Pressure Gauge	Nitrogen Blanketing System	Div. 11	P11.01	NOTE 1		PKG
354	0	C 705	PI 2	Pressure Gauge	Nitrogen Blanketing System	Div. 11	P11.01	NOTE 1		PKG
355	0	C 706	PI 1	Pressure Gauge	Nitrogen Blanketing System	Div. 11	P11.01	NOTE 1		PKG
356	0	C 706	PI 2	Pressure Gauge	Nitrogen Blanketing System	Div. 11	P11.01	NOTE 1		PKG
357	0	C 722	PIT	Pressure Transmitter	Nitrogen Blanketing System	Div. 11	P11.01	NOTE 1	11.02	PKG
358	0	C 752	PIT	Pressure Transmitter	Nitrogen Blanketing System	Div. 11	P11.01	NOTE 1	11.02	PKG
359	0	C 705	FV	Solenoid Valve	Nitrogen Blanketing System	Div. 11	P11.01	NOTE 1	11.02	PKG
360	0	C 706	FV	Solenoid Valve	Nitrogen Blanketing System	Div. 11	P11.01	NOTE 1	11.02	PKG
361	0	C 705	WSL	Low weight switch	N2 Cylinder	Div. 11	P11.01	NOTE 1	11.02	PKG
362										
363	0	C 710	FCV	Motorized Valve Actuator	Methanol Inlet Flow	17213	P11.02	ILD-02	11.07	CON
364	0	C 720	LS	Leak Detection Switch	Methanol Storage Tank #720	17701	P11.02		11.07	CON
365	0	C 720	LT 1	Level Transmitter	Methanol Storage Tank #720	17701	P11.02		11.07	CON
366	0	C 720	LT 2	Level Transmitter	Methanol Storage Tank #720	17701	P11.02		11.07	CON
367	0	C 730	HS 1	Lock-Off Stop Pushbutton Switch	Methanol Dosing Pump #730	17216	P11.02	ILD-32	11.07	CON
368	0	C 730	HS 2	Computer-Off-Hand Selector Switch	Methanol Dosing Pump #730	17216	P11.02	ILD-32	11.07	CON
369	0	C 730	MM 1	Running Pilot Light	Methanol Dosing Pump #730	17216	P11.02	ILD-32	11.07	CON
370	0	C 730	MO 1	Stopped Pilot Light	Methanol Dosing Pump #730	17216	P11.02	ILD-32	11.07	CON
371	0	C 730	PIT	Pressure Transmitter	Methanol Dosing Pump Outlet Flow	Div. 11	P11.02	NOTE 1	11.07	PKG
372	0	C 730	PSH	High Pressure Switch	Methanol Dosing Pump Outlet Flow	Div. 11	P11.02	NOTE 1	11.07	PKG
373	0	C 730	FSL	Low Flow Switch	Methanol Dosing Pump Outlet Flow	Div. 11	P11.02	NOTE 1	11.07	PKG
374	0	C 730	TIT	Temperature Transmitter	Methanol Dosing Pump Chamber	Div. 11	P11.02	NOTE 1	11.07	PKG
375	0	C 730	LS	Leak Detection Switch	Methanol Dosing Pump Chamber	Div. 11	P11.02	NOTE 1	11.07	PKG
376										
377	0	C 740	FCV	Motorized Valve Actuator	Methanol Inlet Flow	17213	P11.03	ILD-02	11.07	CON
378	0	C 750	LS	Leak Detection Switch	Methanol Storage Tank #750	17701	P11.03		11.07	CON
379	0	C 750	LT 1	Level Transmitter	Methanol Storage Tank #750	17701	P11.03		11.07	CON
380	0	C 750	LT 2	Level Transmitter	Methanol Storage Tank #750	17701	P11.03		11.07	CON

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			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE	
381	0	C 760	HS 1	Lock-Off Stop Pushbutton Switch	Methanol Dosing Pump #760	17216	P11.03	ILD-32	11.07	CON
382	0	C 760	HS 2	Computer-Off-Hand Selector Switch	Methanol Dosing Pump #760	17216	P11.03	ILD-32	11.07	CON
383	0	C 760	MM 1	Running Pilot Light	Methanol Dosing Pump #760	17216	P11.03	ILD-32	11.07	CON
384	0	C 760	MO 1	Stopped Pilot Light	Methanol Dosing Pump #760	17216	P11.03	ILD-32	11.07	CON
385	0	C 760	PIT	Pressure Transmitter	Methanol Dosing Pump Outlet Flow	Div. 11	P11.03	NOTE 1	11.07	PKG
386	0	C 760	PSH	High Pressure Switch	Methanol Dosing Pump Outlet Flow	Div. 11	P11.03	NOTE 1	11.07	PKG
387	0	C 760	FSL	Low Flow Switch	Methanol Dosing Pump Outlet Flow	Div. 11	P11.03	NOTE 1	11.07	PKG
388	0	C 760	TIT	Temperature Transmitter	Methanol Dosing Pump Chamber	Div. 11	P11.03	NOTE 1	11.07	PKG
389	0	C 760	LS	Leak Detection Switch	Methanol Dosing Pump Chamber	Div. 11	P11.03	NOTE 1	11.07	PKG
390	0	C 720	LI	Level Indicator	Methanol Truck Unloading Panel	17701	P11.03	ILD-31	11.07	CON
391	0	C 720	LH	Level High Indicating Light	Methanol Truck Unloading Panel	17216	P11.03	ILD-31	11.07	CON
392	0	C 750	LI	Level Indicator	Methanol Truck Unloading Panel	17701	P11.03	ILD-31	11.07	CON
393	0	C 750	LH	Level High Indicating Light	Methanol Truck Unloading Panel	17216	P11.03	ILD-31	11.07	CON
394	0	C 700	HS	Alarm Acknowledged/Silencer	Methanol Truck Unloading Panel	17216	P11.03	ILD-31	11.07	CON
395	0	C 710	HS	Open/Close Selector Switch	Methanol Truck Unloading Panel	17216	P11.03	ILD-31	11.07	CON
396	0	C 740	HS	Open/Close Selector Switch	Methanol Truck Unloading Panel	17216	P11.03	ILD-31	11.07	CON
397	0	C 700	UY 1	System Ready Indicating Light	Methanol Truck Unloading Panel	17216	P11.03	ILD-31	11.07	CON
398	0	C 700	UY 2	Electronic Buzzer	Methanol Truck Unloading Panel	17701	P11.03	ILD-31	11.07	CON
399										
400	0	C 900	TS	Temperature Switch	Fire Alarm Panel	Div. 16	I3.01	ILD-12	11.02	CON
401	0	C 900	US	Trouble Switch	Fire Alarm Panel	Div. 16	I3.01	ILD-12	11.02	CON
402	0	C 910	ZS	Security Motion Detector	Intruder Security System	17701	I102	ILD-11	11.02	CON
403	0	C 911	ZS	Security Door Switch	Intruder Security System	17701	I103	ILD-11	11.02	CON
404	0	C 912	ZS	Security Motion Detector	Intruder Security System	17701	I102	ILD-11	11.02	CON
405	0	C 913	ZS	Security Door Switch	Intruder Security System	17701	I103	ILD-11	11.02	CON
406	0	C 914	ZS	Security Motion Detector	Intruder Security System	17701	I102	ILD-11	11.02	CON
407	0	C 915	ZS	Security Door Switch	Intruder Security System	17701	I103	ILD-11	11.02	CON
408	0	C 916	ZS	Security Motion Detector	Intruder Security System	17701	I102	ILD-11	11.02	CON
409	0	C 917	ZS	Security Door Switch	Intruder Security System	17701	I103	ILD-11	11.02	CON
410										
411	0	C 521	TIT	Temperature Transmitter	Blower Room Ambient Air	17701	M4.01	ILD-15	11.03	CON
412	0	C 521	ZSB 1	Closed limit switch	Motorized Damper 1 #521	Div.15	M4.01	ILD-21	11.03	CON
413	0	C 521	ZSD 1	Open limit switch	Motorized Damper 1 #521	Div.15	M4.01	ILD-21	11.03	CON
414	0	C 521	ZSB 2	Closed limit switch	Motorized Damper 2 #521	Div.15	M4.01	ILD-20	11.03	CON
415	0	C 521	ZSD 2	Open limit switch	Motorized Damper 2 #521	Div.15	M4.01	ILD-20	11.03	CON
416	0	C 521	HS 1	Lock-Off Stop Pushbutton Switch	Exhaust Fan #521	17216	M4.01	ILD-23	11.03	CON
417	0	C 521	HS 2	Computer-Off-Hand Selector Switch	Exhaust Fan #521	17216	M4.01	ILD-23	11.03	CON
418	0	C 522	TIT	Temperature Transmitter	Blower Room Ambient Air	17701	M4.01	ILD-15	11.03	CON

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RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			REFERENCES				
			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE	
419	0	C 522	1	Closed limit switch	Motorized Damper 1 #522	Div.15	M4.01	ILD-21	I1-03	CON
420	0	C 522	1	Open limit switch	Motorized Damper 1 #522	Div.15	M4.01	ILD-21	I1-03	CON
421	0	C 522	2	Closed limit switch	Motorized Damper 2 #522	Div.15	M4.01	ILD-20	I1-03	CON
422	0	C 522	2	Open limit switch	Motorized Damper 2 #522	Div.15	M4.01	ILD-20	I1-03	CON
423	0	C 522	HS 1	Lock-Off Stop Pushbutton Switch	Exhaust Fan #522	17216	M4.01	ILD-23	I1-03	CON
424	0	C 522	HS 2	Computer-Off-Hand Selector Switch	Exhaust Fan #522	17216	M4.01	ILD-23	I1-03	CON
425	0	C 523	TIT	Temperature Transmitter	Blower Room Ambient Air	17701	M4.01	ILD-15	I1-03	CON
426	0	C 523	ZSB 1	Closed limit switch	Motorized Damper 1 #523	Div.15	M4.01	ILD-21	I1-03	CON
427	0	C 523	ZSD 1	Open limit switch	Motorized Damper 1 #523	Div.15	M4.01	ILD-21	I1-03	CON
428	0	C 523	ZSB 2	Closed limit switch	Motorized Damper 2 #523	Div.15	M4.01	ILD-20	I1-03	CON
429	0	C 523	ZSD 2	Open limit switch	Motorized Damper 2 #523	Div.15	M4.01	ILD-20	I1-03	CON
430	0	C 523	HS 1	Lock-Off Stop Pushbutton Switch	Exhaust Fan #523	17216	M4.01	ILD-23	I1-03	CON
431	0	C 523	HS 2	Computer-Off-Hand Selector Switch	Exhaust Fan #523	17216	M4.01	ILD-23	I1-03	CON
432	0	C 524	TIT	Temperature Transmitter	Blower Room Ambient Air	17701	M4.01	ILD-15	I1-03	CON
433	0	C 524	ZSB 1	Closed limit switch	Motorized Damper 1 #524	Div.15	M4.01	ILD-21	I1-03	CON
434	0	C 524	ZSD 1	Open limit switch	Motorized Damper 1 #524	Div.15	M4.01	ILD-21	I1-03	CON
435	0	C 524	ZSB 2	Closed limit switch	Motorized Damper 2 #524	Div.15	M4.01	ILD-20	I1-03	CON
436	0	C 524	ZSD 2	Open limit switch	Motorized Damper 2 #524	Div.15	M4.01	ILD-20	I1-03	CON
437	0	C 524	HS 1	Lock-Off Stop Pushbutton Switch	Exhaust Fan #524	17216	M4.01	ILD-23	I1-03	CON
438	0	C 524	HS 2	Computer-Off-Hand Selector Switch	Exhaust Fan #524	17216	M4.01	ILD-23	I1-03	CON
439										
440	0	C 530	TIT	Temperature Transmitter	Sample Room Ambient Air	17701	M4.02	ILD-15	I1-03	CON
441	0	C 530	ZSB 1	Closed limit switch	Motorized Damper 1 #530	Div.15	M4.02	ILD-21	I1-03	CON
442	0	C 530	ZSD 1	Open limit switch	Motorized Damper 1 #530	Div.15	M4.02	ILD-21	I1-03	CON
443	0	C 530	ZSB 2	Closed limit switch	Motorized Damper 2 #530	Div.15	M4.02	ILD-20	I1-03	CON
444	0	C 530	ZSD 2	Open limit switch	Motorized Damper 2 #530	Div.15	M4.02	ILD-20	I1-03	CON
445	0	C 530	HS 1	Lock-Off Stop Pushbutton Switch	Exhaust Fan #530	17216	M4.02	ILD-23	I1-03	CON
446	0	C 530	HS 2	Computer-Off-Hand Selector Switch	Exhaust Fan #530	17216	M4.02	ILD-23	I1-03	CON
447	0	C 540	TIT	Temperature Transmitter	Exhaust Fan Room Ambient Air	17701	M4.02	ILD-15	I1-03	CON
448	0	C 540	ZSB 1	Closed limit switch	Motorized Damper 1 #540	Div.15	M4.02	ILD-21	I1-03	CON
449	0	C 540	ZSD 1	Open limit switch	Motorized Damper 1 #540	Div.15	M4.02	ILD-21	I1-03	CON
450	0	C 540	ZSB 2	Closed limit switch	Motorized Damper 2 #540	Div.15	M4.02	ILD-20	I1-03	CON
451	0	C 540	ZSD 2	Open limit switch	Motorized Damper 2 #540	Div.15	M4.02	ILD-20	I1-03	CON
452	0	C 540	HS 1	Lock-Off Stop Pushbutton Switch	Exhaust Fan #540	17216	M4.02	ILD-23	I1-03	CON
453	0	C 540	HS 2	Computer-Off-Hand Selector Switch	Exhaust Fan #540	17216	M4.02	ILD-23	I1-03	CON
454	0	C 550	TIT	Temperature Transmitter	Control Room Ambient Air	17701	M4.02	ILD-15	I1-03	CON
455	0	C 550	ZSB 1	Closed limit switch	Motorized Damper #550	Div.15	M4.02	ILD-21	I1-03	CON
456	0	C 550	ZSD 1	Open limit switch	Motorized Damper #550	Div.15	M4.02	ILD-21	I1-03	CON

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			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE	
457	0	C 550	PDSH	High Differential Pressure Switch	Inlet Air Filter #550	17701	M4.02	ILD-25	I1.03	CON
458	0	C 551	TSL	Open limit switch	Inlet Air Filter #550	17701	M4.02	ILD-25	I1.03	CON
459	0	C 550	HS 1	Lock-Off Stop Pushbutton Switch	Supply Fan 2 #550	17216	M4.02	ILD-22	I1.03	CON
460	0	C 550	HS 2	Computer-Off-Hand Selector Switch	Supply Fan 2 #550	17216	M4.02	ILD-22	I1.03	CON
461										
462	0	C 560	TIT	Temperature Transmitter	Electrical Room Ambient Air	17701	M4.03	ILD-15	I1.03	CON
463	0	C 560	ZSB	Closed limit switch	Motorized Damper #560	Div.15	M4.03	ILD-21	I1.03	CON
464	0	C 560	ZSD	Open limit switch	Motorized Damper #560	Div.15	M4.03	ILD-21	I1.03	CON
465	0	C 560	PDSH	High Differential Pressure Switch	Inlet Air Filter #560	17701	M4.03	ILD-25	I1.03	CON
466	0	C 560	HS 1	Lock-Off Stop Pushbutton Switch	Exhaust Fan 6 #560	17216	M4.03	ILD-23	I1.03	CON
467	0	C 560	HS 2	Computer-Off-Hand Selector Switch	Exhaust Fan 6 #560	17216	M4.03	ILD-23	I1.03	CON
468	0	C 580	TIT	Temperature Transmitter	Electrical Room Ambient Air	17701	M4.03	ILD-15	I1.03	CON
469	0	C 580	ZSB	Closed limit switch	Motorized Damper #560	Div.15	M4.03	ILD-20	I1.03	CON
470	0	C 580	ZSD	Open limit switch	Motorized Damper #560	Div.15	M4.03	ILD-20	I1.03	CON
471	0	C 580	HS 1	Lock-Off Stop Pushbutton Switch	Exhaust Fan 7 #580	17216	M4.03	ILD-23	I1.03	CON
472	0	C 580	HS 2	Computer-Off-Hand Selector Switch	Exhaust Fan 7 #580	17216	M4.03	ILD-23	I1.03	CON
473										
474	0	C 570	LSLL	Low Level Switch	Sump Pit 1 #570	15301	M4.04	NOTE 1	I1.01	PKG
475	0	C 570	LSHH	High Level Switch	Sump Pit 1 #570	15301	M4.04	NOTE 1	I1.01	PKG
476	0	C 570	LT	Level Transmitter	Sump Pit 1 #570	15301	M4.04	NOTE 1	I1.01	PKG
477	0	C 570	TE	Temperature Element	Sump Pump 1 #570	15301	M4.04	ILD-26	I1.01	PKG
478	0	C 570	LS	Leakage Sensor	Sump Pump 1 #570	15301	M4.04	ILD-26	I1.01	PKG
479	0	C 572	TE	Temperature Element	Sump Pump 1 #572	15301	M4.04	ILD-26	I1.01	PKG
480	0	C 572	LS	Leakage Sensor	Sump Pump 1 #572	15301	M4.04	ILD-26	I1.01	PKG
481	0	C 571	LSLL	Low Level Switch	Sump Pit 2 #571	15301	M4.04	NOTE 1	I1.01	PKG
482	0	C 571	LSHH	High Level Switch	Sump Pit 2 #571	15301	M4.04	NOTE 1	I1.01	PKG
483	0	C 571	LT	Level Transmitter	Sump Pit 2 #571	15301	M4.04	NOTE 1	I1.01	PKG
484	0	C 571	TE	Temperature Element	Sump Pump 1 #571	15301	M4.04	ILD-26	I1.01	PKG
485	0	C 571	LS	Leakage Sensor	Sump Pump 1 #571	15301	M4.04	ILD-26	I1.01	PKG
486	0	C 573	TE	Temperature Element	Sump Pump 1 #573	15301	M4.04	ILD-26	I1.01	PKG
487	0	C 573	LS	Leakage Sensor	Sump Pump 1 #573	15301	M4.04	ILD-26	I1.01	PKG

SUPPLY CODES: CON = Contractor Supply, OWN = Owner Supply, PKG = Package Supply

NOTE 1 - For detailed wiring schematics refer to supplier docs.

CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTRE
NITROGEN REMOVAL FACILITY
INSTRUMENT INDEX - EXISTING SLUDGE DEWATERING BUILDING

Project No. 66303

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION			REFERENCES				
			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE	
1	0	W 350	FE	Magnetic Flow Element	Treated Centrate Flow	17701	P7.01	ILD-03	I1.01	CON
2	0	W 350	FIT	Magnetic Flow Transmitter	Treated Centrate Flow	17701	P7.01	ILD-03	I1.01	CON
3	0	W 350	PIT	Pressure Transmitter	Treated Centrate Flow	17701	P7.01	ILD-17	I1.01	CON
4										
5	0	W 914	FCV	Motorized Valve Actuator		17213	P20.01	ILD-01	I1.01	CON
6										
7	0	W 904	FCV	Motorized Valve Actuator		17213	P22.01	ILD-01	I1.01	CON
8	0	W 905	TE	Temperature Element	Discharge Piping Flow	17701	P22.01		I1.01	CON
9	0	W 905	TIT	Temperature Transmitter	Discharge Piping Flow	17701	P22.01	ILD-15	I1.01	CON
10	0	W 905	FE	Magnetic Flow Element	Discharge Piping Flow	17701	P22.01	ILD-03	I1.01	CON
11	0	W 905	FIT	Magnetic Flow Transmitter	Discharge Piping Flow	17701	P22.01	ILD-03	I1.01	CON
12	0	W 942	HS 1	Lock-Off Stop Pushbutton Switch	Sampling Pump #942	17216	P22.01	ILD-29	I1.01	CON
13	0	W 942	HS 2	Computer-Off-Hand Selector Switch	Sampling Pump #942	17216	P22.01	ILD-29	I1.01	CON
14	0	W 942	MM	Running Pilot Light	Sampling Pump #942	17216	P22.01	ILD-29	I1.01	CON
15	0	W 942	MO	Stopped Pilot Light	Sampling Pump #942	17216	P22.01	ILD-29	I1.01	CON
16	0	W 950	HS	Computer-Off-Hand Selector Switch	Bristol Sampler	11850	P22.01	ILD-27	I1.01	OWN
17										

SUPPLY CODES: CON = Contractor Supply, OWN = Owner Supply, PKG = Package Supply

NOTE 1 - For detailed wiring schematics refer to supplier docs.

CITY OF WINNIPEG
NORTH END WATER POLLUTION CONTROL CENTRE
NITROGEN REMOVAL FACILITY
INSTRUMENT INDEX - EXISTING OXYGEN REACTOR CONTROL ROOM

Project No. 66303

RECORD NO.	REV. NO.	TAG NAME	DESCRIPTION		REFERENCES				
			INSTRUMENT TYPE	SERVICE	SPEC. SHEET or SECTION	P&ID DRAWING	WIRING REF.	LOCATION DWG.	SUPPLY CODE
1	0	R 256	Magnetic Flow Element	WAS Flow to HPO Reactors	17701	P6.02	ILD-03	11.01	CON
2	0	R 256	Magnetic Flow Transmitter	WAS Flow to HPO Reactors	17701	P6.02	ILD-03	11.01	CON
3									
4	0	R 923	Magnetic Flow Element	RAS Pumps Discharge Flow	17701	P21.01	ILD-03	11.01	CON
5	0	R 923	Magnetic Flow Transmitter	RAS Pumps Discharge Flow	17701	P21.01	ILD-03	11.01	CON
6									
7	0	R 970	Computer-Off-Hand Selector Switch	Bristol Sampler	11850	P24.01	ILD-27	11.01	OWN
8									

SUPPLY CODES: CON = Contractor Supply, OWN = Owner Supply, PKG = Package Supply

NOTE 1 - For detailed wiring schematics refer to supplier docs.

INSTRUMENT SPECIFICATION SHEETS

1. GENERAL

1.1 References - General

- .1 Refer To Section 17010.

1.2 Instrument Specification Sheets

- .1 The following data sheets provide information for instruments included as part of this Work.

I-101	Instrument Specification Sheet – Gas Detection
I-102	Instrument Specification Sheet – Motion Detectors
I-103	Instrument Specification Sheet – Door Switches
I-104	Instrument Specification Sheet – Temperature Transmitter
I-105	Instrument Specification Sheet – Float Switch
I-106	Instrument Specification Sheet – Magnetic Flow Transmitter
I-107	Instrument Specification Sheet – Submersible Level Transmitter
I-108	Instrument Specification Sheet – Pressure Gauge
I-109	Instrument Specification Sheet – Pressure Switch
I-110	Instrument Specification Sheet – Pressure Transmitter
I-111	Instrument Specification Sheet – Solenoid Valve
I-112	Instrument Specification Sheet – Water Temperature Transmitter
I-113	Instrument Specification Sheet – DO Transmitter
I-114	Instrument Specification Sheet – pH Transmitter
I-115	Instrument Specification Sheet – Pressure Switch
I-116	Instrument Specification Sheet – Temperature Transmitter
I-117	Instrument Specification Sheet – Heating Coil Freeze stat
I-118	Instrument Specification Sheet – Differential Pressure Switch
I-119	Instrument Specification Sheet – Indicator (Panel Mount)
I-120	Instrument Specification Sheet – Electronic Buzzer (Panel Mount)
I-121	Instrument Specification Sheet – Methanol Leakage Sensor
I-122	Instrument Specification Sheet – Methanol Level Transmitter
I-123	Instrument Specification Sheet – Ground Permissive Interlock
I-124	Instrument Specification Sheet – Status Indicator Light
I-125	Instrument Specification Sheet – Annunciator Horn

- .2 All instruments described on each instrument Specification Sheet are to be from a single source. Design has been based on the first named product.

2. PRODUCTS

- .1 Not used

INSTRUMENT SPECIFICATION SHEETS

3. EXECUTION

.1 Not used

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I101
DEVICE:	Gas Detection
TAG:	C500-AE/AIT C501-AE/AIT
SENSOR TYPE:	Catalytic Bead,
SERVICE:	H2S inside Exhaust Fan Room
HOUSING:	Explosion proof aluminum
CABLE LENGTH:	TBC
TRANSMITTER TYPE:	Digital Electronic
ENCLOSURE:	EEMAC/NEMA 4X
OUTPUT:	4 Form C N/O relay contacts High, High High, Instrument Fail
INPUT METHOD:	Remote Programmer
INDICATOR:	4 Digit LED Display
RANGE:	0-50 PPM Alert at 10 PPM Alarm at 15 PPM
POWER SUPPLY:	18 to 30 VDC
MOUNTING:	(SENSOR) Surface mount with remote mounting kit
	(TRANSMITTER) Wall mount
SPECIAL INSTRUCTIONS	To be wired directly to Beacon/Strobe (Blue) Local Station to house Silence Button.
ACCESSORIES:	Calibration kit complete with sample gas
MANUFACTURER AND MODEL:	Thermo Electron, Net Safety Monitoring, MSA, Or approved Equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I102
DEVICE:	Motion Detector
TAG:	C910-ZS C912-ZS C914-ZS C916-ZS
TYPE:	Combination Infra-red and microwave
SERVICE:	Electrical Room Control Room Blower Room Exhaust Fan Room
CALIBRATION:	User adjustable detection patterns
OUTPUT:	Form C Reed Relay rated 500 mA at 300 VDC
POWER SUPPLY:	9 to 30 VDC
MOUNTING:	Surface Mount
MANUFACTURER AND MODEL:	C&K Systems DT-450C or approved equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I103
DEVICE:	Door Switch
TAG:	C911-ZS C913-ZS C915-ZS C917-ZS
SERVICE:	Electrical Room Control Room Blower Room Exhaust Fan Room
TYPE:	Electronic
DISPLAY:	LED Status Indicator
OUTPUT:	SPDT Contact suitable for 120 VAC pilot duty
POWER SUPPLY:	120 VAC, 60 Hz
ENCLOSURE:	Surface Mount
MANUFACTURER AND MODEL:	Edwards Approved equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I104
DEVICE:	Temperature Indicating Transmitter with RTD Sensor
TAG:	C410-TIT, C420-TIT C430-TIT, C440-TIT
TYPE:	RTD Sensor with Thermowell and Remote Transmitter
SERVICE:	Blower intake Ambient Air
RTD PROBE:	Platinum 100 Ohm Pt Spring loaded
RANGE:	0°C to 50°C
INACCURACY:	±0.5% of span or better
INDICATION:	3 ½ Digit LED display scaled in engineering units
PROCESS CONNECTION:	3/4" NPT 316 SST Thermowell with insertion of 1/3 the pipe diameter.
OUTPUT:	4 to 20 mA DC into 500 ohm load
POWER:	Loop powered
ENCLOSURE:	EEMAC/NEMA 4X.
MOUNTING:	(SENSOR) Pipe
	(TRANSMITTER) Pipe/Wall mount
MANUFACTURER AND MODEL:	Rosemount Approved equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I105
DEVICE:	Float Switch
TAG:	LSH-C005
SERVICE:	Refer to Instrument Index and P&IDs.
OUTPUT:	SPDT Contacts
ENCLOSURE:	Polypropylene float casing with preterminated signal cable. Minimum
MOUNTING:	Provide strain relief-type connectors to suspend float at desired location. Fabricate mounting brackets from fiberglass or PVC. Provide sway control rings as required.
MANUFACTURER AND MODEL:	Flygt ENM-10 Magnetrol or approved equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I106
DEVICE:	Magnetic Flow Meter
TAG:	R256-FIT, W350-FIT W905-FIT, R923-FIT
SERVICE:	WAS, Treated Centrate, Flushing Water, RAS, Centrate
SIZE AND MATERIAL:	Refer to attached and Process Drawings for flow meter size and piping materials
AREA CLASSIFICATION	See Division 16
LINER MATERIAL:	Neoprene
ELECTRODES:	Bullet Nose – 316 SST
GROUNDING:	Grounding Rings or probes for both inlet and outlet– 316 SST
RANGE:	Refer to Process Drawings
SIGNAL CABLE LENGTH:	25m
INACCURACY:	± 0.5% of span
OUTPUT:	4 to 20 mA DC into 500 ohm load, HART protocol
POWER SUPPLY:	120 VAC, 60 HZ
MOUNTING: (TRANSMITTER) (SENSOR)	Remote Wall Mount Flanged Mount
ELECTRONIC ENCLOSURE:	EEMAC/NEMA 4X Transmitter Housing EEMAC/NEMA 4X Sensor
SPECIAL INSTRUCTIONS:	EEMAC/NEMA 6 Sensor for C256-FE/FIT, rated for water submersion.
MANUFACTURER AND MODEL:	Rosemount 8700 ABB Magmaster E&H Promag 33 or approved equal

INSTRUMENT SPECIFICATION SHEETS

Device Tag	Line Size	Normal Flow	Max Flow	Min Flow
	mm	L/s	L/s	L/s
FE/FIT-C256, WAS	200	80	100	0
FE/FIT-C350, TCE	250	80	100	0
FE/FIT-C923, RAS	250	100	200	25
FE/FIT-C905,FW+CE	350	50	75	0

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I107
DEVICE:	Submersible Level Transmitter
TAG:	C005-LT, C100-LT-1, C100-LT-2 C200-LT-1, C200-LT-2, C300-LT-1, C300-LT-2
SERVICE:	RAS, Treated Centrate
TYPE:	Loop-powered, submersible level transmitter complete with cable
RANGE:	Approximately 10 m water column, See Process Drawings, to be confirmed
POWER SUPPLY:	12 to 28 VDC
OUTPUT:	4 to 20 mA DC into 500 ohm load
CONSTRUCTION:	316 SST suitable for immersion in centrate
CABLE:	Preterminated 15 m cable suitable for immersion in Centrate and Activated Sludge.
MOUNTING:	Suspend from PVC or fiberglass brackets and provide strain relief connector for the cable. Bracket design shall facilitate rapid sensor removal and installation. Provide stilling well to prevent sway in turbulent tanks.
ACCESSORIES:	Quick disconnect Stilling Well Strain relief connector
MANUFACTURER AND MODEL:	Ametek Druck Or approved equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER: I108

DEVICE: Pressure Compound Gauge

TAG: C510-PI1

SERVICE: SBR and Equalization Tank Exhaust
Exhaust Fan Suction

PROCESS CONNECTION: 0.5 inch NPTF

SENSOR: Brass bellows

CASE: 100mm Stainless steel case

RANGE: 0-100mm Vacuum, 0-100mm water column

MOUNTING: Bottom, stem mounted

ENCLOSURE: EEMAC/NEMA 4X

MANUFACTURER AND MODEL: Ashcroft
H O Trerice
Winters
Or Approved Equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I109
DEVICE:	Pressure Switch
TAG:	C300-PSL C300-PSH
SERVICE:	SBR and Equalization Tank
PROCESS CONNECTION:	0.5 inch NPTF
SENSOR:	Brass bellows
RANGE:	0-100mm Water Column Vacuum 0-100mm Water Column
MOUNTING:	Bottom, stem mounted
ENCLOSURE:	EEMAC/NEMA 4X
OUTPUT:	Form C Contacts rated 5 amps at 120 VAC
MANUFACTURER AND MODEL:	United Electric Ashcroft or approved equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I110
DEVICE:	Pressure Transmitter
TAG:	C300-PIT W350-PIT
SERVICE:	Equalization Tank, Treated Centrate
PROCESS CONNECTIONS:	0.50 inch NPTF
RANGE:	0-100mm water column vacuum to 100mm water column
INACCURACY:	±1 percent of span or lower
OUTPUT:	4 to 20 mADC into 500 OHM load
POWER SUPPLY:	Loop powered 24 VDC
CONSTRUCTION:	316 STT
ELECTRONIC ENCLOSURE:	EEMAC/NEMA 4X
ACCESSORIES:	Chemical Seal for treated centrate application
MANUFACTURER AND MODEL:	Rosemount ABB Ametek Or approved Equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER: I111

DEVICE: Solenoid Valve (Water Service)

TAG: C106-SV
C206-SV

AREA CLASSIFICATION: See Division 16

SERVICE: Flushing Water

PROCESS CONNECTIONS: 1" NPT

MATERIALS: 304 SS

OPERATION: Normally Closed

DIFFERENTIAL PRESSURE: Min: 0 kPa, Max: 800 kPa

ENCLOSURE: EEMAC/NEMA 4X

POWER SUPPLY: 120VAC/60Hz

MANUFACTURER AND MODEL: ASCO 8210
or approved equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I112
DEVICE:	Water Temperature Transmitter
TAG:	W905-TE/TIT
SERVICE:	Flushing Water
RANGE:	0 to 100°C
PROCESS CONNECTION:	3/4" Stainless Steel NPT Thermowell with insertion of 1/3 the pipe diameter
RTD PROBE:	Platinum 100 OHM Spring loaded
INACCURACY:	±0.5% of span or better
INDICATION:	3 ½ Digit LED Display scaled
OUTPUT:	4 to 20 mA DC into 500 Ohm Load
POWER SUPPLY:	Loop powered
ENCLOSURE:	EEMAC/NEMA 4
MOUNTING:	Direct to process, locate at tee or elbow in system.
MANUFACTURER:	Rosemount Or approved equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER: I113

DEVICE: Dissolved Oxygen Transmitter

TAG: AE/AIT-185-1, AE/AIT-285-1

PROBE TYPE: Optical DO

OPERATING PRINCIPLE: Light Scatter

PROBE LENGTH: TBC

AREA CLASSIFICATION: See Division 16

SERVICE: SBR Tanks Centrate
Refer to Process sections for Centrate characteristics

SELF CLEANING/CALIBRATION: Air Jet Cleaner

TEMPERATURE COMPENSATION: Integral

CABLE LENGTH: TBC with Quick connectors

RANGE: 0-10 mg/L

INACCURACY: ±0.5% of span

TRANSMITTER TYPE: Dissolved Oxygen Analyzer

OUTPUT: Isolated 4 to 20 mA Analog Output(s)
2 configurable Form C Alarm Contacts N/O

POWER SUPPLY: 120 VAC, 60 HZ

ENCLOSURE: EEMAC/NEMA 4X Transmitter Housing

MOUNTING: (SENSOR) Pipe Mount
(TRANSMITTER) Wall Mount

ACCESSORIES: Jet Compressor System
Sensor Mounting Kit with jet cleaning attachment
Connections required for 2" tee

MANUFACTURER AND MODEL: Aysix 2000 with Model 10 D.O. Sensor
Royce
Hach
or approved equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I114
DEVICE:	pH Transmitter
TAG:	AE/AIT-185-2, AE/AIT-285-2
TYPE:	Plunger PH electrode
AREA CLASSIFICATION:	See Division 16
SERVICE:	SBR Tanks Centrate Refer to Process sections for Centrate characteristics
PROCESS DATA:	Ph and Temperature of Centrate
CONNECTION TYPE:	1"NPT Pipe Tee ¾" Reducing Bushing Use Teflon tape on sensor to permit easy removal
MATERIAL:	316 SS
TEMPERATURE:	0-50°C
RANGE:	5-8 ph
ACCURACY:	1Mv @25C ±0.01 pH
OUTPUT:	Isolated 4 to 20 mA Analog Output(s) for PH and Temp. 2 configurable Form C Alarm Contacts
POWER SUPPLY:	120 VAC, 60 HZ
ENCLOSURE:	EEMAC/NEMA 4X Transmitter Housing
MOUNTING:	Pipe Connection
	(SENSOR)
	(TRANSMITTER)
ACCESSORIES:	Process connections Self cleaning kit (Air)
MANUFACTURER AND MODEL:	Aysix Model 22 Process Sensor with Model A6-223 PH/ORP Transmitter Rosemount Analytical Hach or approved equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I115
DEVICE:	Pressure Gauge
TAG:	C510-PI2
SERVICE:	SBR and Equalization Tank Exhaust Discharge from Exhaust Fan
PROCESS CONNECTION:	0.5 inch NPTF
SENSOR:	Brass Bellows
CASE:	100mm Stainless steel
RANGE:	0-100mm water column
MOUNTING:	Bottom, stem mounted
ENCLOSURE:	EEMAC/NEMA 4X
MANUFACTURER AND MODEL:	Ashcroft H O Trerice Winters Or Approved Equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I116	
DEVICE:	Temperature Transmitter	
TAG:	C521-TIT C522-TIT C523-TIT C524-TIT	C530-TIT C540-TIT C550-TIT C560-TIT C580-TIT
TYPE:	RTD Sensor	
SERVICE:	Ambient Air Temperature Transmitter	
PROBE:	5mm dia x100mm L ambient air probe	
RANGE:	0°C to 50°C	
ACCURACY:	±0.5°C of span or better	
DISPLAY:	Three digit LED display with one decimal point.	
OUTPUT:	4 to 20 mA DC into 500 OHM load	
ENCLOSURE:	EEMAC/NEMA 4X	
MOUNTING:	Wall	
ACCESSORIES:	Tamper-proof cover	
MANUFACTURER AND MODEL:	Rosemount Type 3044C Or Approved Equal	

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I117
DEVICE:	Heating Coil Freezestat
TAG:	C551-TSL
TYPE:	Duct Averaging Vapor-Charged Capillary
SERVICE:	Air handling units
RANGE:	-9.4 to 12.8°C
SETPOINT:	1.6°C trip with manual reset
OUTPUT:	1 N.O. and 1 N.C. contacts with pilot duty rating
POWER SUPPLY:	N/A
ENCLOSURE:	Manufacturer's standard
ACCESSORIES:	Duct mounting kit with sensor element holder

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I118
DEVICE:	Differential Pressure Switch
TAG:	C550-PDSH C560-PDSH
SERVICE:	Clogged filter detection
RANGE:	As required, with adjustable set point and differential
PROCESS CONNECTIONS	Barbed tube fittings on switch and static pressure probes.
INACCURACY:	±1.0% of span or better
OUTPUT:	Form C dry contact rated for pilot duty
POWER SUPPLY:	N/A
ENCLOSURE:	Manufacturer's standard
MOUNTING:	Direct mount static pressure probes to the duct. Wall mount bracket for the switch body.
ACCESSORIES:	Wall mount bracket. 5 mm copper sensing lines.

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I119
DEVICE:	Indicator (Panel mount)
TAG:	C720-LI C750-LI
INPUT:	4 to 20 mA
DISPLAY:	4 digit, 20 mm LED
CALIBRATION:	Zero and span adjustable Digital readout scaled in engineering units
INACCURACY	±1 percent or less
POWER SUPPLY:	Loop powered
MOUNTING:	Flush Panel Mount, EEMAC/NEMA 4X
AREA CLASSIFICATION:	Class 1, Zone 2
MANUFACTURER AND MODEL:	Precision Digital Action Instruments Or Approved Equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER: I120

DEVICE: Electronic Buzzer

TAG:

TYPE: Piezo Electric Buzzer with Continuous tone, 70 dBA at 600 mm

SERVICE: Methanol truck unloading panel

POWER SUPPLY: 120 VAC, 60 Hz

ENCLOSURE: Flush panel mount,
EEMAC/NEMA 4X

AREA CLASSIFICATION: Class 1, Zone 2

MANUFACTURER: Mallory
Or Approved Equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I121
DEVICE:	Methanol Storage Tank Leakage Sensor
TAG:	C720-LS C750-LS
LEAKAGE SENSOR TYPE:	Liquid Sensor to detect Methanol
SERVICE:	Interstitial Space for double-wall tanks
OPERATING TEMPERATURE:	-40 to 80°C
AREA CLASSIFICATION:	Class 1, Zone 0
MOUNTING:	(SENSORS) Mounting for tank installation (from top)
APPROVALS:	Intrinsically Safe for Class 1, Zone 0
ACCESSORIES:	Provide all necessary tank accessories for mounting sensors.
MANUFACTURER AND MODEL:	Sequence Controls Or approved Equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I122
DEVICE:	Methanol Storage Tank Continuous Level Device
TAG:	C720-LT-1, C720-LT-2 C750-LT-1, C750-LT-2
TRANSMITTER TYPE:	Magnetrostrictive
SERVICE:	Methanol storage tank
CONNECTION:	4" Flange
OPERATING TEMPERATURE:	-40 to 80°C
AREA CLASSIFICATION:	Class 1, Zone 0
PROBE LENGTH:	Refer to Process Drawings
OUTPUT:	4 to 20 mA DC into 500 ohm load
POWER SUPPLY:	24V DC (Loop Powered)
ENCLOSURE:	Explosion Proof
MOUNTING:	Flange Mounting
APPROVAL:	Intrinsically Safe for Class 1, Zone 0
ACCESSORIES:	Provide all necessary tank accessories for top mount application
MANUFACTURER AND MODEL:	K-TEK Or approved Equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I123
DEVICE:	Ground Permissive Interlock
TAG:	C700-CSH/CAH
TYPE:	GPI
SERVICE:	Methanol Unloading Truck Connect
OPERATING TEMPERATURE:	-40 to 40°C
AREA CLASSIFICATION:	Class 1, Zone 1
POWER SUPPLY:	120 VAC
OUTPUT:	SPDT 5A@250VAC
ENCLOSURE:	EEMAC/NEMA 4X
INDICATION:	Pilot Indicating lights
CONNECTION:	Grounding Clamp
CABLE LENGTH:	25 FT of cord 14/3 S.O.W.
MANUFACTURER AND MODEL:	SPARTECH Or approved Equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER:	I124
DEVICE:	Status Indicator Light
TAG:	C500-XA-1
TYPE:	Multi Color Multi Mode LED Status Light
SERVICE:	Gas Detection
COLOR:	BLUE – H2S Gas RED – Fire, LEL AMBER – Process GREEN – Safe Condition
NOMINAL VOLTAGE:	120 VAC
OPERATING TEMPERATURE:	-40 to 40°C
AREA CLASSIFICATION:	General Purpose
MOUNTING:	Wall
ENCLOSURE:	EEMAC/NEMA 4X
SPECIAL INSTRUCTIONS	Steady on High Alarm, Flash on High High Alarm
ACCESSORIES:	Provide housing to protect light from vandals.
MANUFACTURER AND MODEL:	Federal Signal Corporation Edwards Or approved Equal

INSTRUMENT SPECIFICATION SHEETS

INSTRUMENT SPECIFICATION NUMBER: I125

DEVICE: Annunciator Horn

TAG: C500-XA-2

TYPE: Dual Tone Grille Type Vibrating Horn

SERVICE: Process Alarms

NOMINAL VOLTAGE: 120 VAC

OPERATING TEMPERATURE: -40 to 40°C

AREA CLASSIFICATION: General Purpose

MOUNTING: Wall mount for Exhaust Fan Building
Pole Mount for Methanol Storage Tanks

ENCLOSURE: EEMAC/NEMA 4X
Heavy Duty
Zinc Die Cast

SPECIAL INSTRUCTIONS Sound Levels for Outdoor Applications
Tone 1 for High Alarm
Tone 2 for High High Alarm
Silence Pushbutton to shutdown horn

ACCESSORIES: 4" box for mounting

MANUFACTURER AND MODEL: Fedral Signal Corporation
Edwards
Or approved Equal

END OF SECTION

INSTRUMENT LOOP DRAWINGS

1. GENERAL

1.1 References - General

- .1 Refer to Section 17010.

1.2 Instrument Loop Drawings

- .1 The following Drawings show typical instrument loop wiring diagrams. One (1) Drawing per loop will be completed and submitted for approval after award of Contract. The following 35 Drawings are an integral part of this Specification Section:

ILD-01	Typical Motorized Valve/Gate Actuator
ILD-02	Typical Two Position Valve Actuator
ILD-03	Typical Magnetic Flow Meter
ILD-04	Typical Level Transmitter
ILD-05	Typical Float Switch
ILD-06	Typical Solenoid Valve
ILD-07	Typical Dissolved Oxygen Transmitter
ILD-08	Typical pH Transmitter
ILD-09	Typical Gas Detection Transmitter
ILD-10	Typical Horn & Beacon
ILD-11	Typical Intrusion Alarms
ILD-12	Fire Alarm Panel
ILD-13	Typical CCTV Camera
ILD-14	Typical Submersible Level Transmitter
ILD-15	Typical Temperature Transmitter
ILD-16	Typical RTD Sensor
ILD-17	Typical Pressure Transmitter
ILD-18	Typical Process Variable Switch
ILD-19	Typical Blower Panel
ILD-20	Typical HVAC Two Position Damper
ILD-21	HVAC Modulating Control Valve
ILD-22	Typical HVAC Fan Starter
ILD-23	Typical HVAC Variable Speed Drive
ILD-24	HVAC Heater/Chiller Control Valve
ILD-25	Typical HVAC Temp. & Diff. Pressure Switches
ILD-26	Typical Duplex Sump Pumps
ILD-27	Typical Bristol Sampler
ILD-28	Analytical Analyzer
ILD-29	Typical Sampling Pump
ILD-30	Typical Variable Frequency Drive
ILD-31	Methanol Truck Unloading Panel
ILD-32	Typical FVNR Motor Starter
ILD-33	Typical Intrinsically Safe Transmitter
ILD-34	Typical Intrinsically Safe Switch
ILD-35	Soda Ash System Interconnection Block Diagram

INSTRUMENT LOOP DRAWINGS

- .2 All control circuits and I/O points shown on the instrument loop wiring diagrams shall be individually fused.
- .3 The instrument loop wiring diagrams are intended to be typical. For instruments being supplied by Vendor Packages or under other Divisions refer to detailed wiring schematics and documentation provided by the supplier.

2. PRODUCTS

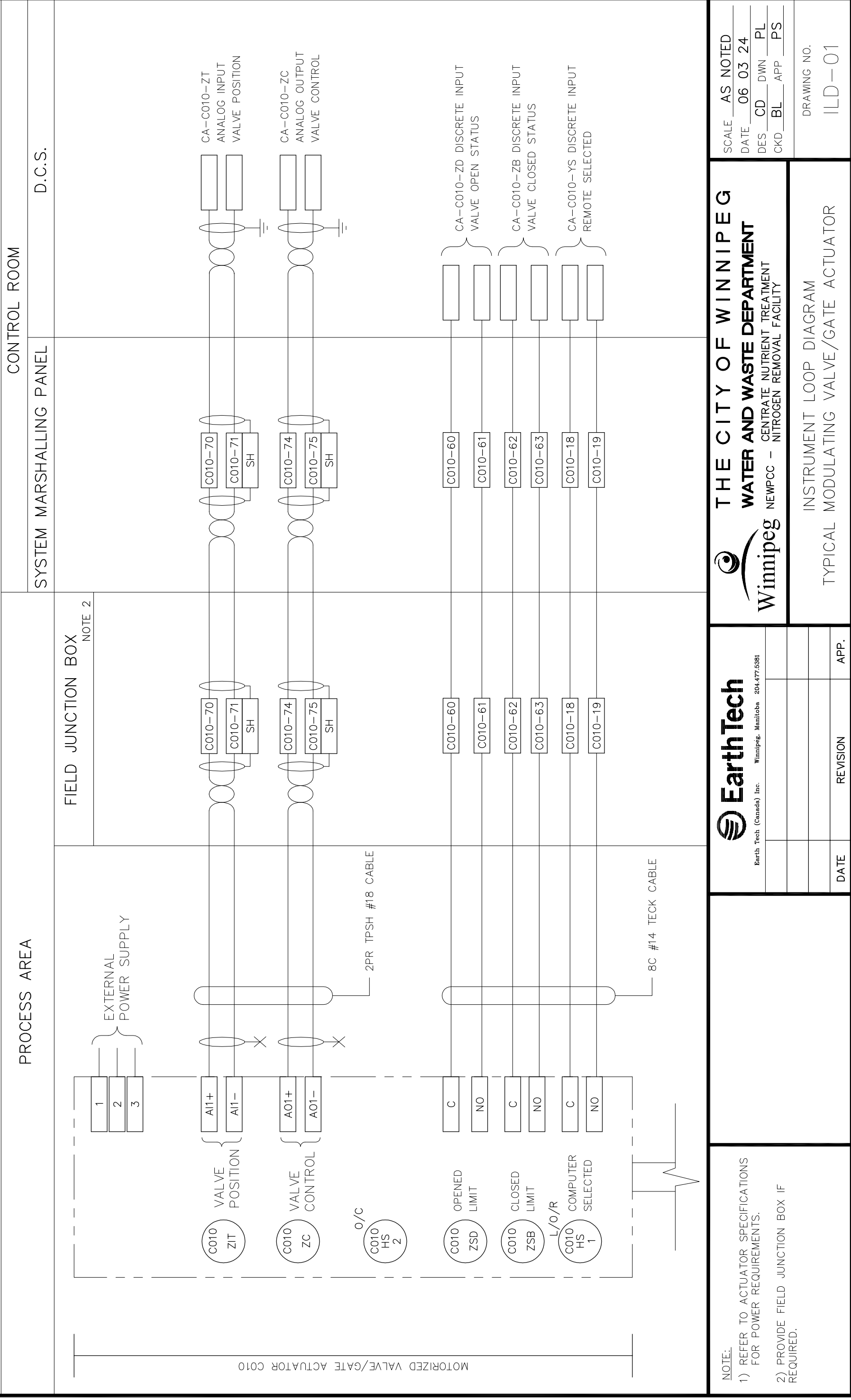
- .1 Not used

3. EXECUTION

- .1 Not used

INSTRUMENT LOOP DIAGRAM

LOOP NO. C010



PROCESS AREA

SYSTEM MARSHALLING PANEL

CONTROL ROOM

D.C.S.

FIELD JUNCTION BOX
NOTE 2

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INSTRUMENT LOOP DIAGRAM
TYPICAL MODULATING VALVE/GATE ACTUATOR

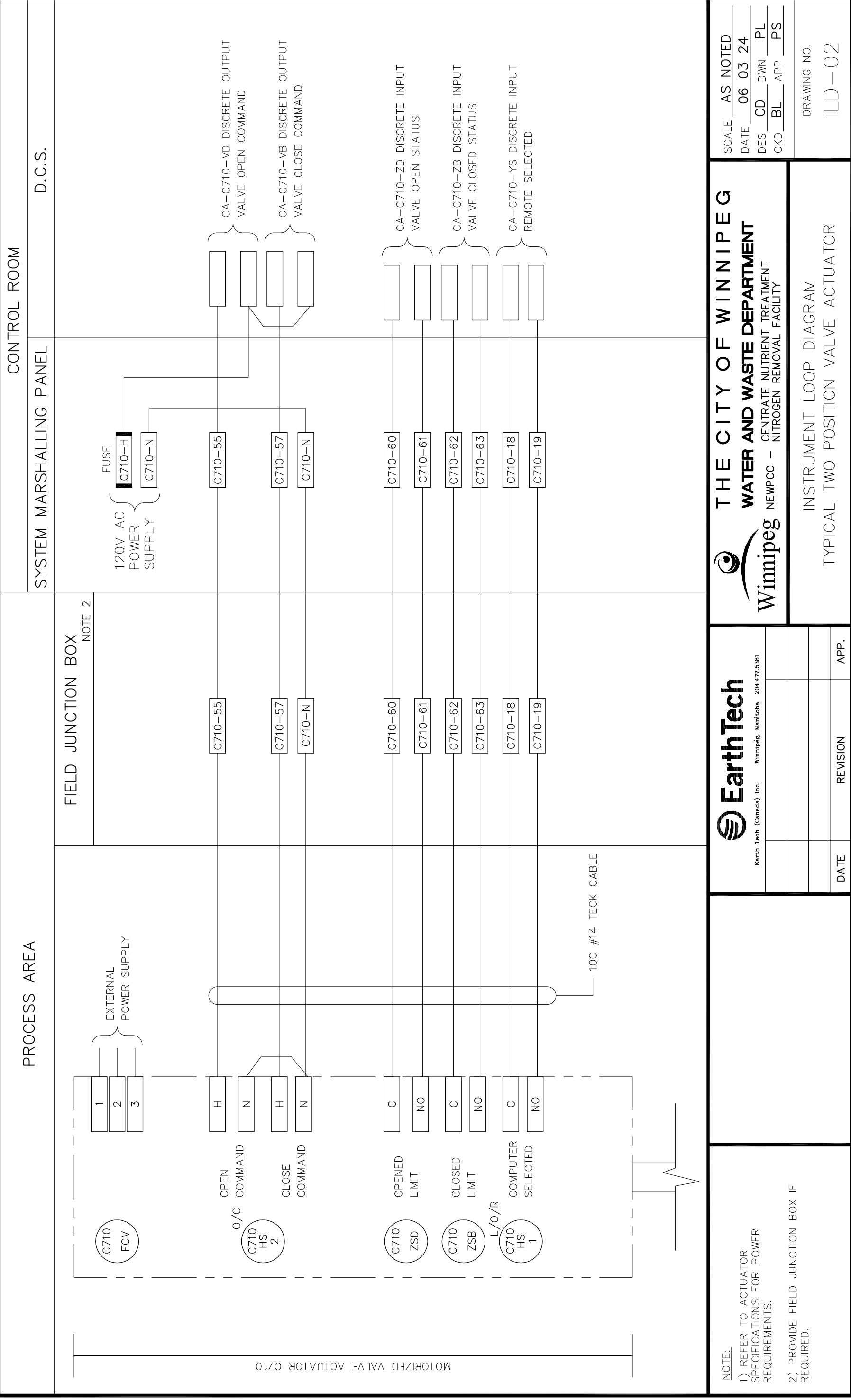
DATE	REVISION	APP.

SCALE AS NOTED
DATE 06 03 24
DES CD DWN PL
CKD BL APP PS
DRAWING NO. ILD-01

NOTE:
1) REFER TO ACTUATOR SPECIFICATIONS FOR POWER REQUIREMENTS.
2) PROVIDE FIELD JUNCTION BOX IF REQUIRED.

INSTRUMENT LOOP DIAGRAM

LOOP NO. C710



PROCESS AREA

FIELD JUNCTION BOX
NOTE 2

SYSTEM MARSHALLING PANEL

CONTROL ROOM

D.C.S.

NOTE:
1) REFER TO ACTUATOR SPECIFICATIONS FOR POWER REQUIREMENTS.
2) PROVIDE FIELD JUNCTION BOX IF REQUIRED.

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DATE	REVISION	APP.

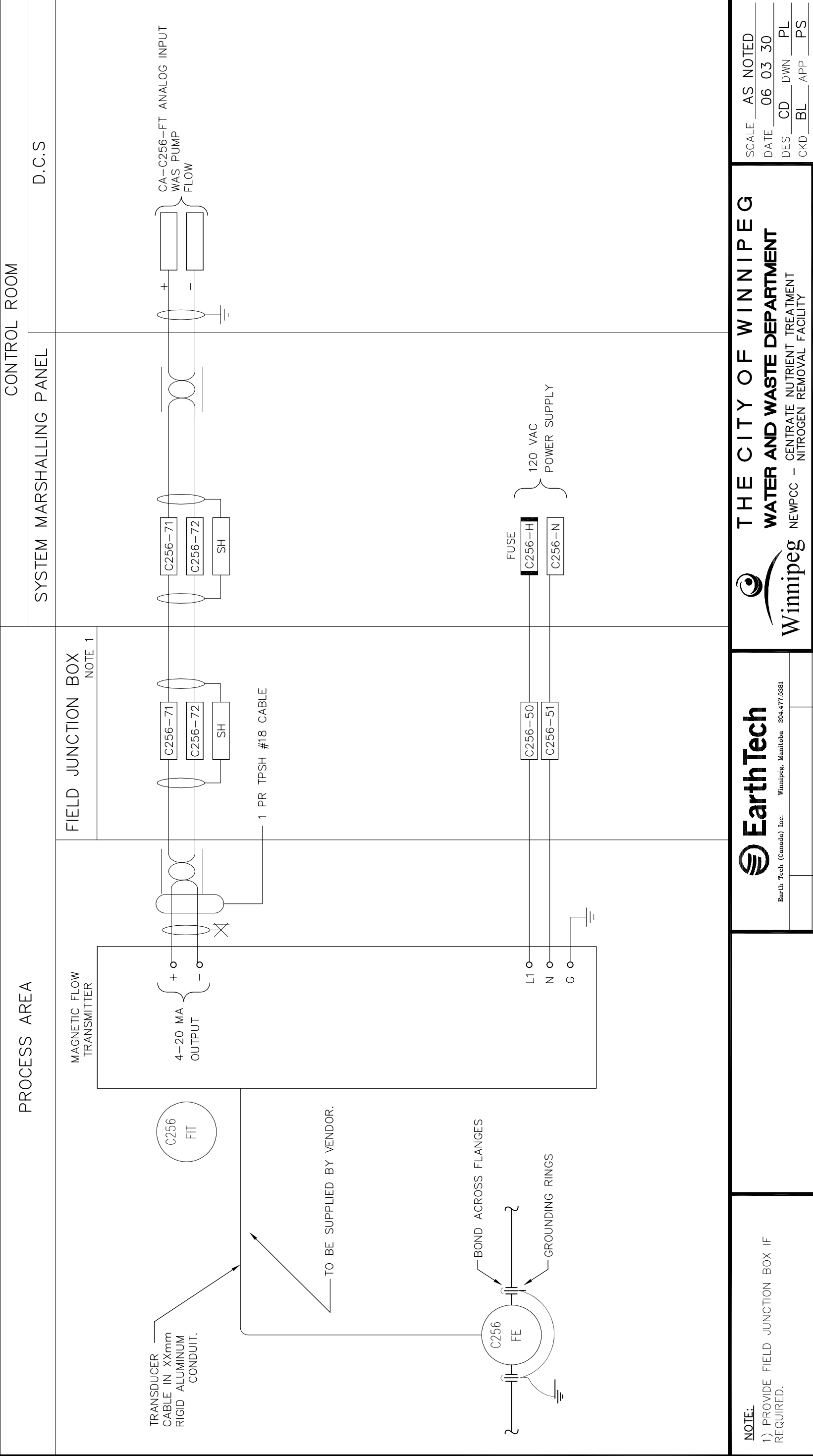
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NITROGEN REMOVAL FACILITY

INSTRUMENT LOOP DIAGRAM
TYPICAL TWO POSITION VALVE ACTUATOR

SCALE AS NOTED
DATE 06 03 24
DES CD DWN PL
CKD BL APP PS
DRAWING NO. ILD-02

INSTRUMENT LOOP DIAGRAM

LOOP NO. C256



NOTE:
1) PROVIDE FIELD JUNCTION BOX IF REQUIRED.

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INSTRUMENT LOOP DIAGRAM
TYPICAL MAGNETIC FLOW METER

SCALE AS NOTED
DATE 06 03 30
DES CD DWN PL
CKD BL APP PS
DRAWING NO.
ILD-03

INSTRUMENT LOOP DIAGRAM

LOOP NO. C645

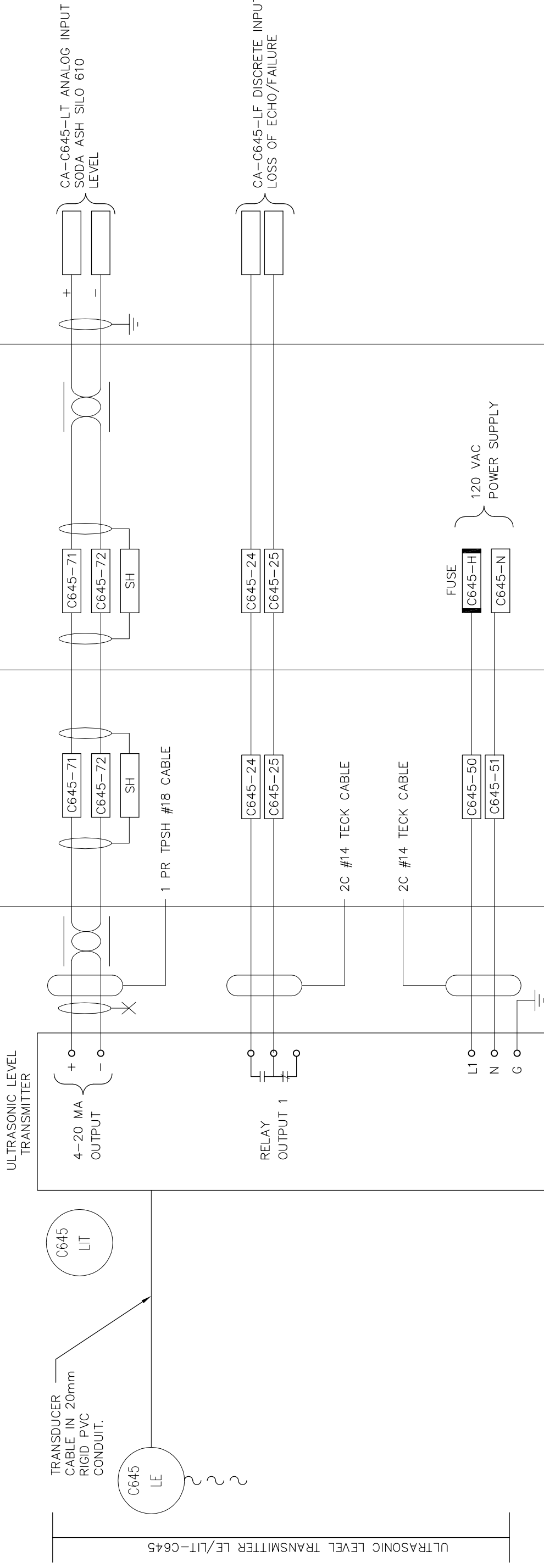
PROCESS AREA

SODA ASH CONTROL PANEL

CONTROL ROOM

SYSTEM MARSHALLING PANEL

D.C.S



NOTE:

- 1) PROVIDE FIELD JUNCTION BOX IF REQUIRED.



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SCALE AS NOTED

DATE 06 03 30

DES CD DWN PL

CKD BL APP PS

INSTRUMENT LOOP DIAGRAM
 TYPICAL LEVEL TRANSMITTER

DRAWING NO.

ILD-04

INSTRUMENT LOOP DIAGRAM

LOOP NO. C005

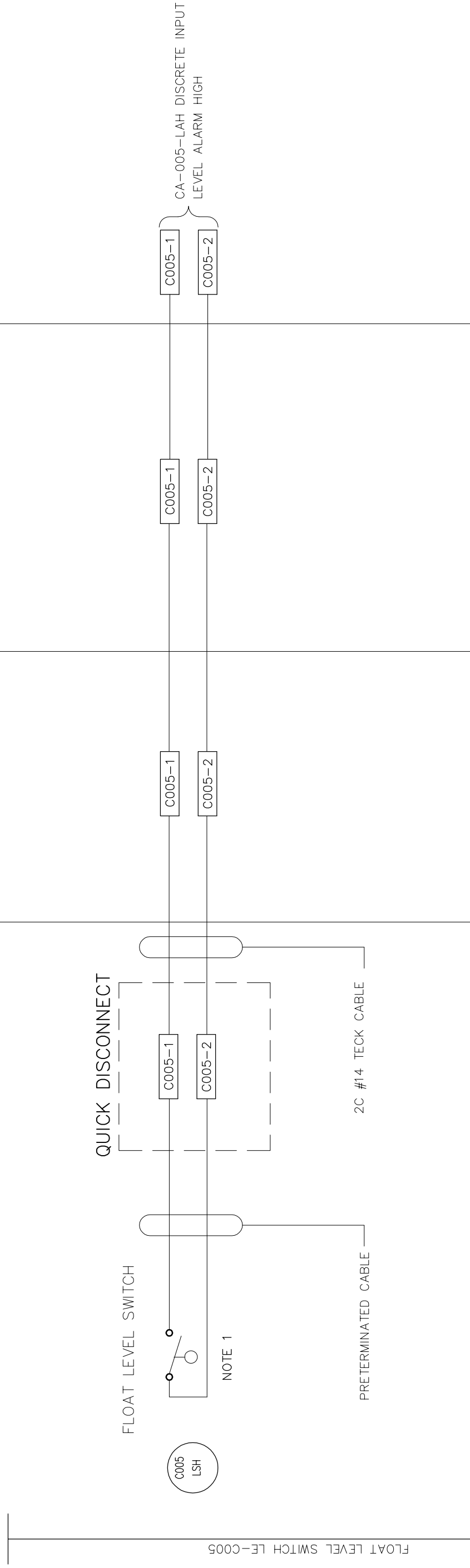
FIELD PROCESS AREA

CONTROL ROOM

SYSTEM MARSHALLING PANEL

D.C.S.

FIELD JUNCTION BOX
NOTE 2



FLOAT LEVEL SWITCH LE-C005

NOTE 1

PRETERMINATED CABLE

2C #14 TECK CABLE

NOTE:

- 1) CONNECT TO "NORMALLY CLOSED" CONTACTS FOR ALARMS AND "NORMALLY OPEN" CONTACTS FOR EQUIPMENT STATUS, ETC.
- 2) PROVIDE FIELD JUNCTION BOX IF REQUIRED.



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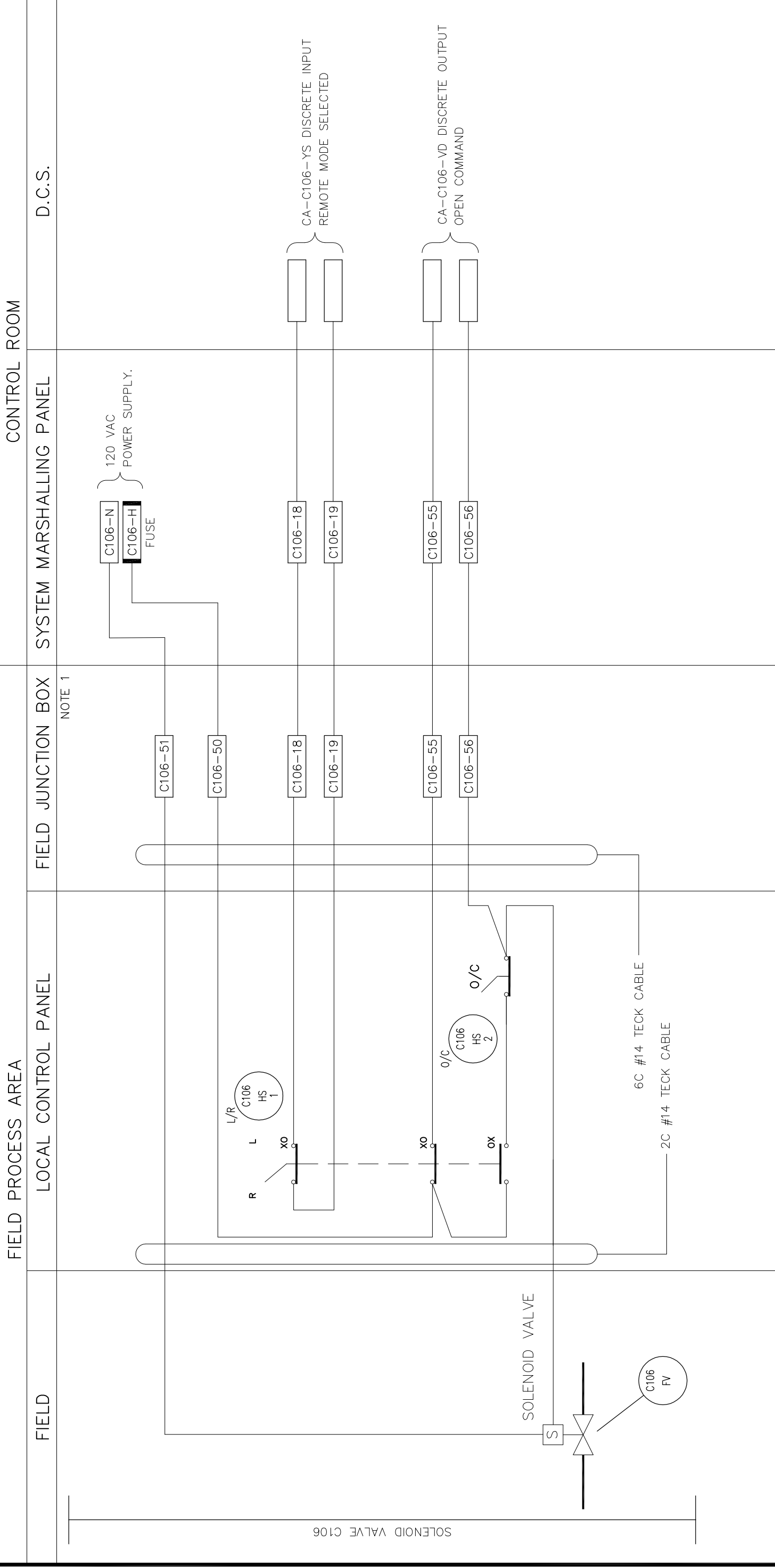
INSTRUMENT LOOP DIAGRAM
TYPICAL FLOAT SWITCH

DRAWING NO.
ILD-05

SCALE AS NOTED
DATE 06 03 24
DES CD DWN PL
CKD BL APP PS

INSTRUMENT LOOP DIAGRAM

LOOP NO. C106



CONTROL ROOM

D.C.S.

SYSTEM MARSHALLING PANEL

FIELD JUNCTION BOX

LOCAL CONTROL PANEL

FIELD

NOTE 1

SOLENOID VALVE C106

NOTE:
1) PROVIDE FIELD JUNCTION BOX IF REQUIRED.

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DATE	REVISION
	APP.

SCALE AS NOTED
 DATE 06 03 30
 DES CD DWN PL
 CKD BL APP PS
 DRAWING NO.
 ILD-06

INSTRUMENT LOOP DIAGRAM
 TYPICAL SOLENOID VALVE

INSTRUMENT LOOP DIAGRAM

LOOP NO. C185

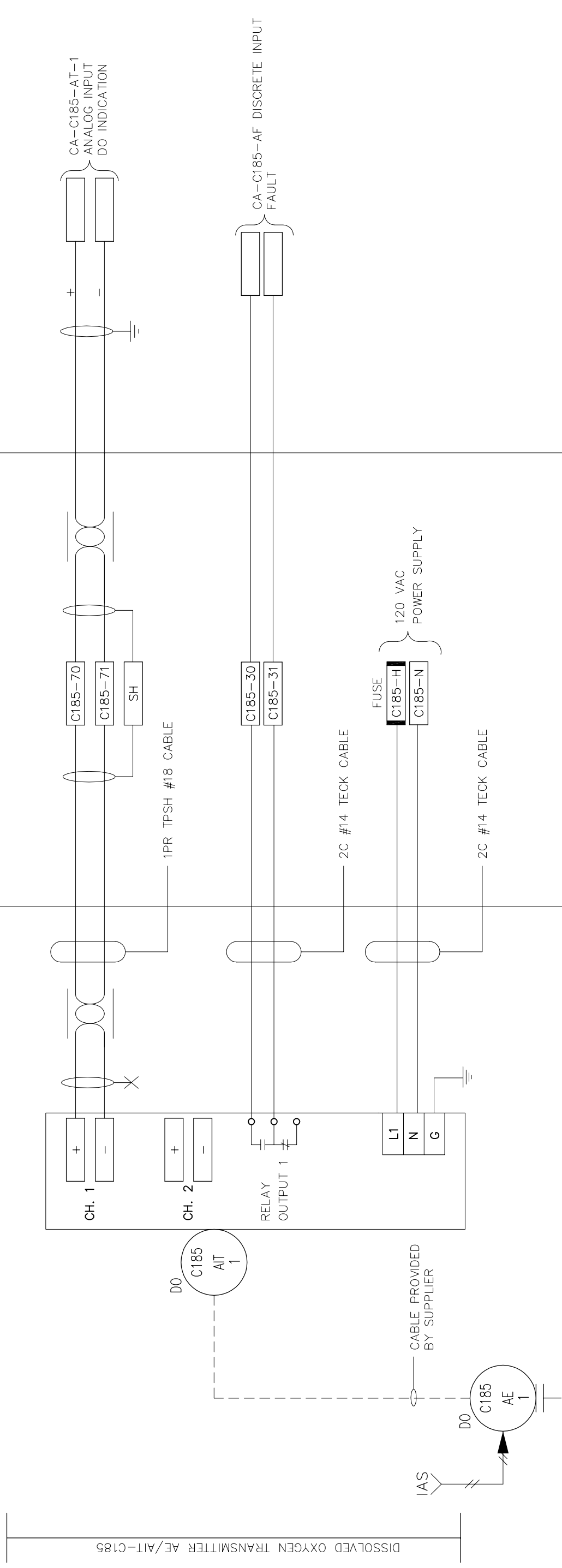
PROCESS AREA

CONTROL ROOM

NOTE 1

SYSTEM MARSHALLING PANEL

D.C.S.



NOTE:

- 1) PROVIDE FIELD JUNCTION BOX IF REQUIRED.



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INSTRUMENT LOOP DIAGRAM
TYPICAL DISSOLVED OXYGEN TRANSMITTER

SCALE AS NOTED
DATE 06 03 30
DES BL DWN CD
CKD BL APP PS
DRAWING NO.
ILD-07

DATE REVISION APP.

INSTRUMENT LOOP DIAGRAM

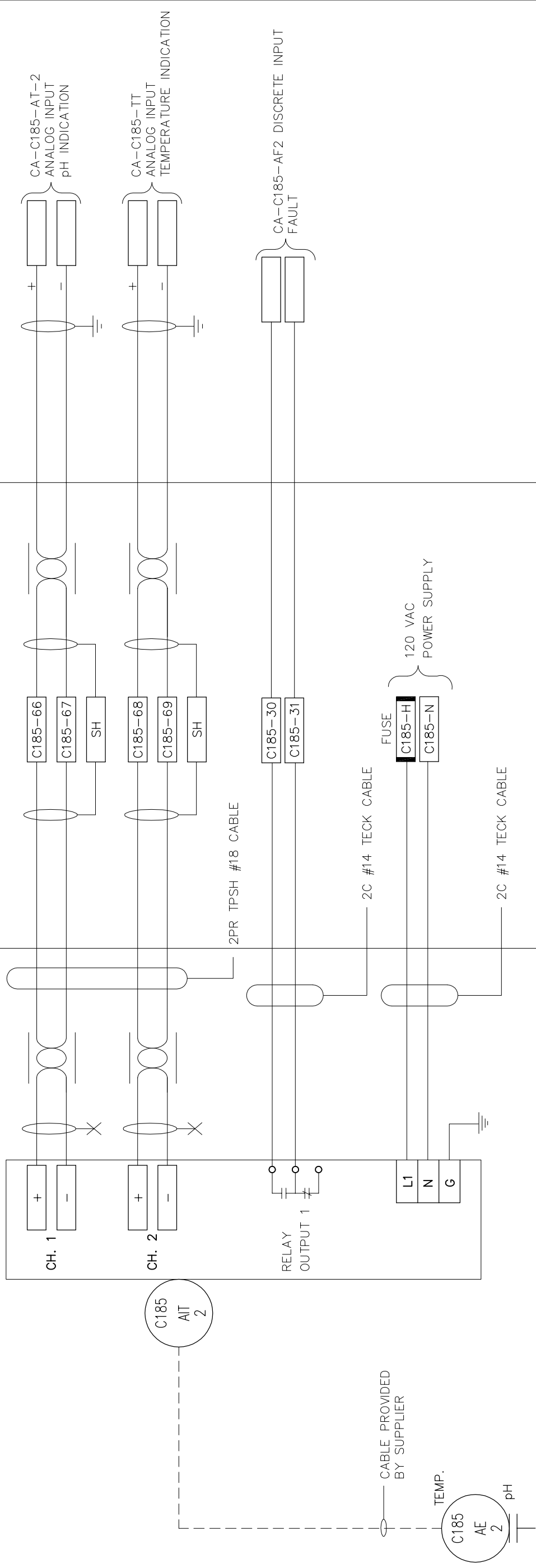
LOOP NO. C185

PROCESS AREA NOTE 1

CONTROL ROOM

SYSTEM MARSHALLING PANEL

D.C.S.



NOTE:
1) PROVIDE FIELD JUNCTION BOX IF REQUIRED.



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INSTRUMENT LOOP DIAGRAM
TYPICAL pH TRANSMITTER

SCALE AS NOTED
DATE 06 03 30
DES BL DWN CD
CKD PS APP
DRAWING NO.
ILD-08

DATE	REVISION	APP.

INSTRUMENT LOOP DIAGRAM

LOOP NO. C500

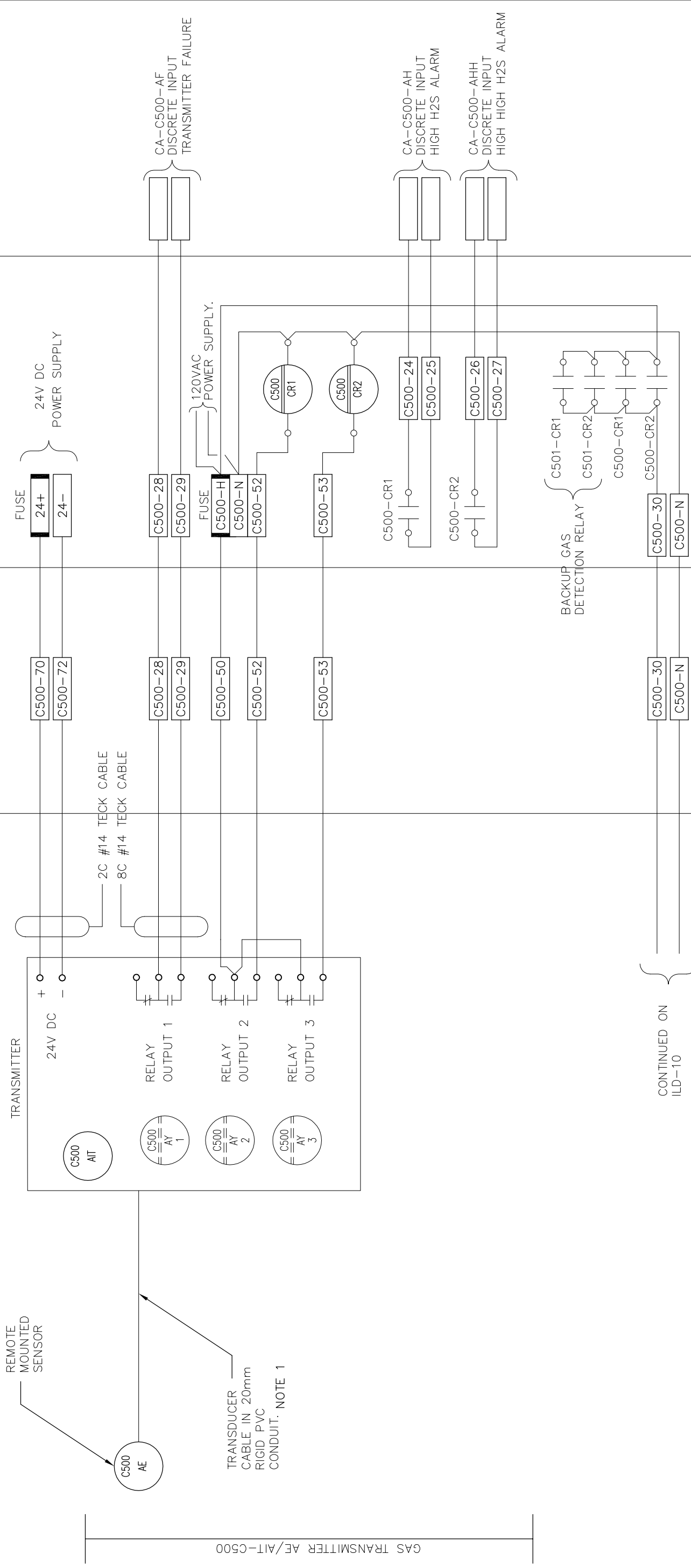
EXHAUST FAN BUILDING

FIELD JUNCTION BOX
NOTE 2

MARSHALLING PANEL

CONTROL ROOM

D.C.S



GAS TRANSMITTER AE/AIT-C500

TRANSUDUCER CABLE IN 20mm RIGID PVC CONDUIT. NOTE 1

REMOTE MOUNTED SENSOR

NOTE:

- 1) TRANSDUCER CABLE TO MEET MANUFACTURER'S RECOMMENDATION.
- 2) PROVIDE FIELD JUNCTION BOX IF REQUIRED.



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INSTRUMENT LOOP DIAGRAM
TYPICAL GAS DETECTION TRANSMITTER

SCALE AS NOTED
DATE 06 03 24
DES CD DWN PL
CKD BL APP PS
DRAWING NO. ILD-09

DATE	REVISION	APP.

INSTRUMENT LOOP DIAGRAM

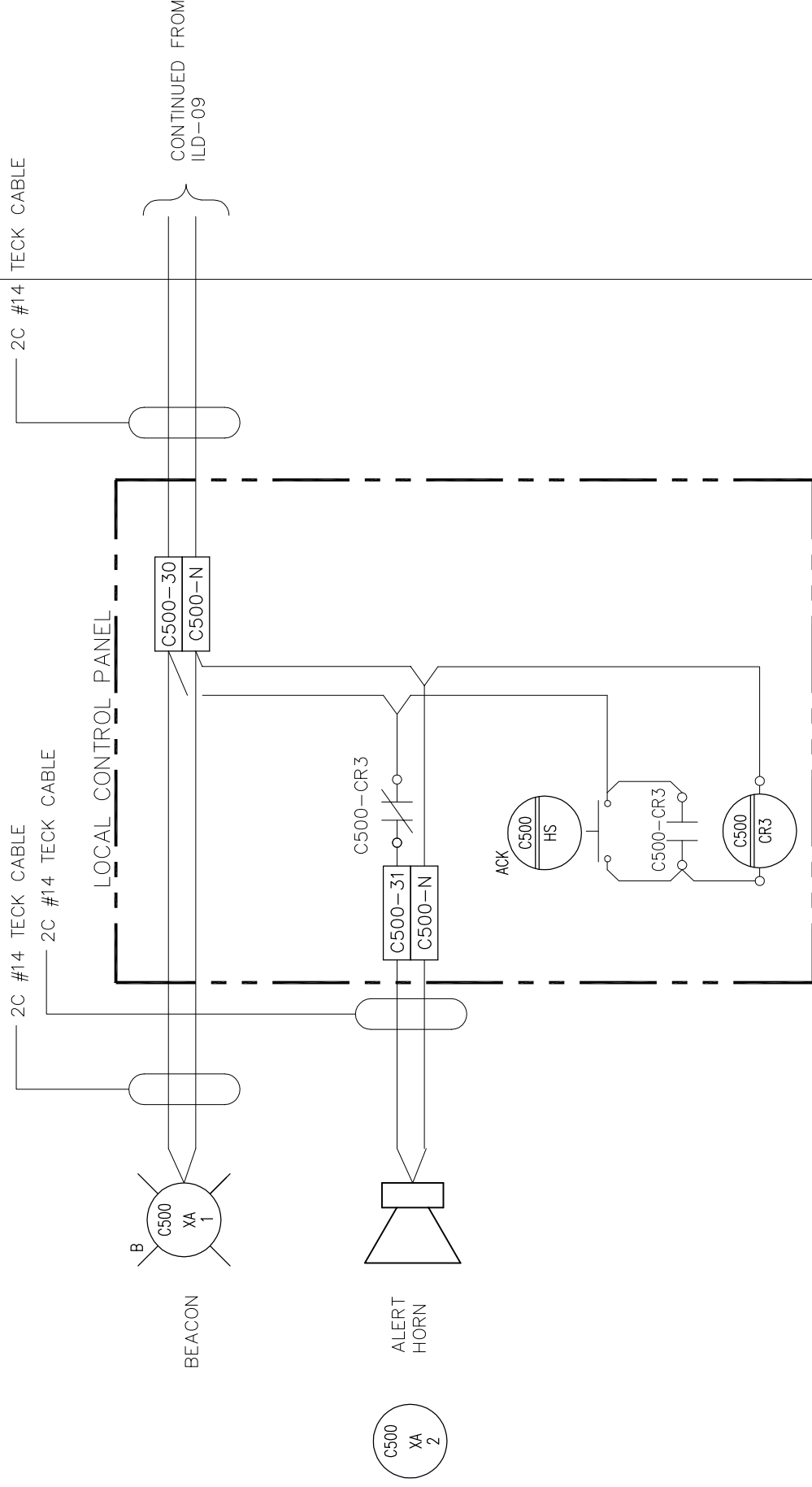
LOOP NO. C500

EXHAUST FAN BUILDING

CONTROL ROOM

FIELD JUNCTION BOX

D.C.S



NOTE:

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ILD-TYP50

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INSTRUMENT LOOP DIAGRAM
 TYPICAL HORN & BEACON

DRAWING NO.
 ILD-10

SCALE AS NOTED
 DATE 06 03 24
 DES CD DWN PL
 CKD BL APP

INSTRUMENT LOOP DIAGRAM

LOOP NO. C910, 911

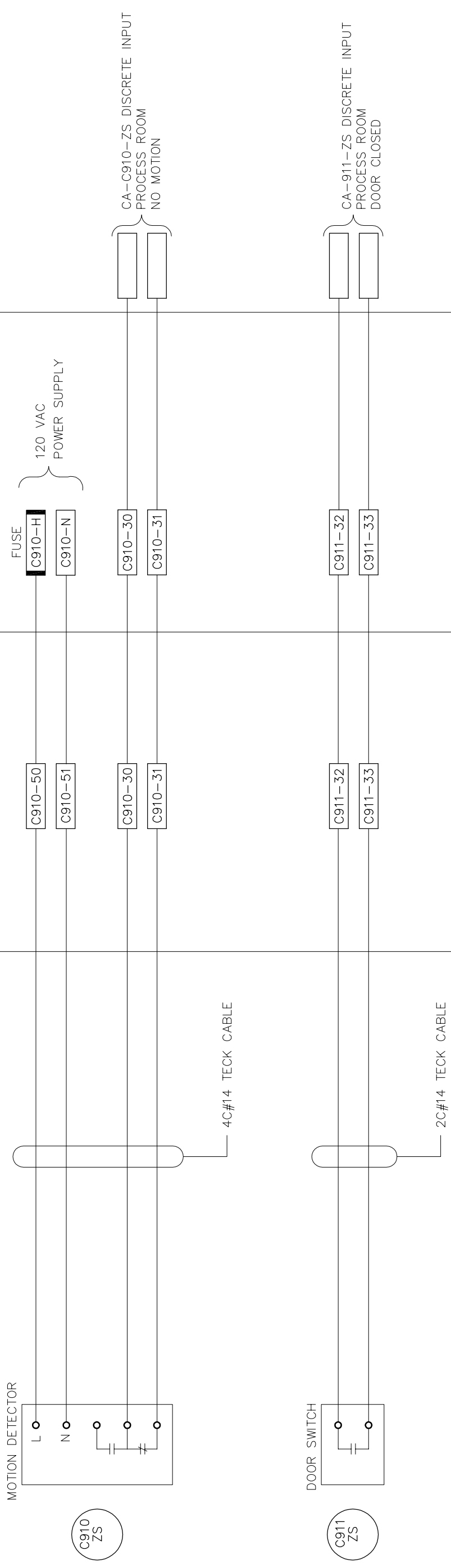
PROCESS AREA

FIELD JUNCTION BOX NOTE 2

CONTROL ROOM

SYSTEM MARSHALLING PANEL

D.C.S



NOTE:
 1) CONNECT TO "NORMALLY CLOSED" CONTACTS FOR ALARMS AND "NORMALLY OPEN" CONTACTS FOR EQUIPMENT STATUS, ETC.

2) PROVIDE FIELD JUNCTION BOX IF REQUIRED.

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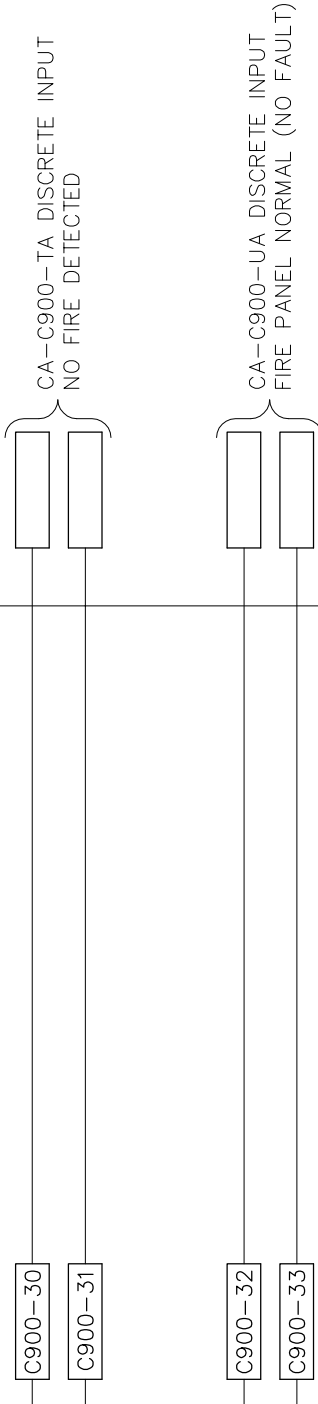
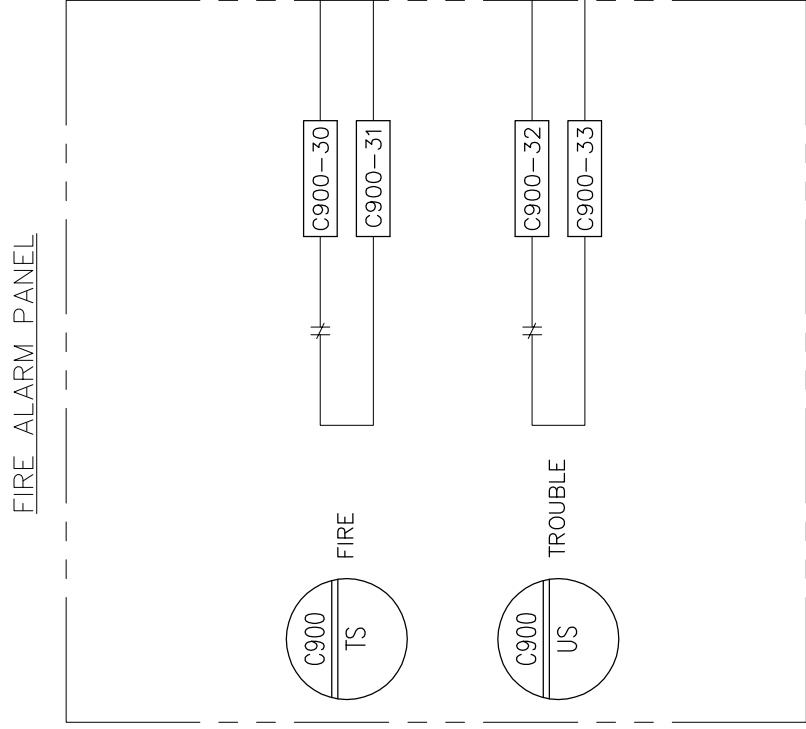
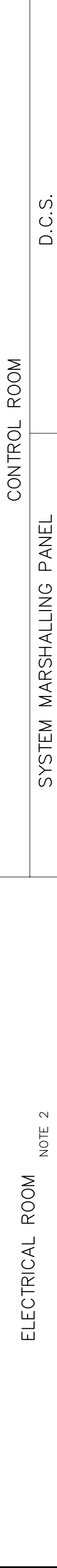
SCALE AS NOTED
 DATE 06 03 24
 DES CD DWN PL
 CKD BL APP PS

INSTRUMENT LOOP DIAGRAM
 TYPICAL INTRUSION ALARMS

DRAWING NO.
 ILLD-11

INSTRUMENT LOOP DIAGRAM

LOOP NO. C900



NOTE:
 1) CONNECT TO "NORMALLY CLOSED" CONTACTS FOR ALARMS AND "NORMALLY OPEN" CONTACTS FOR EQUIPMENT STATUS, ETC.

2) PROVIDE FIELD JUNCTION BOX IF REQUIRED.



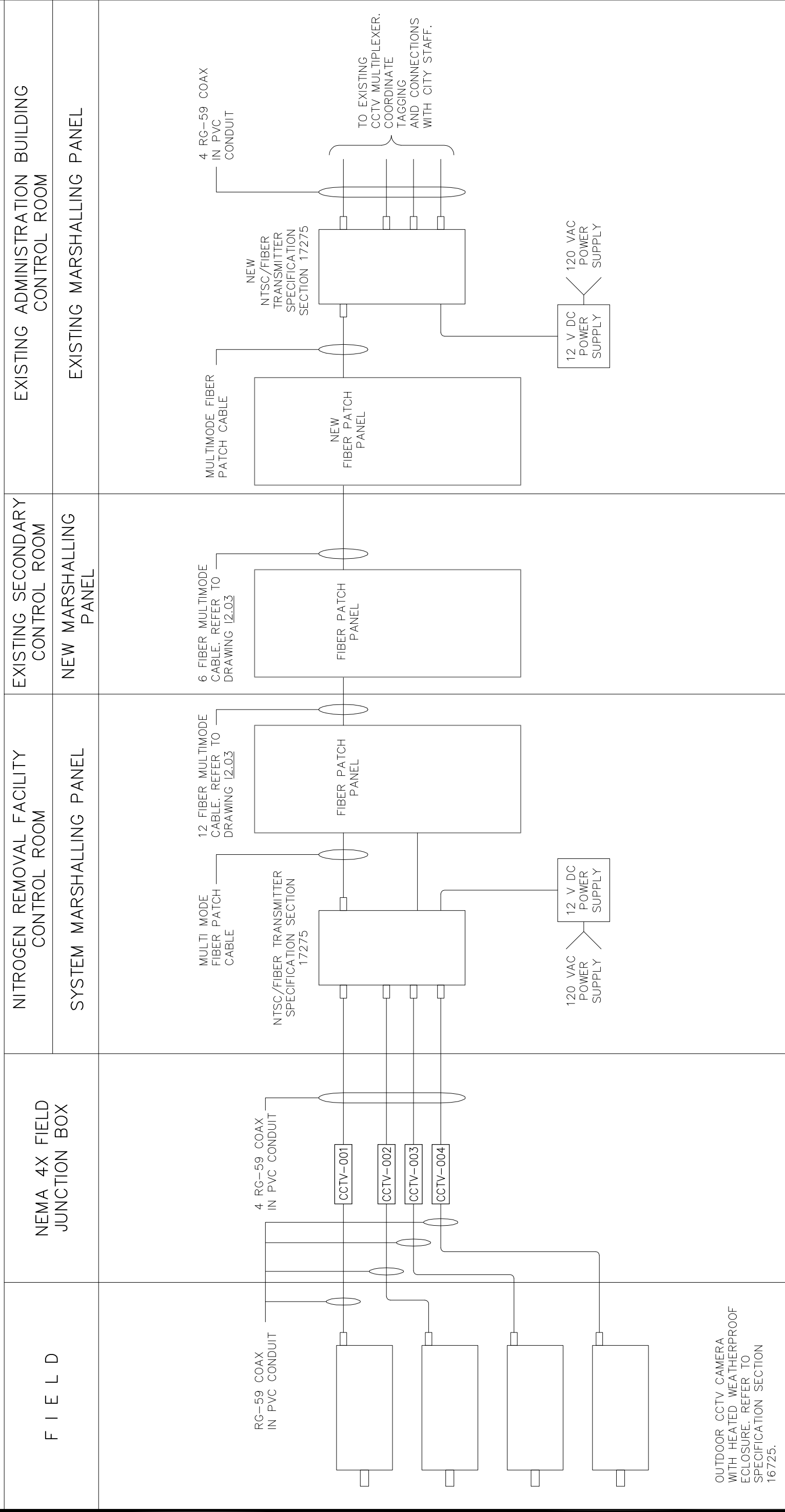
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INSTRUMENT LOOP DIAGRAM
 FIRE ALARM PANEL

SCALE AS NOTED
 DATE 06 03 30
 DES CD DWN PL
 CKD BL APP PS
 DRAWING NO.
 ILD-12

DATE	REVISION	APP.

INSTRUMENT LOOP DIAGRAM



OUTDOOR CCTV CAMERA WITH HEATED WEATHERPROOF ENCLOSURE. REFER TO SPECIFICATION SECTION 16725.

NOTE:

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INSTRUMENT LOOP DIAGRAM
 TYPICAL CCTV CAMERA

SCALE AS NOTED
 DATE 06 04 20
 DES CD DWN PL
 CKD BL APP PS
 DRAWING NO.
 ILLD-13

INSTRUMENT LOOP DIAGRAM

LOOP NO. C005

PROCESS AREA

CONTROL ROOM

NOTE 1

SYSTEM MARSHALLING PANEL

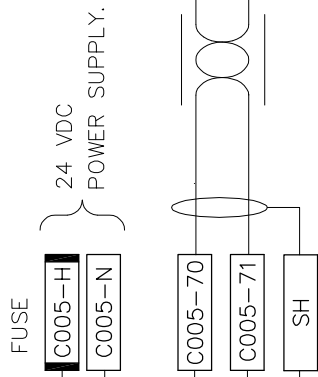
D.C.S.

FIELD JUNCTION BOX



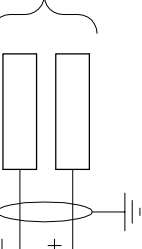
PRETERMINATED CABLE
SUPPLIED WITH INSTRUMENT

C005
LT



FUSE
C005-H
C005-N

24 VDC
POWER SUPPLY.



CA-C005-LT
ANALOG INPUT
LIQUID LEVEL

1PR TPSH #18 CABLE

NOTE:

- 1) PROVIDE FIELD JUNCTION BOX IF REQUIRED.



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SCALE AS NOTED
DATE 06 03 30
DES CD DWN PL
CKD BL APP PS

INSTRUMENT LOOP DIAGRAM
TYPICAL SUBMERSIBLE LEVEL TRANSMITTER

DRAWING NO.
ILD-14

INSTRUMENT LOOP DIAGRAM

LOOP NO. C410

PROCESS AREA

NOTE 1

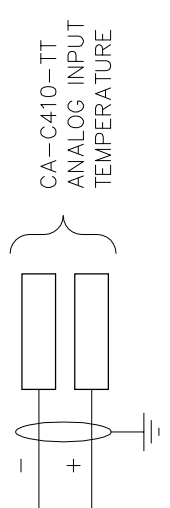
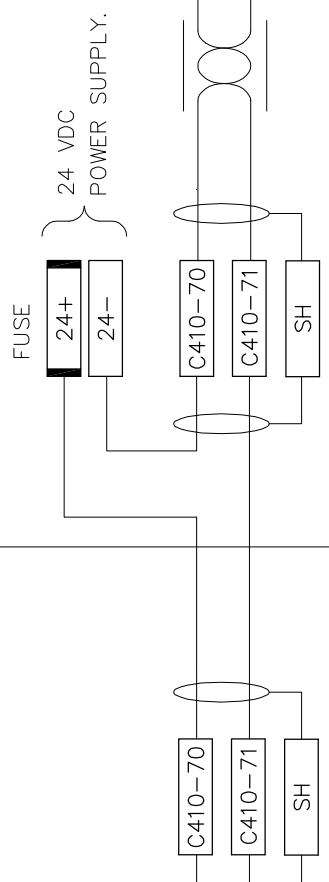
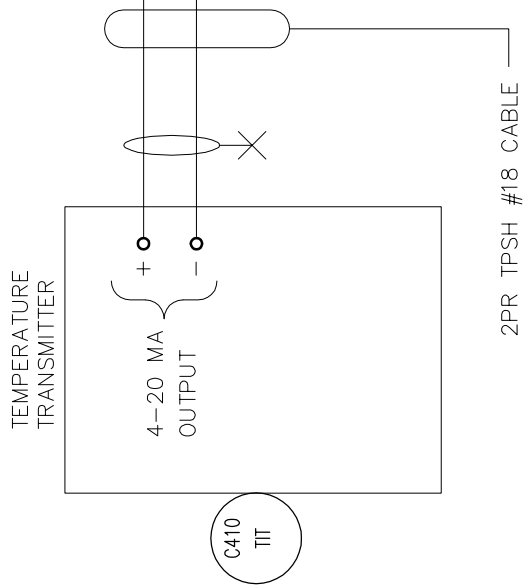
CONTROL ROOM

FIELD JUNCTION BOX

SYSTEM MARSHALLING PANEL

D.C.S.

TEMPERATURE TRANSMITTER C410



NOTE:

- 1) PROVIDE FIELD JUNCTION IF REQUIRED.



DATE	REVISION	APP.

INSTRUMENT LOOP DIAGRAM
TYPICAL TEMPERATURE TRANSMITTER

SCALE AS NOTED
DATE 06 03 30
DES CD DWN PL
CKD BL APP PS
DRAWING NO.
ILD-15

INSTRUMENT LOOP DIAGRAM

LOOP NO. C410

PROCESS AREA

BLOWER PANEL

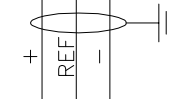
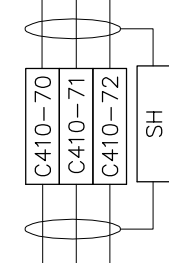
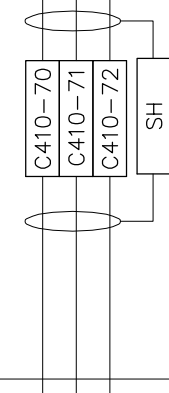
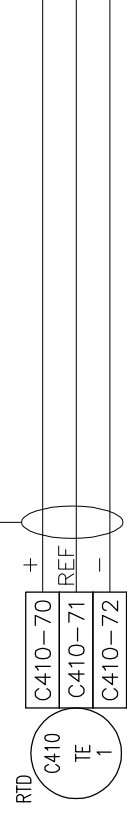
SYSTEM MARSHALLING PANEL

CONTROL ROOM

D.C.S.



3 CONDUCTOR, TWISTED & SHIELDED
IN CONDUIT



CA-C410-TE1
RTD ANALOG INPUT
TEMPERATURE

NOTE:

- 1) PROVIDE FIELD JUNCTION BOX IF REQUIRED.

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INSTRUMENT LOOP DIAGRAM
TYPICAL RTD SENSOR

DRAWING NO.
ILD-16

SCALE AS NOTED
DATE 06 03 30
DES CD DWN PL
CKD BL APP PS

DATE	REVISION	APP.

INSTRUMENT LOOP DIAGRAM

LOOP NO. C410

PROCESS AREA

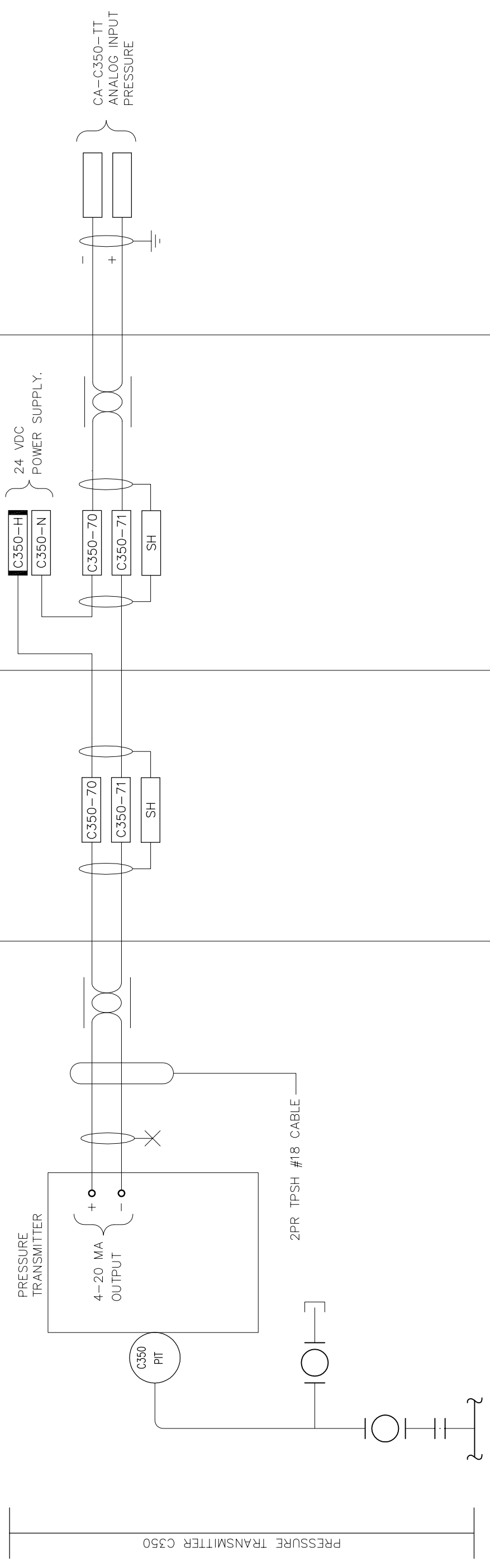
NOTE 1

CONTROL ROOM

FIELD JUNCTION BOX

SYSTEM MARSHALLING PANEL

D.C.S.



NOTE:

- 1) PROVIDE FIELD JUNCTION BOX IF REQUIRED.

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INSTRUMENT LOOP DIAGRAM
 TYPICAL PRESSURE TRANSMITTER

SCALE AS NOTED
 DATE 06 03 30
 DES CD DWN PL
 CKD BL APP PS
 DRAWING NO.
 ILLD-17

INSTRUMENT LOOP DIAGRAM

LOOP NO. C300

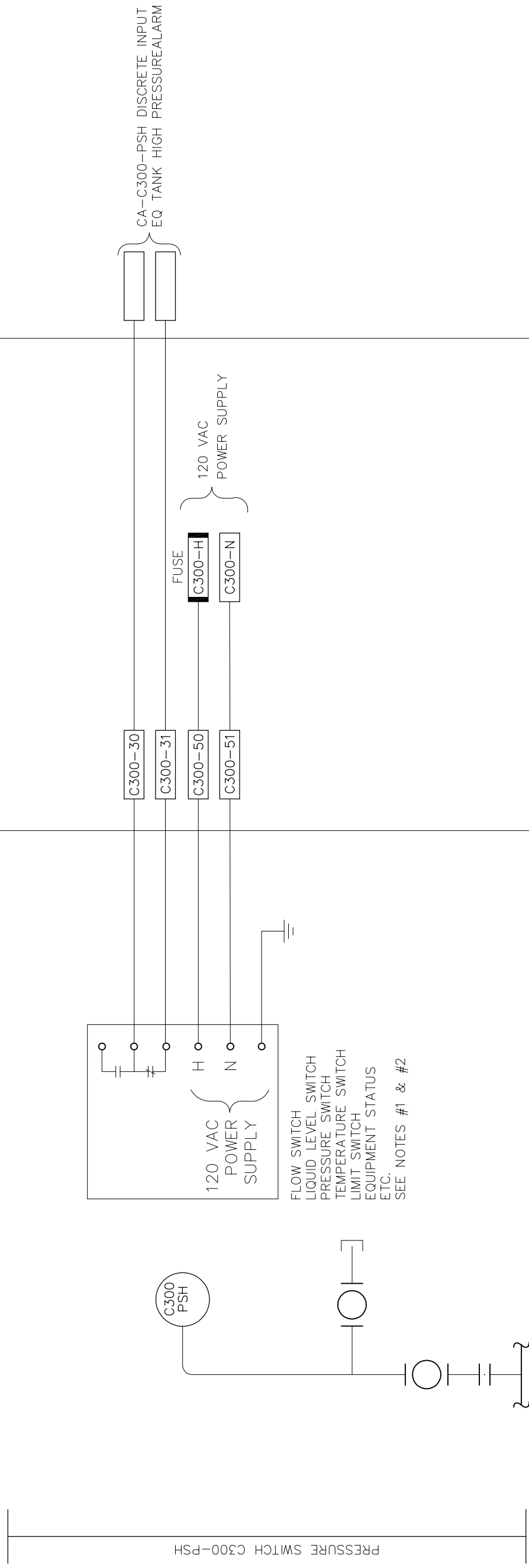
PROCESS AREA

CONTROL ROOM

NOTE 3

SYSTEM MARSHALLING PANEL

D.C.S.



NOTE:

- 1) CONNECT TO "NORMALLY CLOSED" CONTACTS FOR ALARMS AND "NORMALLY OPEN" CONTACTS FOR EQUIPMENT STATUS, ETC.

- 2) POWER SUPPLY APPLICABLE TO SWITCHES REQUIRING 120 VAC EXTERNAL SUPPLY.
- 3) PROVIDE FIELD JUNCTION BOX IF REQUIRED.



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INSTRUMENT LOOP DIAGRAM
 TYPICAL PROCESS VARIABLE SWITCH

SCALE AS NOTED
 DATE 06 04 18
 DES CD DWN PL
 CKD BL APP PS
 DRAWING NO.
 ILD-18

DATE	REVISION	APP.

INSTRUMENT LOOP DIAGRAM

LOOP NO. C410

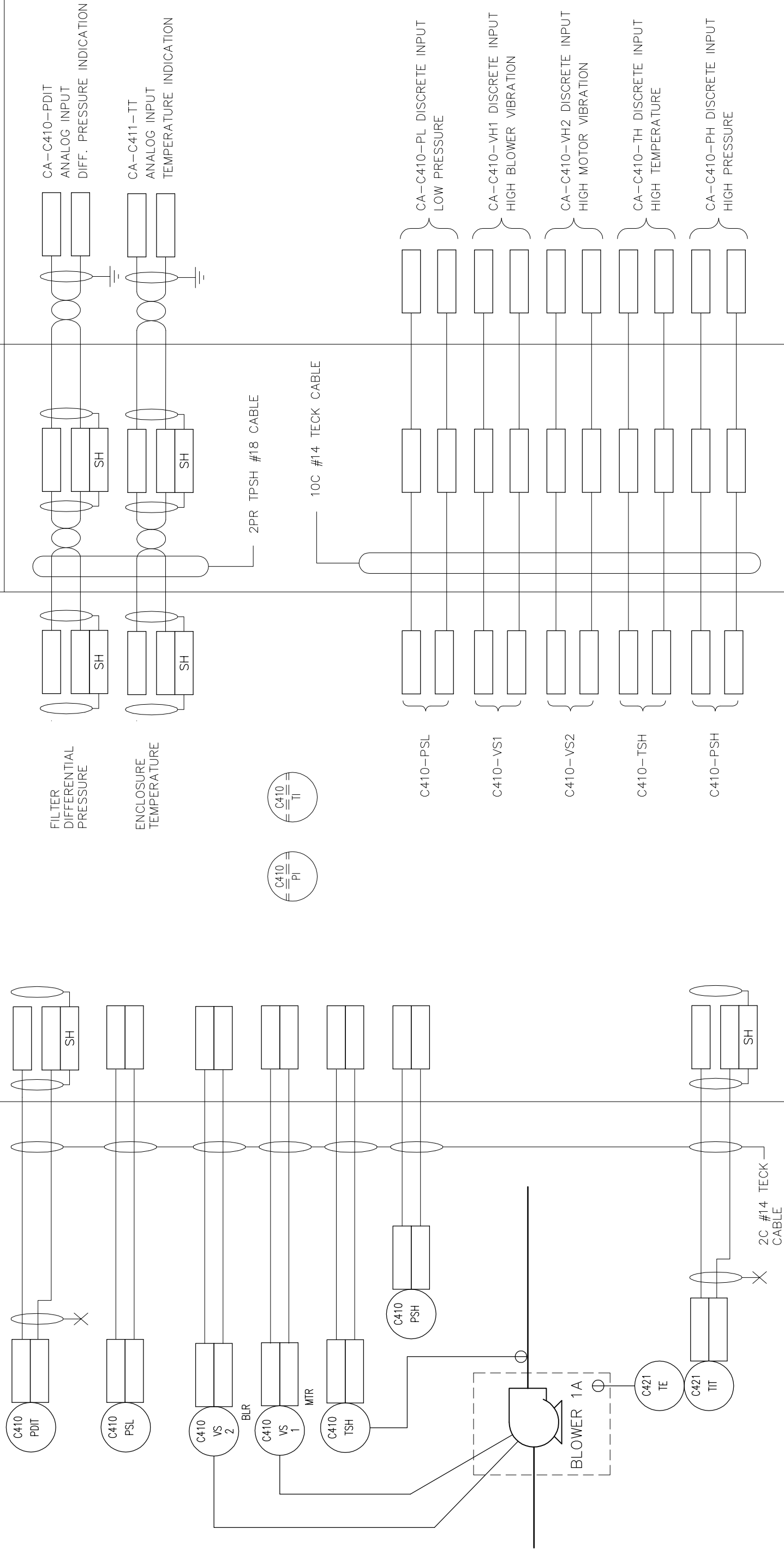
PROCESS AREA - BLOWER ROOM

BLOWER PANEL

CONTROL ROOM

NOTE 4

D.C.S.



- NOTE:
- 1) EACH BLOWER COMES WITH A VFD. PLEASE REFER TYPICAL VFD ILD FOR INSTRUMENTATION AND I/O REQUIREMENTS.
 - 2) REFER TO ILD-16 FOR RTD WIRING. EACH BLOWER HAS 8 RTD SENSORS.

- 3) REFER TO VENDOR SHOP DRAWINGS FOR EXACT WIRING AND I/O REQUIREMENTS.
- 4) PROVIDE FIELD JUNCTION BOX IF REQUIRED.

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DATE	REVISION
	APP.

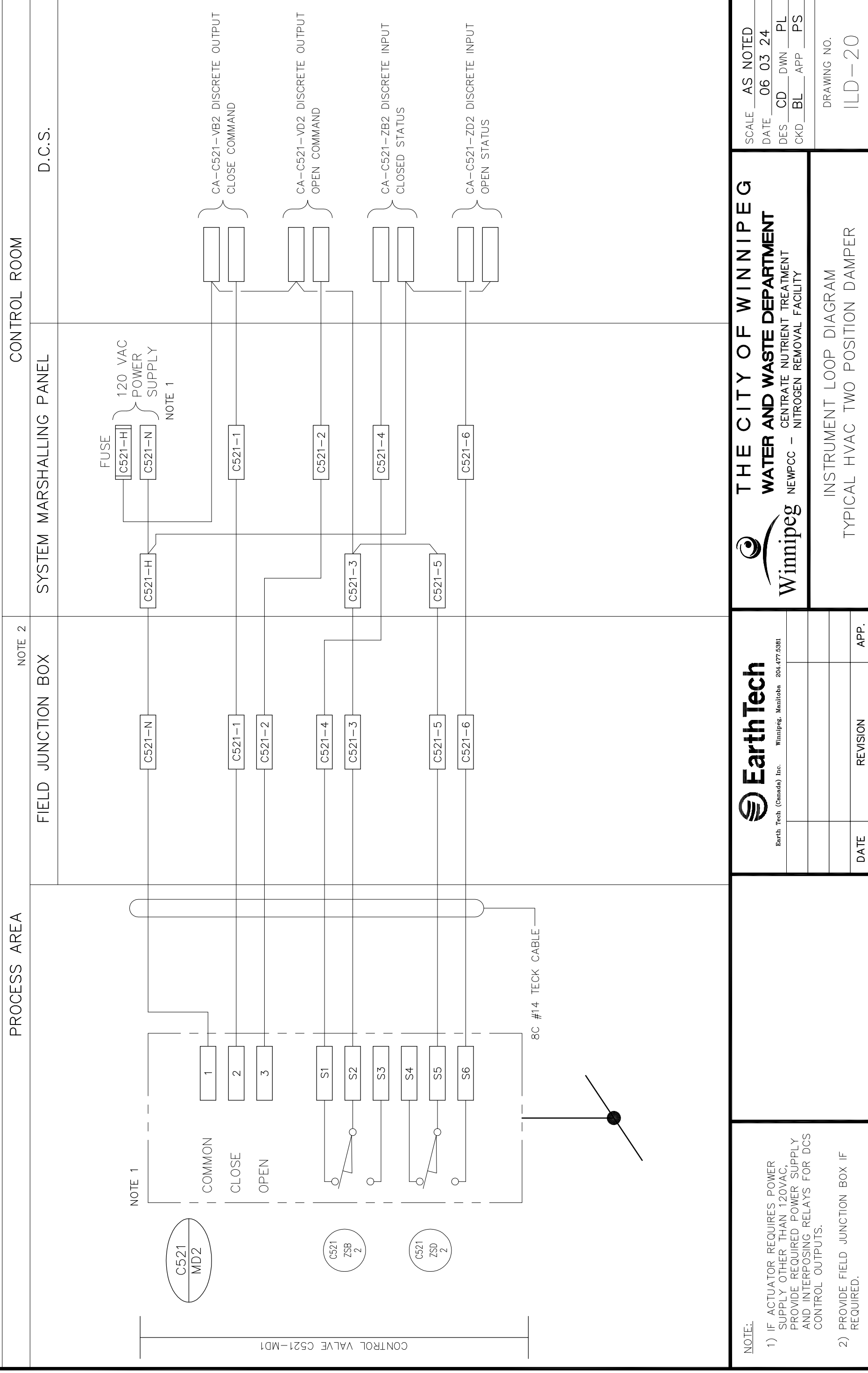
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 - NITROGEN REMOVAL FACILITY

INSTRUMENT LOOP DIAGRAM
TYPICAL BLOWER PANEL

SCALE	AS NOTED
DATE	06 03 24
DES	CD DWN PL
CKD	BL APP PS
DRAWING NO.	ILD-19

INSTRUMENT LOOP DIAGRAM

LOOP NO. C521



SCALE AS NOTED
 DATE 06 03 24
 DES CD DWN PL
 CKD BL APP PS
 DRAWING NO. ILD-20

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INSTRUMENT LOOP DIAGRAM
 TYPICAL HVAC TWO POSITION DAMPER

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DATE	REVISION
	APP.

NOTE:

- IF ACTUATOR REQUIRES POWER SUPPLY OTHER THAN 120VAC, PROVIDE REQUIRED POWER SUPPLY AND INTERPOSING RELAYS FOR DCS CONTROL OUTPUTS.
- PROVIDE FIELD JUNCTION BOX IF REQUIRED.

INSTRUMENT LOOP DIAGRAM

LOOP NO. C521

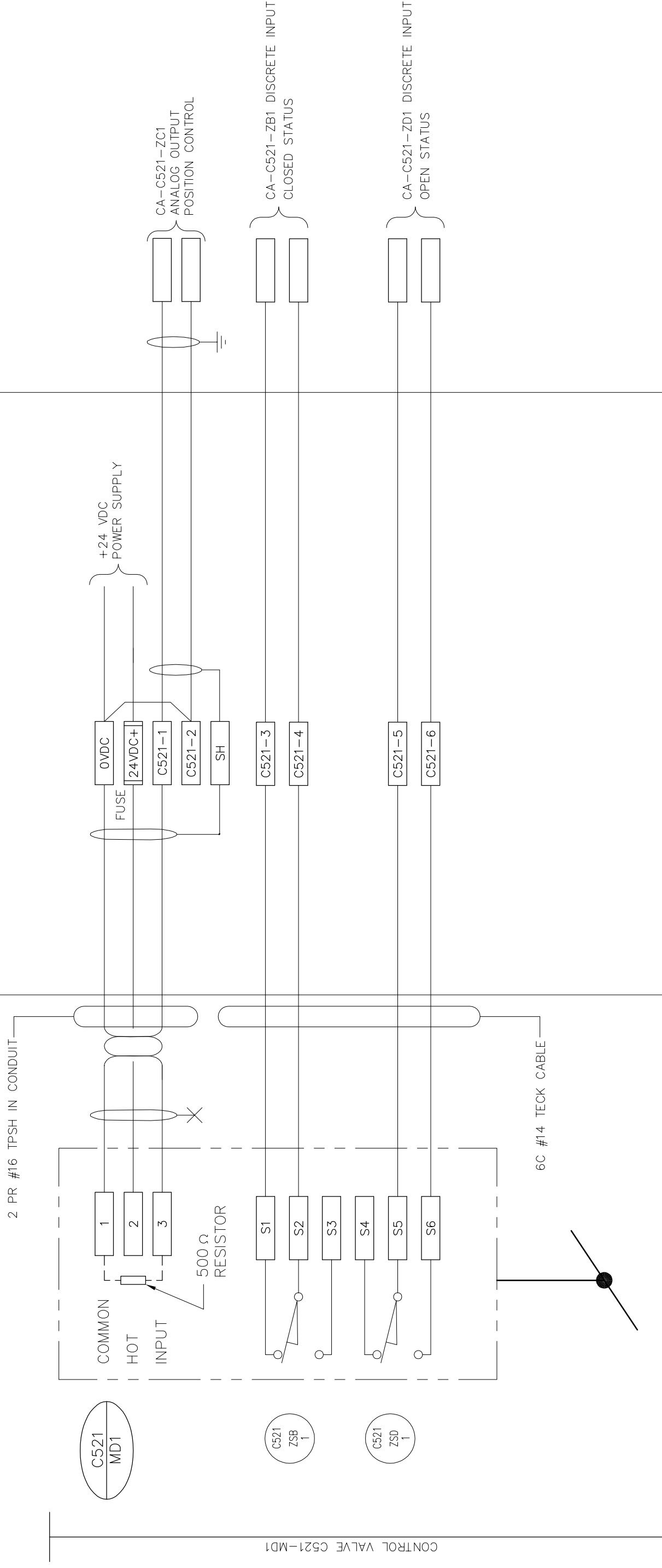
PROCESS AREA

CONTROL ROOM

NOTE 1

SYSTEM MARSHALLING PANEL

D.C.S.



NOTE:

- 1) PROVIDE FIELD JUNCTION BOX IF REQUIRED.



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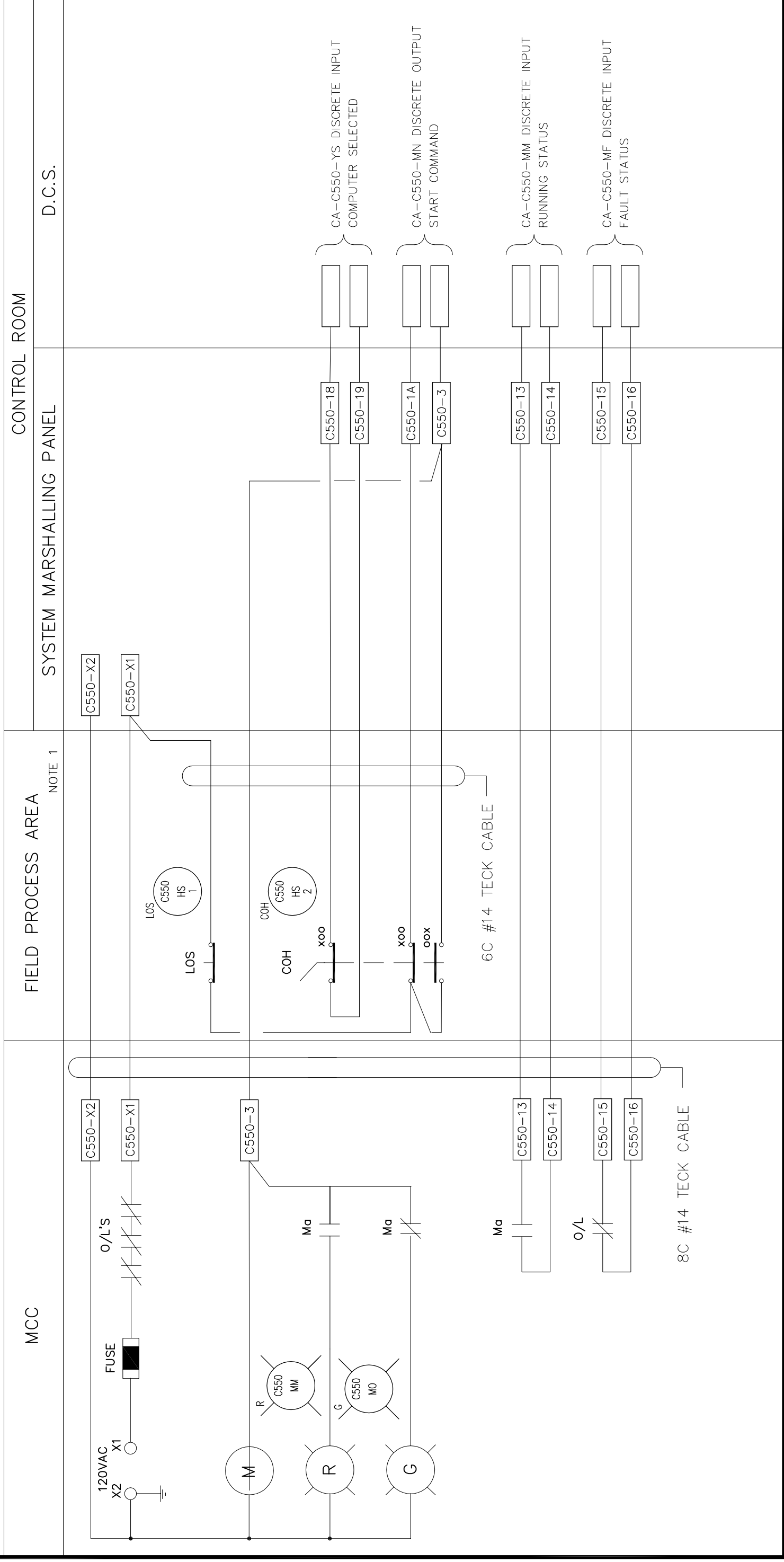
INSTRUMENT LOOP DIAGRAM
 HVAC MODULATING CONTROL VALVE

SCALE AS NOTED
 DATE 06 03 24
 DES CD DWN PL
 CKD BL APP PS
 DRAWING NO.
 ILD-21

DATE REVISION APP.

INSTRUMENT LOOP DIAGRAM

LOOP NO. C550



MCC

FIELD PROCESS AREA

CONTROL ROOM

SYSTEM MARSHALLING PANEL

D.C.S.

NOTE 1

NOTE:

- 1) PROVIDE FIELD JUNCTION BOX IF REQUIRED.



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INSTRUMENT LOOP DIAGRAM
 TYPICAL HVAC FAN STARTER

DRAWING NO.
 ILD-22

SCALE AS NOTED
 DATE 06 03 24
 DES CD DWN PL
 CKD BL APP PS

DATE REVISION APP.

INSTRUMENT LOOP DIAGRAM

LOOP NO. C521

PROCESS AREA

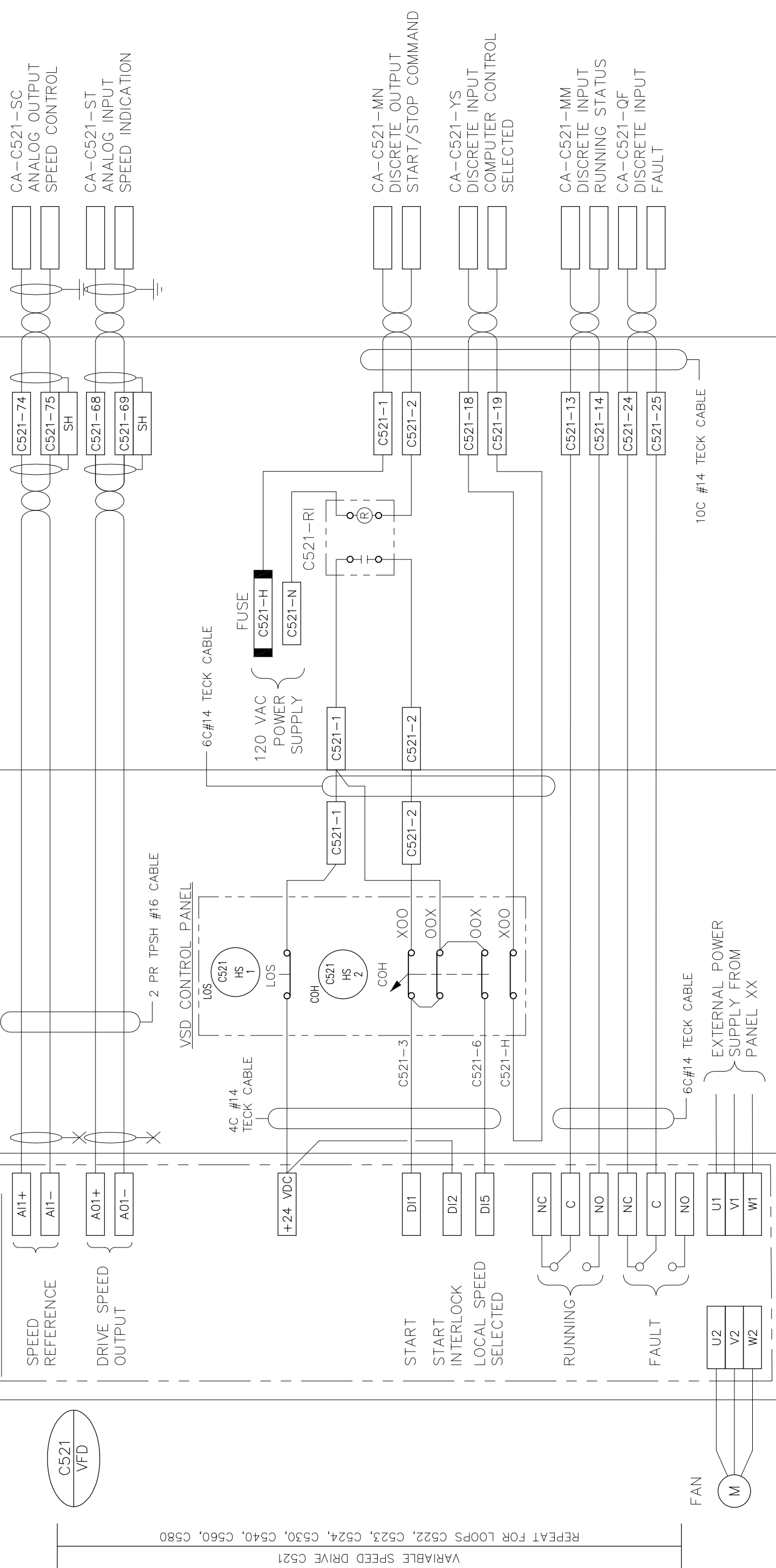
ELECTRICAL ROOM

LOCAL CONTROL STATION

CONTROL ROOM

SYSTEM MARSHALLING PANEL

D.C.S.



NOTE:

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 NITROGEN REMOVAL FACILITY

INSTRUMENT LOOP DIAGRAM
 TYPICAL HVAC VARIABLE SPEED DRIVE

SCALE AS NOTED
 DATE 06 03 24
 DES CD DWN PL
 CKD BL APP PS
 DRAWING NO.
 ILD-23

INSTRUMENT LOOP DIAGRAM

LOOP NO. C551

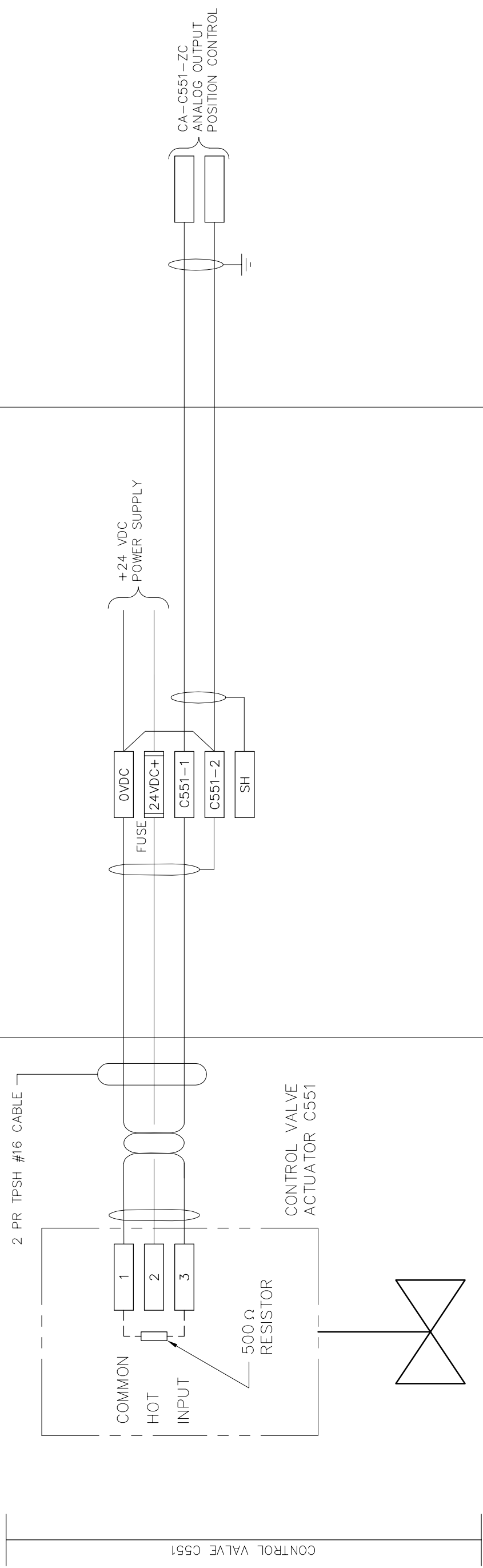
NOTE 1

PROCESS AREA

CONTROL ROOM

SYSTEM MARSHALLING PANEL

D.C.S.



NOTE:

- 1) PROVIDE FIELD JUNCTION BOX IF REQUIRED.



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INSTRUMENT LOOP DIAGRAM
 HVAC HEATER/CHILLER CONTROL VALVE

SCALE AS NOTED
 DATE 06 03 24
 DES CD DWN PL
 CKD BL APP PS

DRAWING NO.
 ILD-24

DATE	REVISION	APP.

INSTRUMENT LOOP DIAGRAM

LOOP NO. C550

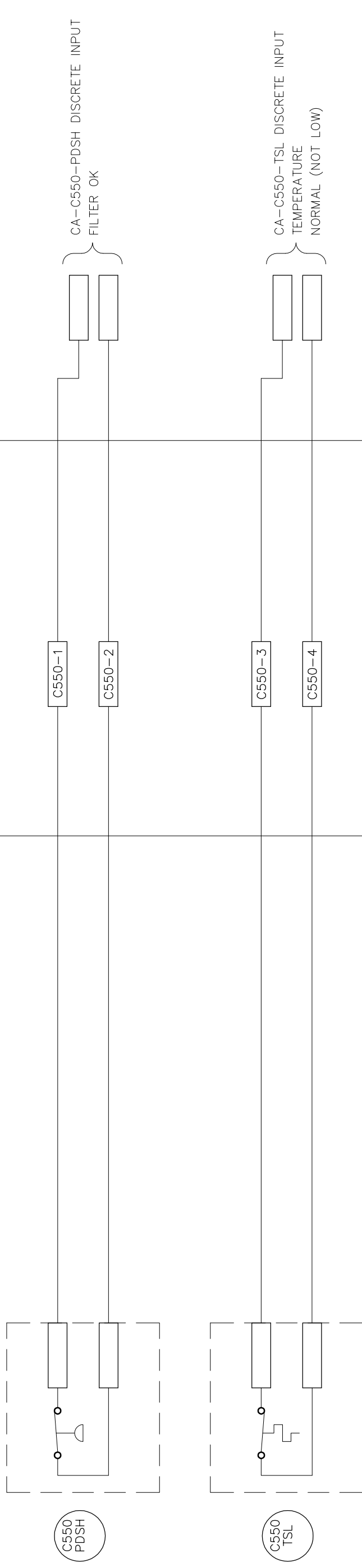
FIELD

NOTE 1

CONTROL ROOM

SYSTEM MARSHALLING PANEL

D.C.S.



NOTE:

1) PROVIDE FIELD JUNCTION IF REQUIRED.



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INSTRUMENT LOOP DIAGRAM
 TYPICAL HVAC TEMP. & DIFF. PRESSURE SWITCHES

SCALE	AS NOTED
DATE	06 03 24
DES	CD DWN PL
CKD	BL APP PS
DRAWING NO. ILD-25	

INSTRUMENT LOOP DIAGRAM

LOOP NO. C570, C572

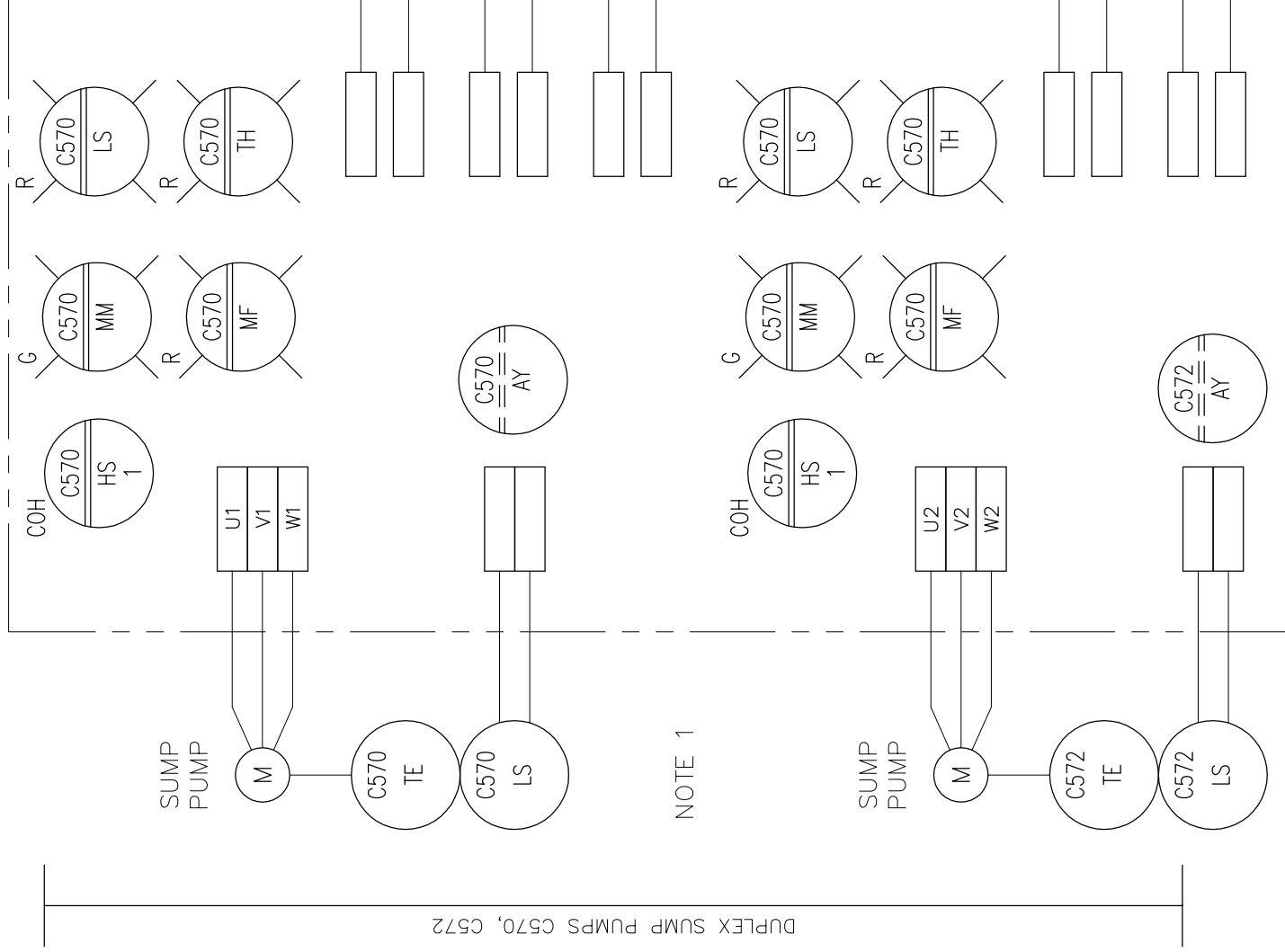
PROCESS AREA

CONTROL ROOM

DUPLEX SUMP PUMPS LOCAL CONTROL PANEL

SYSTEM MARSHALLING PANEL

D.C.S.



DUPLEX SUMP PUMPS C570, C572

NOTE 1

NOTE:

- 1) REFER TO VENDOR SHOP DRAWINGS FOR EXACT WIRING DETAILS AND I/O AND INSTRUMENTATION REQUIREMENTS.



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INSTRUMENT LOOP DIAGRAM
 TYPICAL DUPLEX SUMP PUMPS

SCALE AS NOTED
 DATE 06 03 24
 DES CD DWN PL
 CKD BL APP PS
 DRAWING NO.
 ILD-26

INSTRUMENT LOOP DIAGRAM

LOOP NO. C950

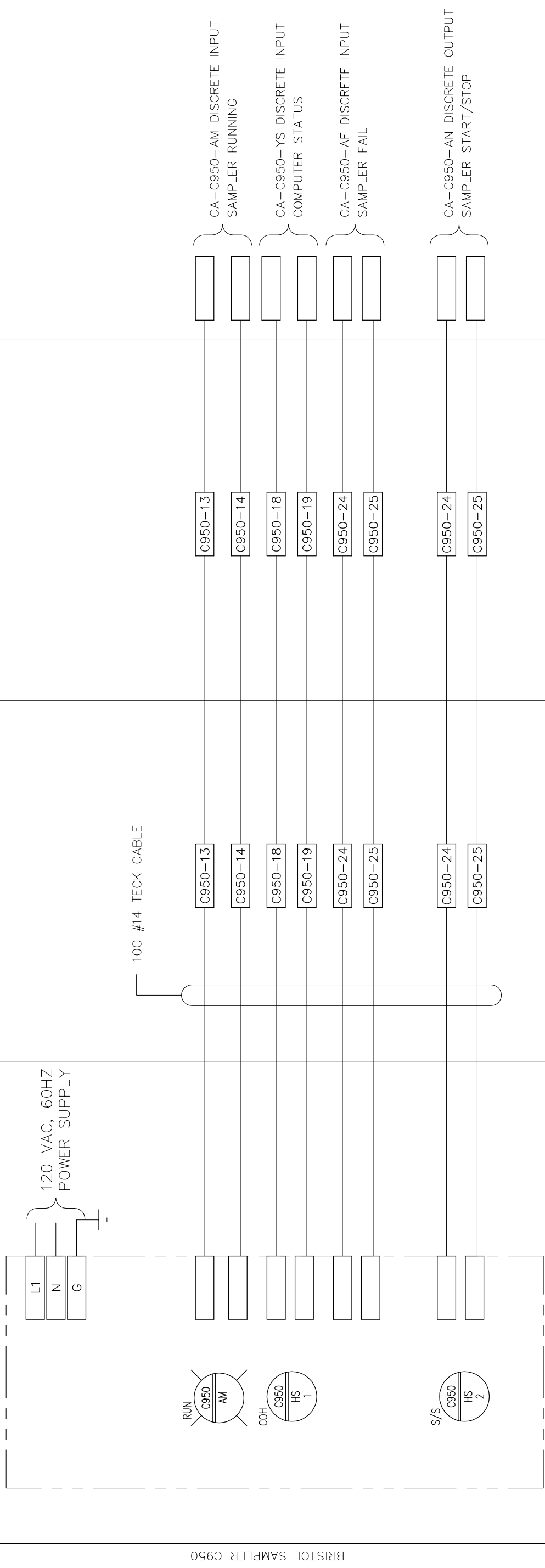
PROCESS AREA

CONTROL ROOM

SYSTEM MARSHALLING PANEL

D.C.S.

FIELD JUNCTION BOX NOTE 4



NOTE:

- BRISTOL SAMPLERS SUPPLIED BY CITY AND INSTALLED BY CONTRACTOR.
- REFER TO VENDOR DRAWINGS FOR EXACT WIRING AND I/O REQUIREMENTS.
- CONTRACTOR TO CONFIRM WITH CITY EXACT MAKE AND MODEL # FOR CONTROL REQUIREMENTS.
- PROVIDE FIELD JUNCTION BOX IF REQUIRED.



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INSTRUMENT LOOP DIAGRAM
 TYPICAL BRISTOL SAMPLER

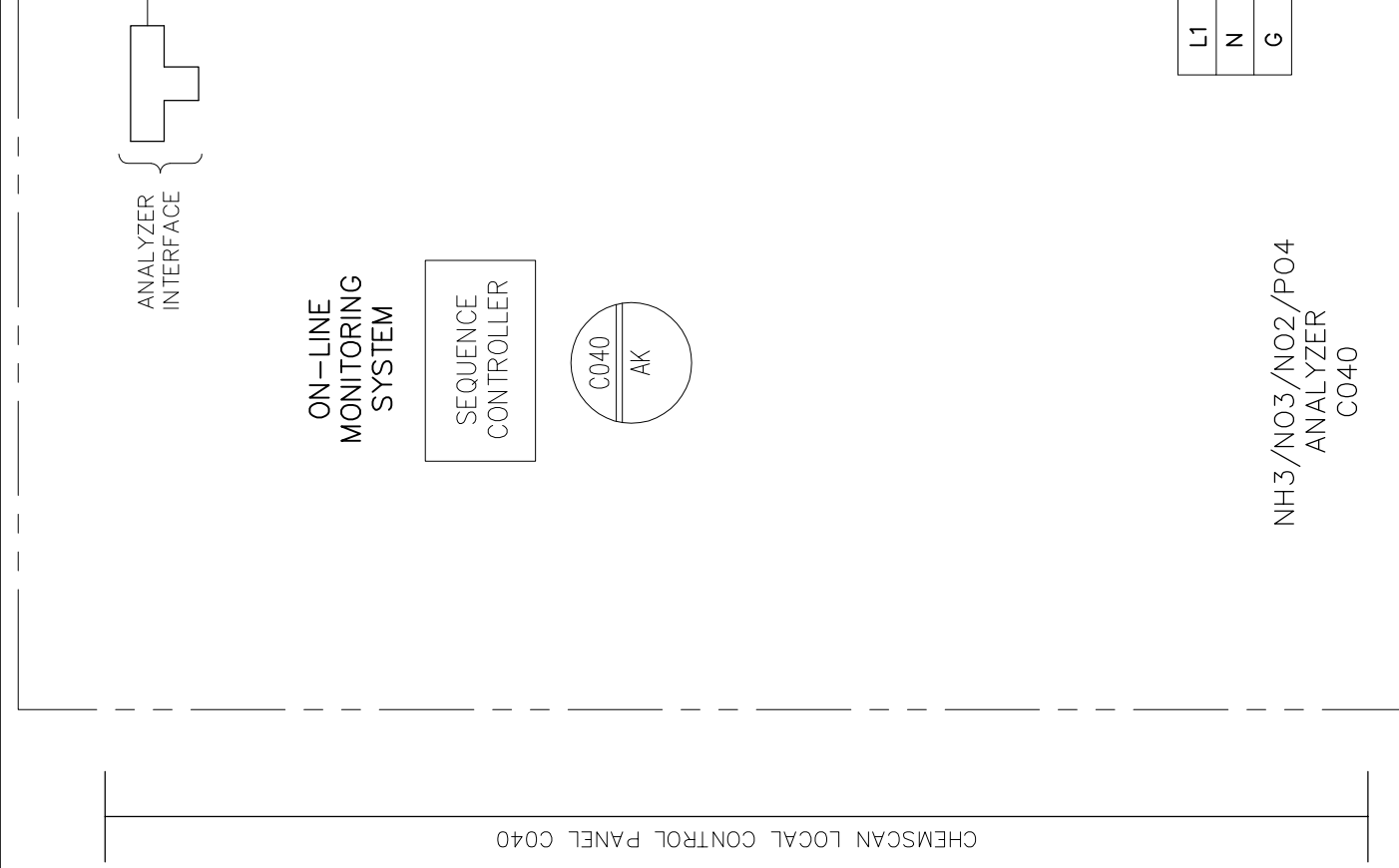
SCALE AS NOTED
 DATE 06 03 24
 DES CD DWN PL
 CKD BL APP PS
 DRAWING NO.
 ILD-27

INSTRUMENT LOOP DIAGRAM

LOOP NO. C040

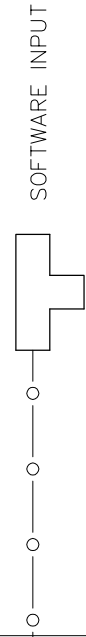
PROCESS AREA

CONTROL ROOM



SYSTEM MARSHALLING PANEL

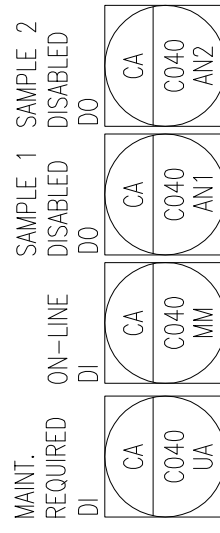
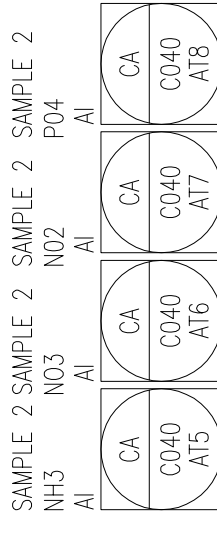
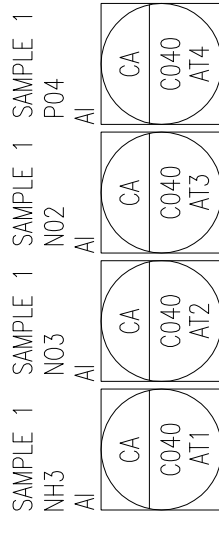
ETHERNET SWITCH



CABLE RECOMMENDED BY ANALYZER SUPPLIER. IN 25mm CONDUIT.

CHEMSCAN LOCAL CONTROL PANEL C040

SOFTWARE POINTS



NOTE:

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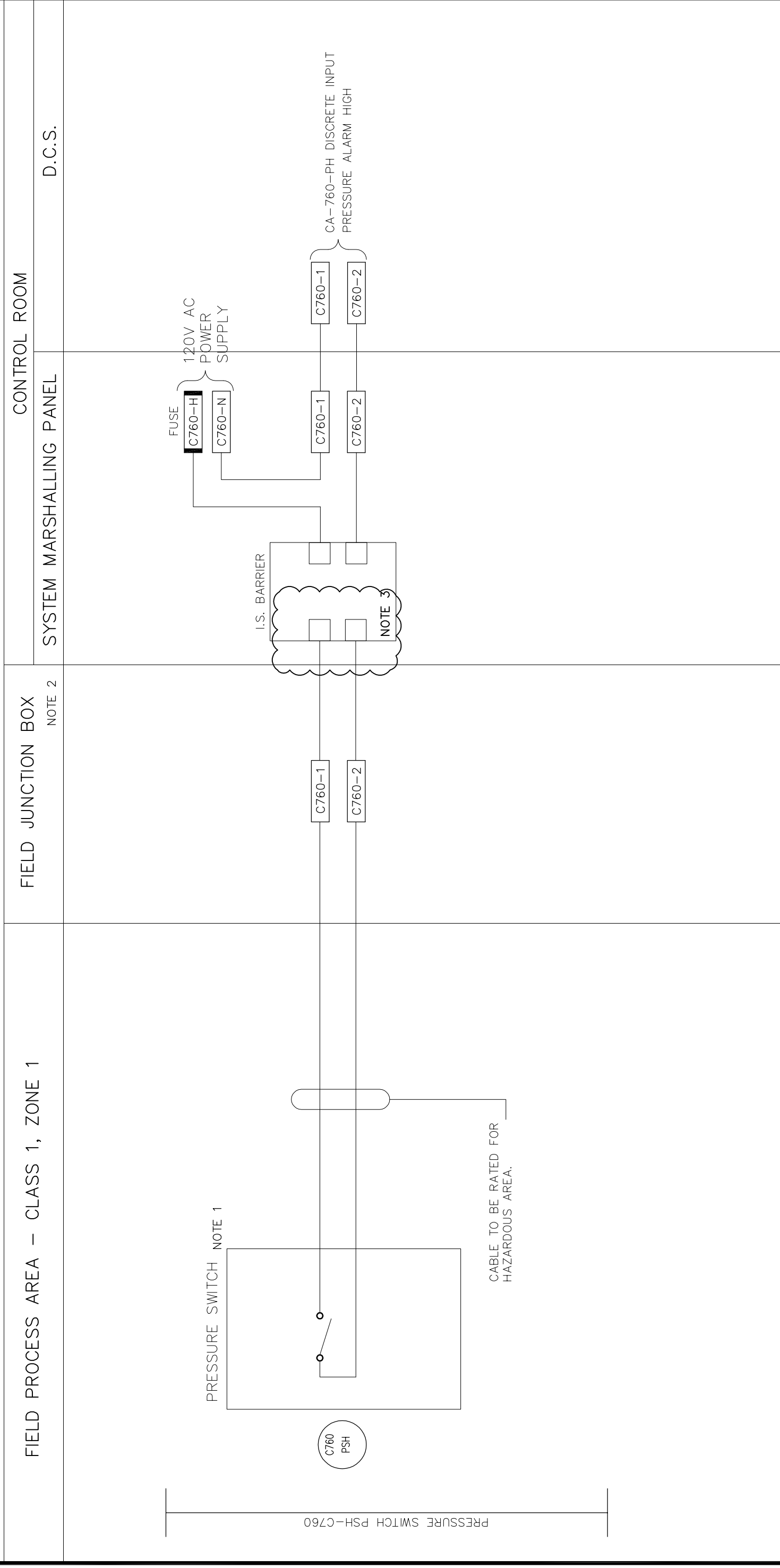
INSTRUMENT LOOP DIAGRAM
ANALYTICAL ANALYZER


DRAWING NO.
ILD-28

SCALE AS NOTED
DATE 06 03 24
DES CD DWN PL
CKD BL APP PS

INSTRUMENT LOOP DIAGRAM

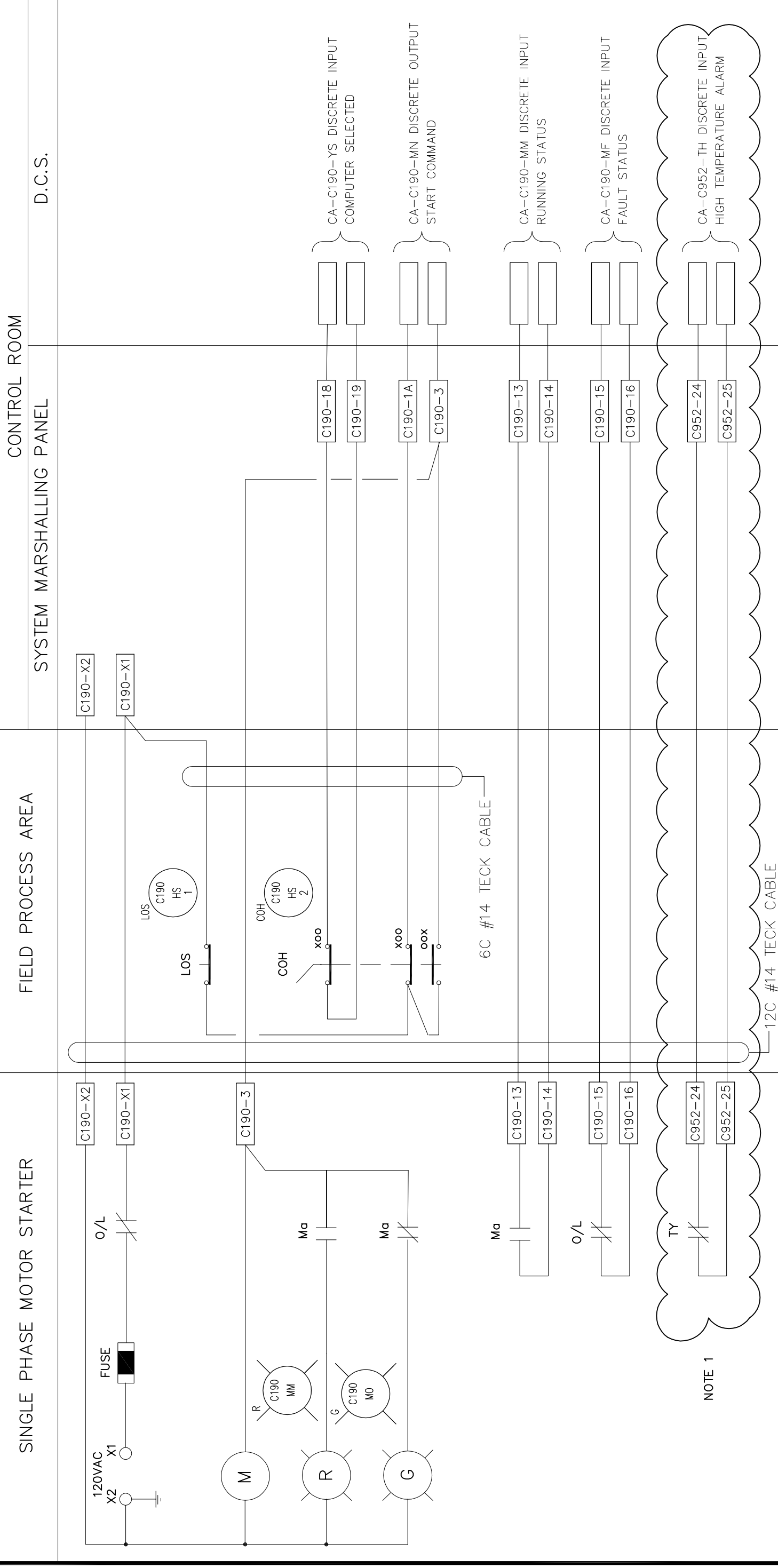
LOOP NO. C760



<p>NOTE:</p> <ol style="list-style-type: none"> CONNECT TO "NORMALLY CLOSED" CONTACTS FOR ALARMS AND "NORMALLY OPEN" CONTACTS FOR EQUIPMENT STATUS, ETC. PROVIDE FIELD JUNCTION BOX IF REQUIRED. TERMINAL BLOCKS REQUIRED BEFORE WIRES LEAVE MARSHALLING PANEL. 	 <p>EarthTech <small>Earth Tech (Canada) Inc. Winnipeg, Manitoba 204.477.5361</small></p>	<p>THE CITY OF WINNIPEG WATER AND WASTE DEPARTMENT <small>CENTRATE NUTRIENT TREATMENT NEWPCC – NITROGEN REMOVAL FACILITY</small></p>	<p>SCALE AS NOTED DATE 06 03 24 DES CD DWN PL CKD BL APP PS</p>
<p>INSTRUMENT LOOP DIAGRAM TYPICAL INTRINSICALLY SAFE SWITCH</p>		<p>DRAWING NO. ILD-34</p>	

INSTRUMENT LOOP DIAGRAM

LOOP NO. C190



NOTE 1

NOTE:

- 1) SAMPLING PUMP C952-P WILL BE A SUBMERSIBLE PUMP. PUMP PROTECTION MAY BE SUPPLIED. PROVIDE PROPER WIRING IN ACCORDANCE WITH PUMP MANUFACTURER.

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 PHOSPHORUS REMOVAL FACILITY

INSTRUMENT LOOP DIAGRAM
 TYPICAL SAMPLING PUMP

SCALE AS NOTED
 DATE 06 03 30
 DES CD DWN PL
 CKD BL APP PS

DRAWING NO.
 ILD-29

INSTRUMENT LOOP DIAGRAM

LOOP NO. C510

PROCESS AREA

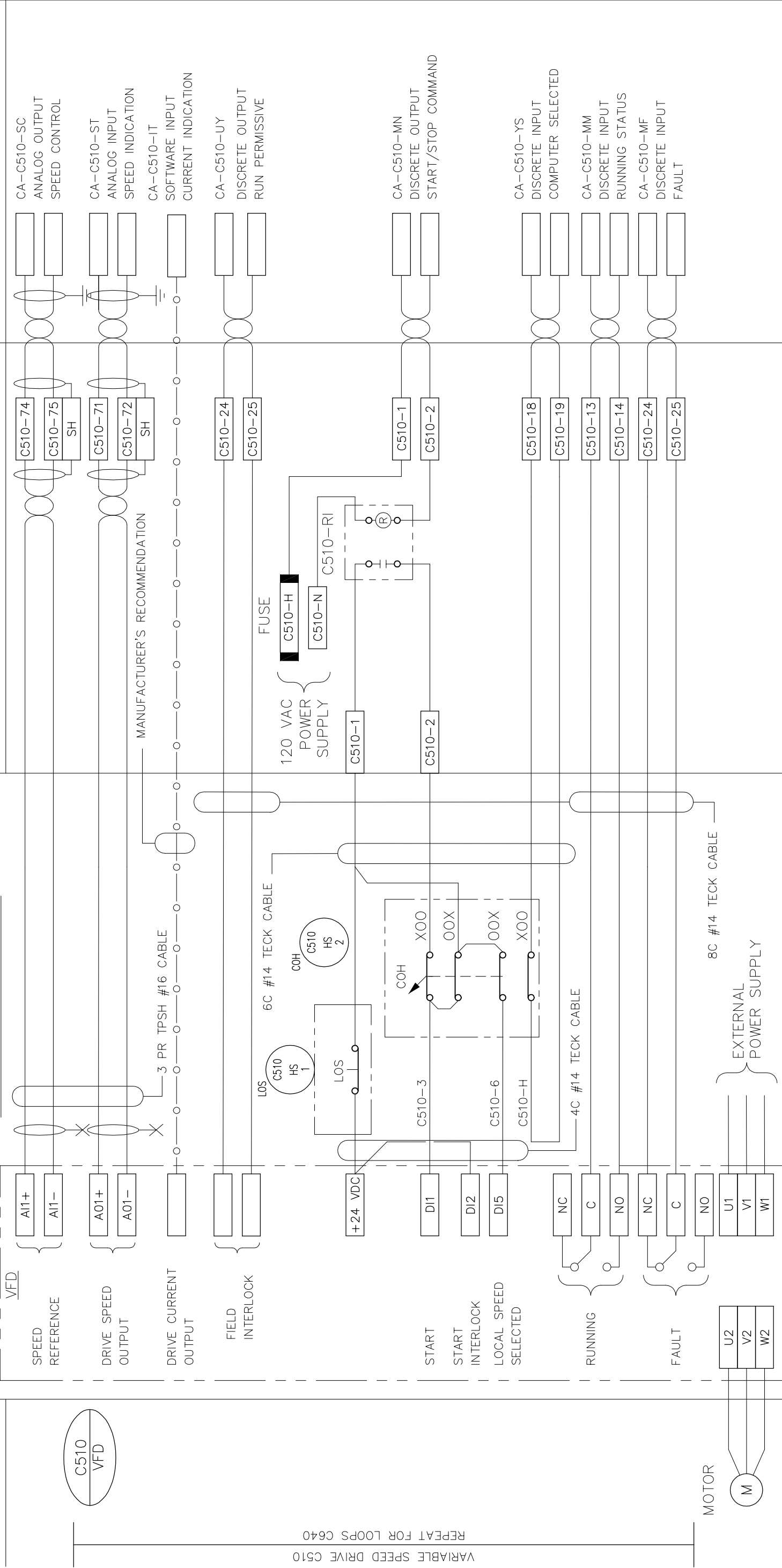
EXHAUST FAN ROOM

CONTROL ROOM

VFD LOCAL CONTROL PANEL

SYSTEM MARSHALLING PANEL

D.C.S.



NOTE:



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INSTRUMENT LOOP DIAGRAM
TYPICAL VARIABLE FREQUENCY DRIVE

DRAWING NO.
ILD-30

SCALE AS NOTED
DATE 06 03 24
DES CD DWN PL
CKD BL APP PS

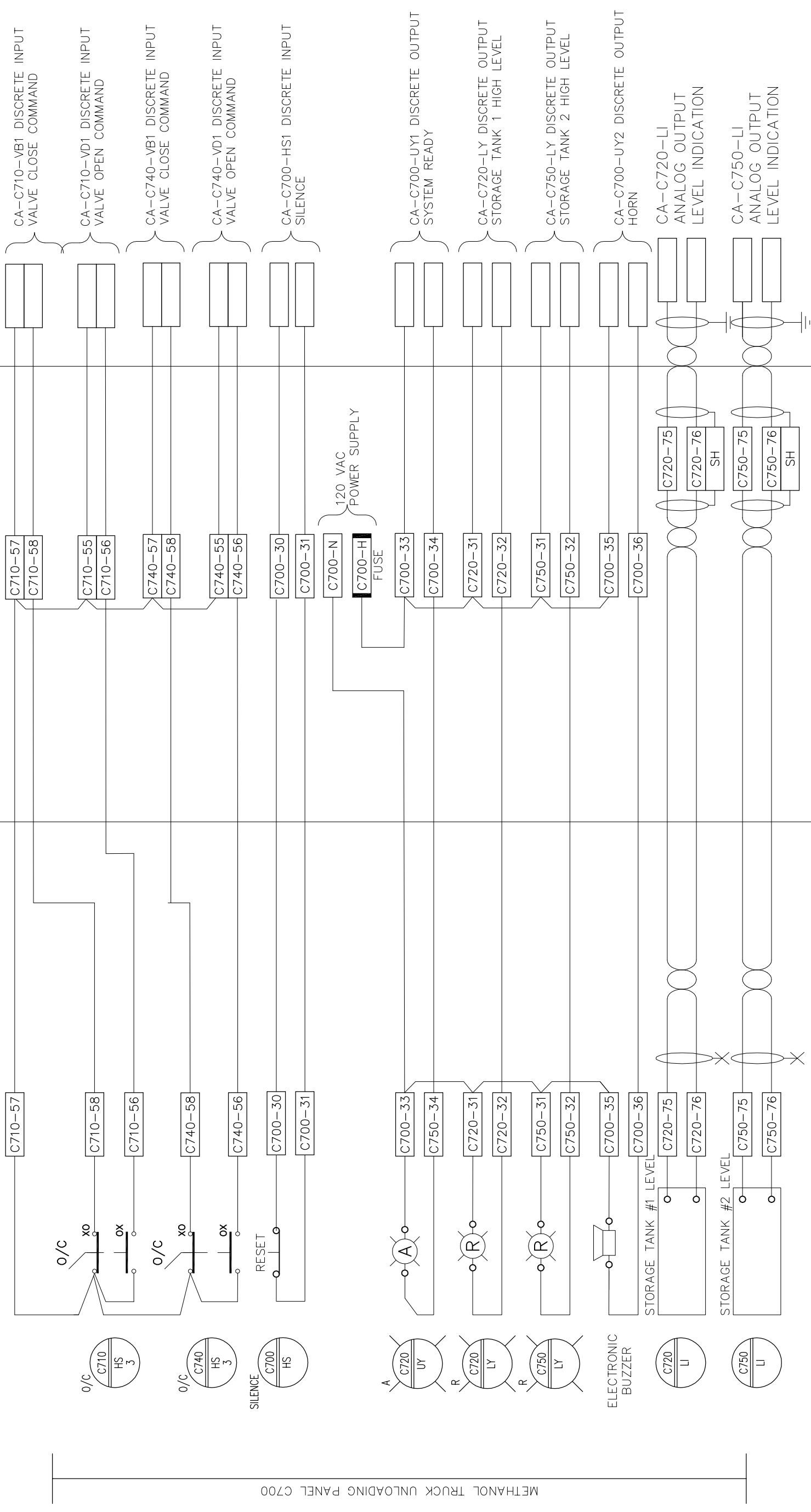
INSTRUMENT LOOP DIAGRAM

LOOP NO. C700

TRUCK UNLOADING PANEL - CLASS 1, ZONE 2

SYSTEM MARSHALLING PANEL

D.C.S.



NOTE:

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PHOSPHORUS REMOVAL FACILITY

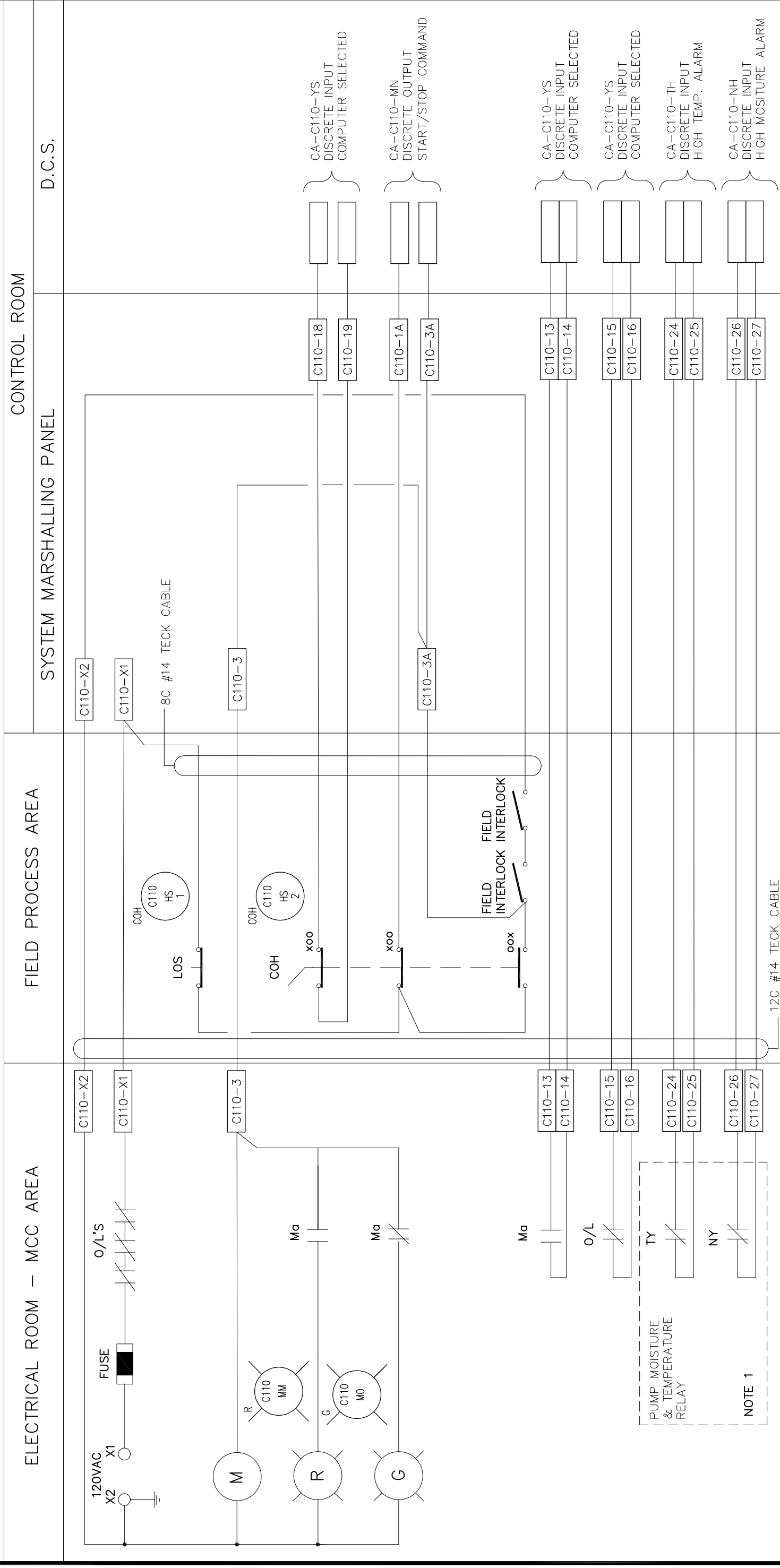
DATE	REVISION	APP.

INSTRUMENT LOOP DIAGRAM
METHANOL TRUCK UNLOADING PANEL

SCALE AS NOTED
DATE 06 05 07
DES CD DWN PL
CKD BL APP PS
DRAWING NO. ILD-31

INSTRUMENT LOOP DIAGRAM

LOOP NO. C110



NOTE:
1) MIXED LIQUOR PUMPS TO BE SUPPLIED WITH TEMPERATURE PROTECTION ONLY.

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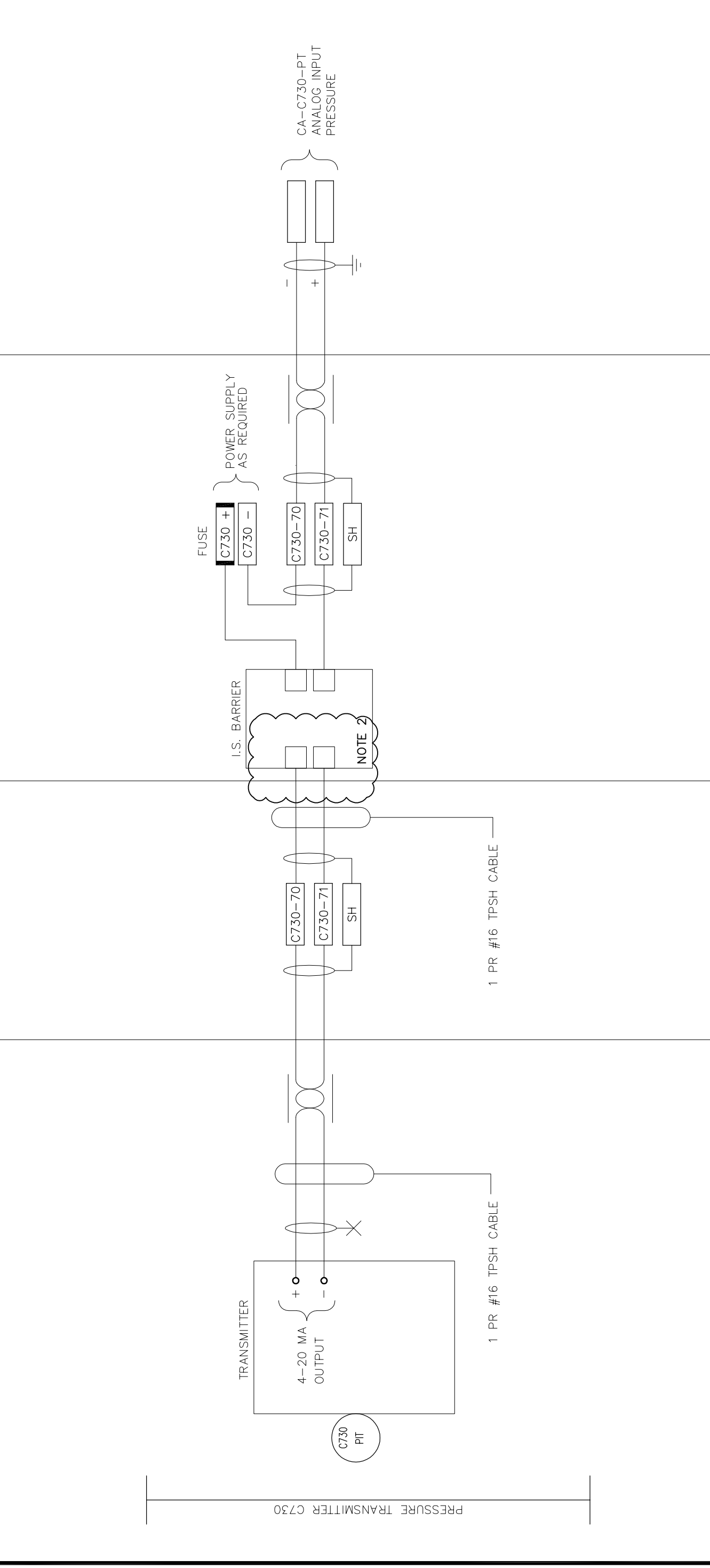
THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT
NEWPCC - CENTRATE NUTRIENT TREATMENT
PHOSPHORUS REMOVAL FACILITY

INSTRUMENT LOOP DIAGRAM
TYPICAL FVNR MOTOR STARTER

SCALE AS NOTED
DATE 06 03 30
DES CD DWN PL
CKD BL APP PS
DRAWING NO.
ILD-32

INSTRUMENT LOOP DIAGRAM

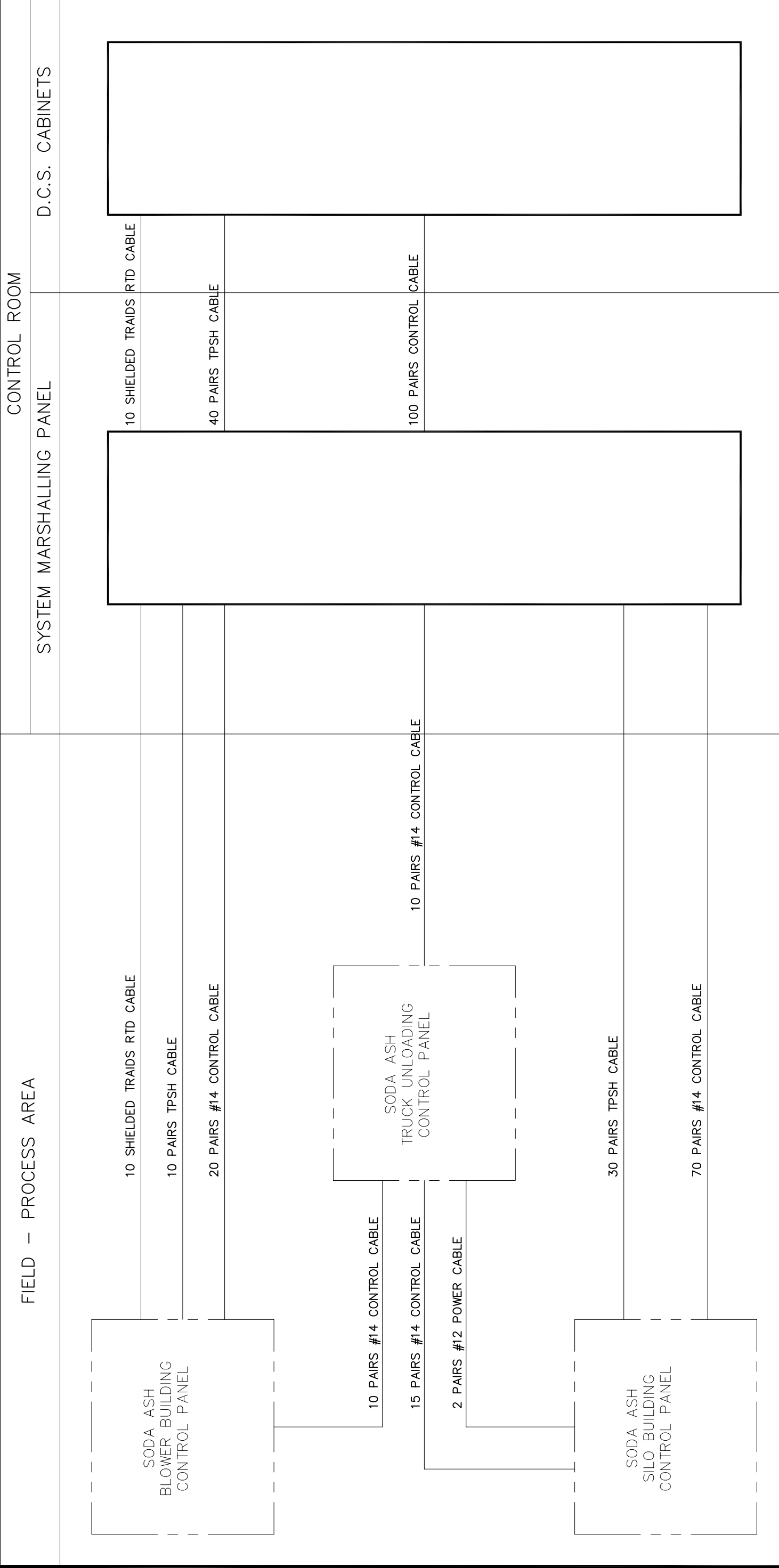
LOOP NO. C730



<p>NOTE:</p> <ol style="list-style-type: none"> 1) PROVIDE FIELD JUNCTION BOX IF REQUIRED. 2) TERMINAL BLOCKS REQUIRED BEFORE WIRES LEAVE MARSHALLING PANEL. 	<p style="text-align: center;">EarthTech Earth Tech (Canada) Inc. Winnipeg, Manitoba 204.477.5381</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">DATE</td> <td style="width: 33%;">REVISION</td> <td style="width: 33%;">APP.</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	DATE	REVISION	APP.				<p style="text-align: center;">THE CITY OF WINNIPEG WATER AND WASTE DEPARTMENT NEWPCC - CENTRATE NUTRIENT TREATMENT NITROGEN REMOVAL FACILITY</p> <p style="text-align: center;">INSTRUMENT LOOP DIAGRAM TYPICAL INTRINSICALLY SAFE TRANSMITTER</p>
DATE	REVISION	APP.						
<p>SCALE AS NOTED DATE 06 03 30 DES CD DWN PL CKD BL APP PS DRAWING NO. ILD-33</p>								

INSTRUMENT LOOP DIAGRAM

LOOP NO. C615



<p>NOTE:</p> <p>1) INSTALL SYSTEM CONTROL CONDUIT & CABLES PARALLEL TO POWER DISTRIBUTION CABLES MAINTAINING CODE REQUIRED SEPARATION.</p> <p>2) WHERE CONDUITS & CABLES ARE BURIED IN TRENCH, USE TRENCH DETAIL AS SHOWN ON ELECTRICAL DRAWINGS AND ADD ADDITIONAL CONDUITS & CABLES AS REQUIRED.</p> <p>3) THIS DRAWING IS FOR ESTIMATING PURPOSES. ACTUAL CONDUIT & CABLE REQUIREMENTS TO BE DETERMINED WHEN SODA ASH SYSTEM SHOP DRAWINGS ARE AVAILABLE.</p>	<p style="text-align: center;">EarthTech</p> <p style="font-size: small;">Earth Tech (Canada) Inc. Winnipeg, Manitoba 204.477.5361</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">DATE</td> <td style="width: 30%;">REVISION</td> <td style="width: 40%;">APP.</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>	DATE	REVISION	APP.				<p style="text-align: center;">THE CITY OF WINNIPEG</p> <p style="text-align: center;">WATER AND WASTE DEPARTMENT</p> <p style="font-size: small; text-align: center;">NEWPCC - CENTRATE NUTRIENT TREATMENT PHOSPHORUS REMOVAL FACILITY</p>
DATE	REVISION	APP.						
<p>SCALE AS NOTED</p> <p>DATE 06 05 10</p> <p>DES CD DWN PL</p> <p>CKD BL APP PS</p>		<p>DRAWING NO.</p> <p style="font-size: large;">ILD-35</p>						
<p>INSTRUMENT LOOP DIAGRAM</p> <p>SODA ASH SYSTEM INTERCONNECTION BLOCK DIAGRAM</p>								

INSTRUMENT STANDARD DETAILS

1. GENERAL

1.1 References - General

- .1 Refer to Section 17010 for general requirements for this Section.

1.2 Instrument Standard Details

- .1 The following 24 Drawings provide standard instrumentation installation details as referenced by this Specification Section:

- ISD-01 Instrument Standard Detail - Magnetic Flowmeter
- ISD-02 Instrument Standard Detail - Remote Transmitter Mounting
- ISD-03 Instrument Standard Detail - Pressure Switch Process Connection and Adaptors
- ISD-04 Instrument Standard Detail - Pressure Gauges Process Connection and Adaptors
- ISD-05 Instrument Standard Detail - Solenoid Valves
- ISD-06 Instrument Standard Detail - Pressure Transmitter Process Connection and Adaptors
- ISD-07 Instrument Standard Detail - Pressure Transmitter and In-Line Pressure Sensor
- ISD-08 Instrument Standard Detail - Instrument Vertical Bracket Mounting
- ISD-09 Instrument Standard Detail - Instrument Mounting Stands for Wall/Floor Mounting
- ISD-10 Instrument Standard Detail - Typical Instrument Local Panel Mounting Stand
- ISD-11 Instrument Standard Detail - Air-Low Range Differential Pressure Gauge/Switch
- ISD-12 Instrument Standard Detail - Hazardous Areas Instrument Installation Details SHT 1 of 2
- ISD-13 Instrument Standard Detail - Hazardous Areas Instrument Installation Details SHT 2 of 2
- ISD-14 Instrument Standard Detail - Temperature Switch
- ISD-15 Instrument Standard Detail - Typical Rotary Valve Mounting Arrangements
- ISD-16 Instrument Standard Detail - Typical Electric Actuator Mounting Arrangements
- ISD-17 Instrument Standard Detail - Gas Detection Sensors and Monitor
- ISD-18 Instrument Standard Detail - Sump Pump
- ISD-19 Instrument Standard Detail - Float Level Switches
- ISD-20 Instrument Standard Detail - Solenoid Valve Location Control Station
- ISD-21 Instrument Standard Detail - Fixed Speed Drives Local Control Station
- ISD-22 Instrument Standard Detail - pH Transmitter
- ISD-23 Instrument Standard Detail - '100' Terminal Junction Box
- ISD-24 Instrument Standard Detail - '25' Terminal Junction Box

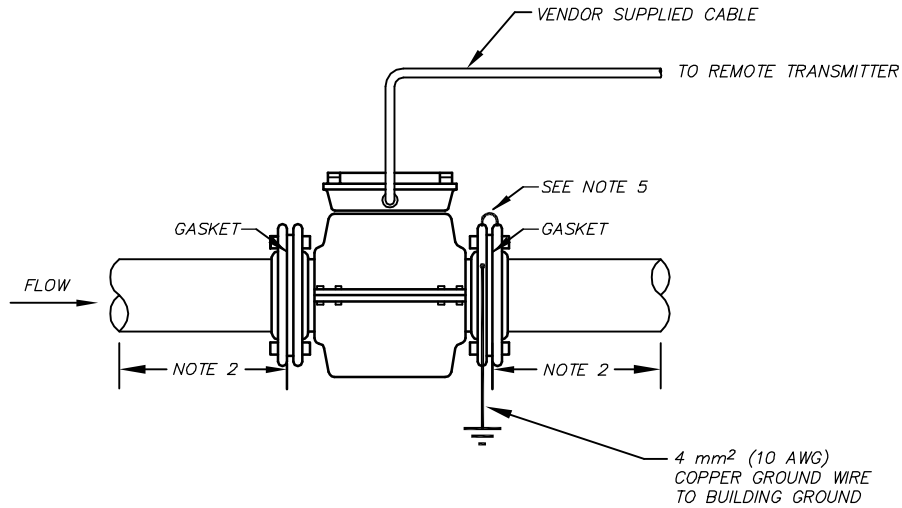
INSTRUMENT STANDARD DETAILS

2. PRODUCTS

.1 Not used

3. EXECUTION

.1 Not used



FLOW METER INSTALLATION

NOTES:

1. LOCATE THE METER IN A STRAIGHT RUN OF PIPE FREE OF VALVES OR FITTINGS WITH MINIMUM OF FIVE AND FIVE PIPE DIAMETERS UPSTREAM AND DOWNSTREAM LENGTH.
2. IN A VERTICAL PIPE RUN, MOUNT THE METER WITH THE FLOW DIRECTION UPWARD.
3. THE PROCESS PIPE MUST FLOW FULL OF LIQUID.
4. AVOID LOCATING MAGNETIC FLOWMETERS NEAR HEAVY INDUCTION EQUIPMENT (100 hp AND LARGER, NO CLOSER THAN 6 m).
5. INSTALL BONDING CABLES (SUPPLIED WITH MAGNETIC FLOWMETERS) ON METALLIC PIPES ONLY.

2006-04-27 1:11pm By: chad.deisnider
 L:\work\66303\02-Design\K&C\Nitrogen Removal\7704 - Standard Details\ISD-01.DWG

DATE	REVISIONS	APP

CITY OF WINNIPEG
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MAGNETIC FLOWMETER
 INSTRUMENT STANDARD DETAIL



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 Winnipeg, MB R3M 2M7
 Phone: (204) 477-5381
 Fax: (204) 284-2040

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 CKD BL APP ST
 PROJECT. No. 66303

DWG. No.
ISD-01

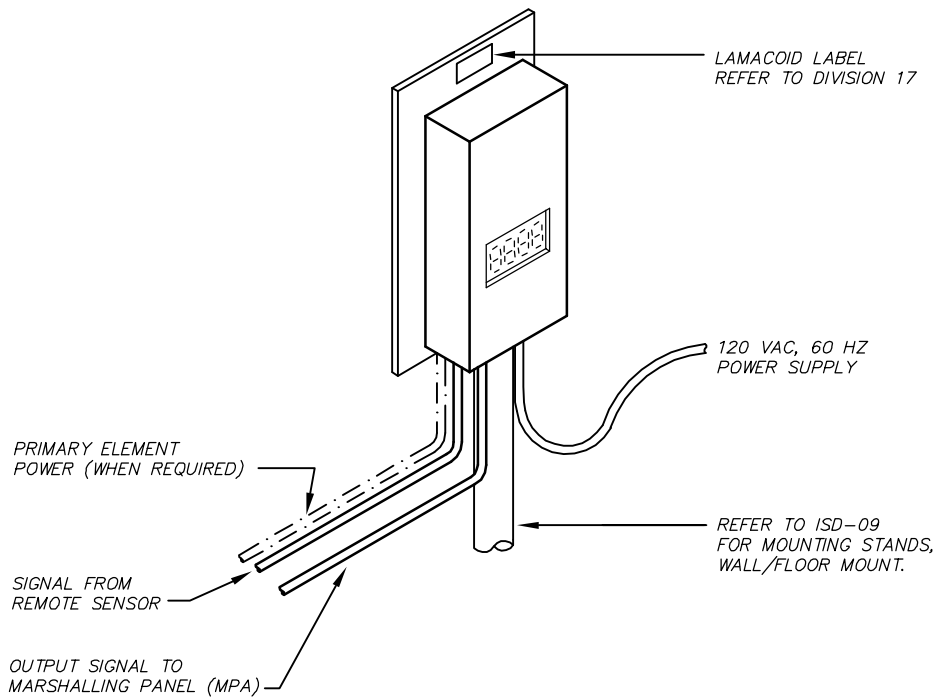


FIG. 1 REMOTE INDICATING TRANSMITTER (SELF POWERED)

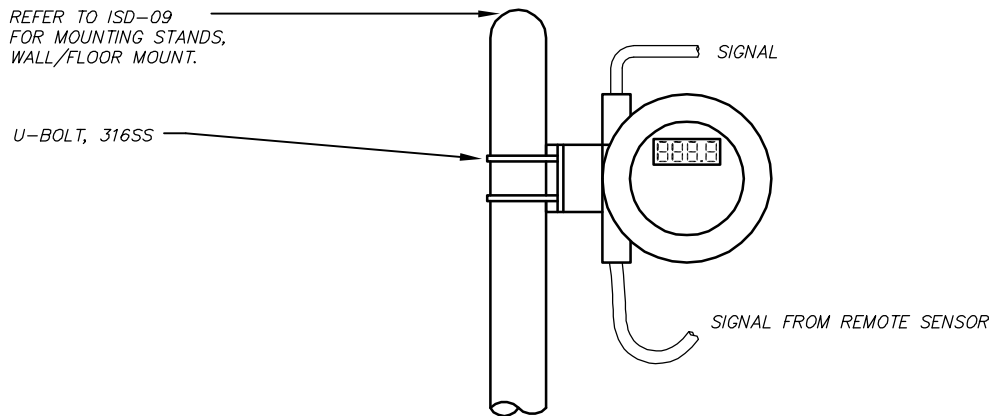


FIG. 2 REMOTE INDICATING TRANSMITTER (LOOP POWERED)

NOTES:

1. REFER TO INSTRUMENT SPECIFICATION SHEET FOR REMOTE TRANSMITTER TYPE.

2006-04-27 1:11pm By: chad.deisnider L:\work\66000\66303\02-Design\K&C\Nitrogen Removal\7704 - Standard Details\ISD-02.DWG

DATE	REVISIONS	APP

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REMOTE TRANSMITTER MOUNTING
INSTRUMENT STANDARD DETAIL



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Fax: (204) 284-2040

SCALE N.T.S.
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DES CD DWN PPL
CKD BL APP ST
PROJECT. No. 66303

DWG. No.
 ISD-02

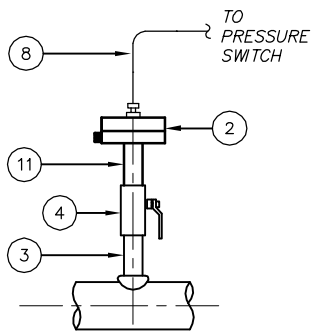


FIG. (a) DIRTY SERVICE DIAPHRAGM SEAL

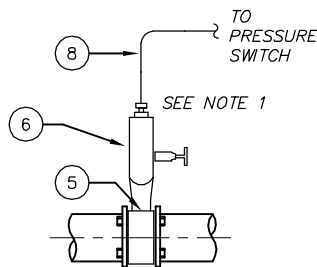


FIG. (b) DIRTY SERVICE IN-LINE SERVICE

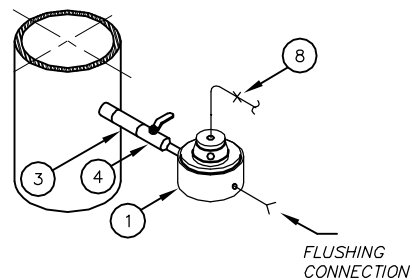


FIG. (c) DIRTY SERVICE - DIAPHRAGM SERVICE WITH CONTINUOUS FLUSH

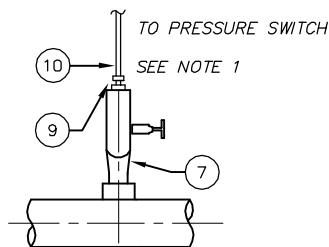


FIG. (d) CLEAN SERVICE

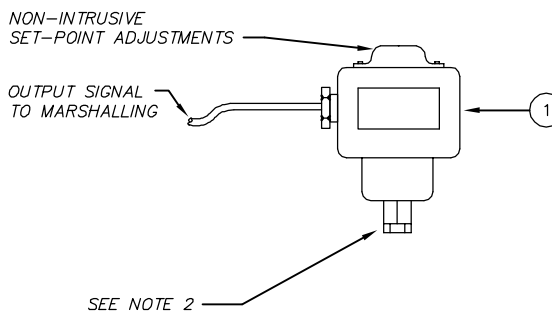


FIG. 1 PRESSURE SWITCH REMOTE MOUNT

NOTES:

1. WHEN BOTH PRESSURE GAUGE AND PRESSURE SWITCH REQUIRED BY APPLICATION - SEE DWG. ISD-04.
2. PROVIDE REQUIRED CONNECTOR TO ACCOMMODATE PROCESS CONNECTION TO PRESSURE SWITCH.

ITEM	DESCRIPTION
1	PRESSURE SWITCH, 12mm (NPT) PROCESS CONNECTION
2	DIAPHRAGM SEAL
3	LONG NIPPLE, 20mm DIA x 50 mm, SEE NOTE 3
4	BALL VALVE - BV02, 20mm DIA.
5	THRU IN-LINE PRESSURE SENSOR, 12mm (NPT) CONN.
6	MULTI-PORT GAUGE VALVE, STRAIGHT THROUGH TYPE, 12mm x 12mm (NPT)
7	MULTI-PORT GAUGE VALVE, STRAIGHT THROUGH TYPE, 12mm x 20mm (NPT)
8	CAPILLARY TUBING, C/W 316SST ARMoured SHEATH
9	MALE CONNECTOR, 12mm x 10mm (NPT)
10	TUBING, 10mm DIA, 316SST
11	LONG NIPPLE, 20mm DIA X 50mm LONG

CITY OF WINNIPEG
NEWPCC NITROGEN REMOVAL FACILITY

PRESSURE SWITCH
PROCESS CONNECTION AND ADAPTORS
INSTRUMENT STANDARD DETAIL

 **EarthTech**
A Tyco International Ltd. Company

Earth Tech (Canada) Inc.
Winnipeg, MB R3M 2M7
Phone: (204) 477-5381
Fax: (204) 284-2040

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PROJECT. No. 66303

DWG. No.
ISD-03

DATE	REVISIONS	APP

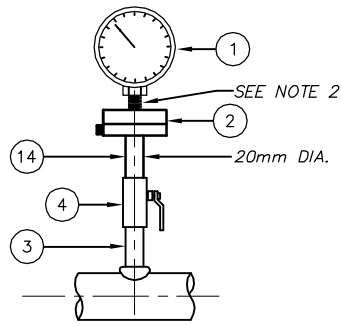


FIG. 1 DIRTY SERVICE DIAPHRAGM SEAL

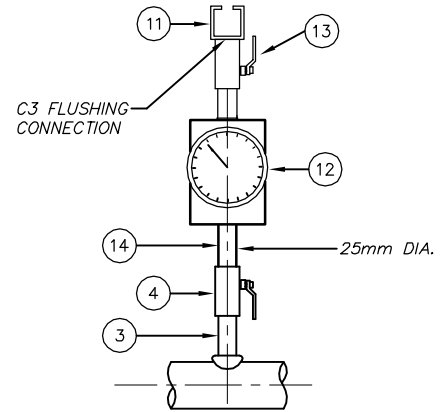


FIG. 2 DIRTY SERVICE IN-LINE SENSOR

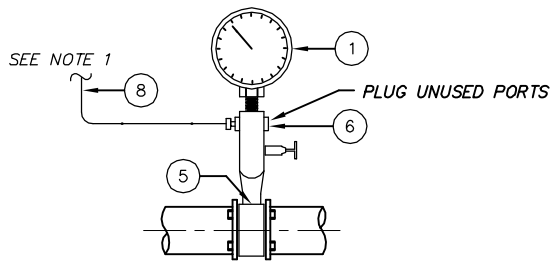


FIG. 3 DIRTY SERVICE IN-LINE SENSOR

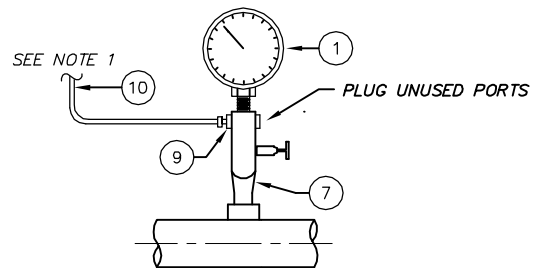


FIG. 4 CLEAN SERVICE

NOTES:

1. TO REMOTE MOUNT PRESSURE SWITCH OR OTHER GAUGE VALVES (FIG. 4 ONLY) WHEN REQUIRED BY APPLICATION. SEE DWG. ISD-03.
2. REFER TO INSTRUMENT SPECIFICATION SHEET TO DETERMINE WHETHER A SNUBBER IS REQUIRED.

ITEM	DESCRIPTION
1	PRESSURE GAUGE, 12mm (NPT).
2	DIAPHRAGM SEAL
3	LONG NIPPLE, 50 mm LONG.
4	BALL VALVE - BV02, 20mm DIA.
5	THRU IN-LINE PRESSURE SENSOR, 12mm (NPT) CONN. C/W FLUSHING AND FILL CONN.
6	MULTI-PORT GAUGE VALVE, STRAIGHT THROUGH TYPE, 12mm x 12mm (NPT).
7	MULTI-PORT GAUGE VALVE, STRAIGHT THROUGH TYPE, 12mm x 20mm (NPT).
8	CAPILLARY TUBING, C/W 316SST ARMoured SHEATH.
9	MALE CONNECTOR, 12mm x 10mm (NPT).
10	TUBING, 10mm DIA, 316SST.
11	QUICK DISCONNECT, 25mm.
12	IN-LINE PRESSURE SENSOR, RED VALVE TYPE 42S, C/W SENSING LIQUID & GAUGE
13	BALL VALVE - BV01, 25mm DIA.
14	LONG NIPPLE, 50mm LONG

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NEWPCC NITROGEN REMOVAL FACILITY

PRESSURE GAUGES
PROCESS CONNECTION AND ADAPTORS
INSTRUMENT STANDARD DETAIL

 **EarthTech**
A Tyco International Ltd. Company

Earth Tech (Canada) Inc.
Winnipeg, MB R3M 2M7
Phone: (204) 477-5381
Fax: (204) 284-2040

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ISD-04

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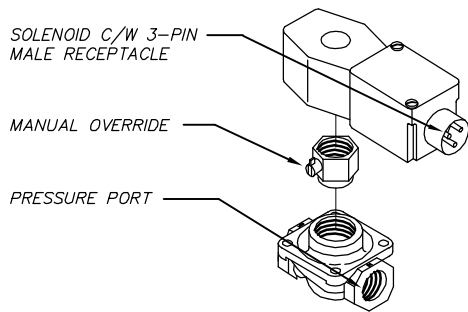


FIG. 1 2-WAY SINGLE ACTING SOLENOID

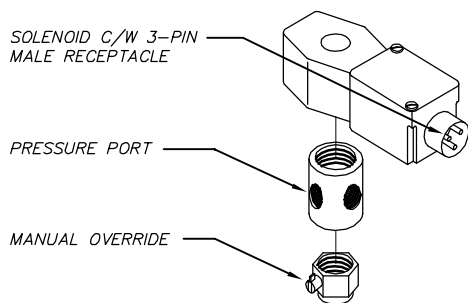


FIG. 2 3-WAY SINGLE ACTING SOLENOID

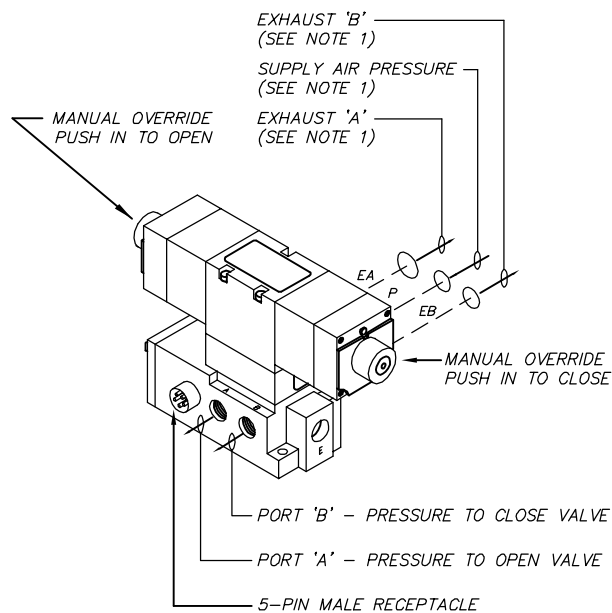


FIG. 3 4-WAY DOUBLE ACTING SOLENOID (DIRECT SOLENOID ACTUATED)

NOTES:

1. SUPPLY AND EXHAUST PIPING MUST BE FULL AREA, UNRESTRICTED.
2. PROVIDE MANUAL OVERRIDE UNLESS OTHERWISE SPECIFIED.
3. REFER TO INSTRUMENT SPECIFICATION SHEET FOR ADDITIONAL REQUIREMENTS.
4. THIS DETAIL NOT APPLICABLE FOR HAZARDOUS LOCATION INSTALLATIONS. REFER TO DWG'S ISD-12 & ISD-13.

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CITY OF WINNIPEG
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SOLENOID VALVES
INSTRUMENT STANDARD DETAIL

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A Tyco International Ltd. Company

Earth Tech (Canada) Inc.
 Winnipeg, MB R3M 2M7
 Phone: (204) 477-5381
 Fax: (204) 284-2040

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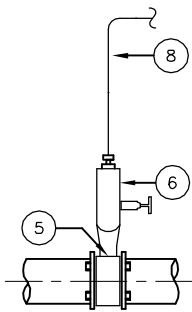


FIG. (a) DIRTY SERVICE IN-LINE SENSOR

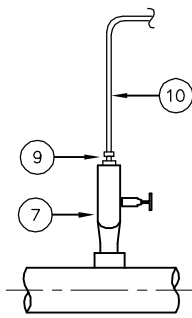


FIG. (b) CLEAN SERVICE

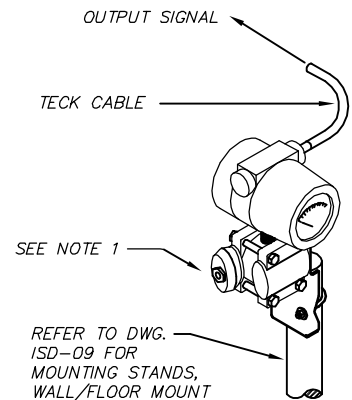


FIG. 1 PRESSURE TRANSMITTER

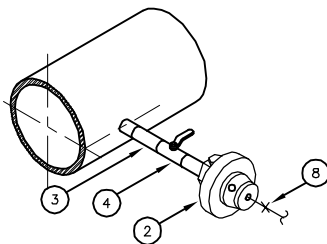


FIG. (c) DIRTY SERVICE DIAPHRAGM SEAL

NOTES:

1. PROVIDE REQUIRED CONNECTOR.
2. REFER TO DWG. ISD-07 FOR ADDITIONAL IN-LINE PRESSURE SENSOR APPLICATIONS.
3. DUPLICATE SENSOR CONNECTION LINES FOR DIFFERENTIAL PRESSURE APPLICATIONS.

ITEM	DESCRIPTION
1	DIAPH. SEAL, ONYX C/W GUAGE TYPE, C/W 12mm PROC. & FLUSHING CONN.
2	DIAPHRAGM SEAL, ASHCROFT TYPE 101, C/W FLUSHING AND FILL CONN.
3	LONG NIPPLE, 20mm DIA x 50 mm
4	BALL VALVE, 20mm DIA.
5	THRU IN-LINE PRESSURE SENSOR, 12mm (NPT) CONN.
6	MULTI-PORT GAUGE VALVE, STRAIGHT THROUGH TYPE, 12mm x 12mmmm (NPT)
7	MULTI-PORT GAUGE VALVE, STRAIGHT THROUGH TYPE, 12mm x 20mm (NPT)
8	CAPILLARY TUBING, C/W 316SST ARMoured SHEATH
9	MALE CONNECTOR, 12mm x 10mm (NPT)
10	TUBING, 10mm DIA, 316SST

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PRESSURE TRANSMITTER
PROCESS CONNECTION AND ADAPTORS
INSTRUMENT STANDARD DETAIL

 **EarthTech**
A Tyco International Ltd. Company

Earth Tech (Canada) Inc.
Winnipeg, MB R3M 2M7
Phone: (204) 477-5381
Fax: (204) 284-2040

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DWG. No.
 ISD-06

DATE	REVISIONS	APP
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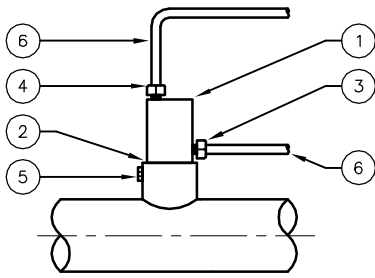


FIG. (a) DIRTY SERVICE
IN-LINE SENSOR

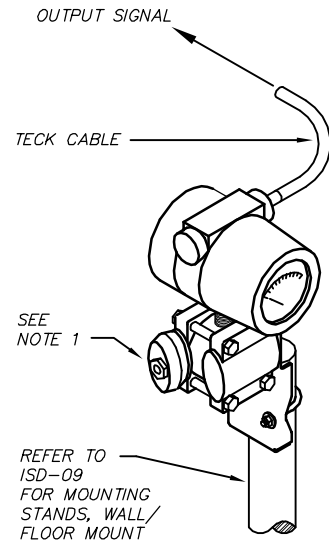


FIG. 1 PRESSURE TRANSMITTER

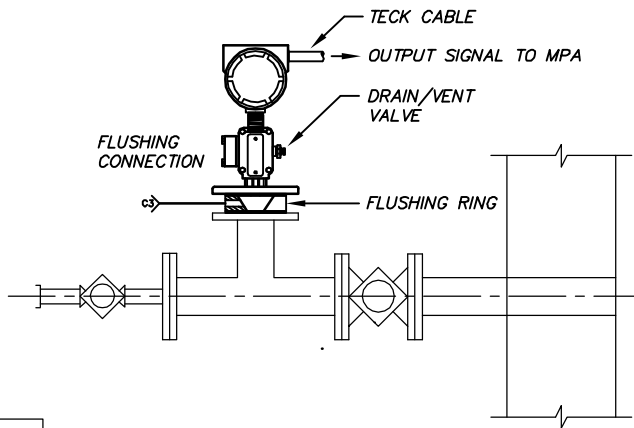


FIG. 2 FLANGE-MOUNTED
LIQUID LEVEL TRANSMITTER (CONSTANT FLUSH)

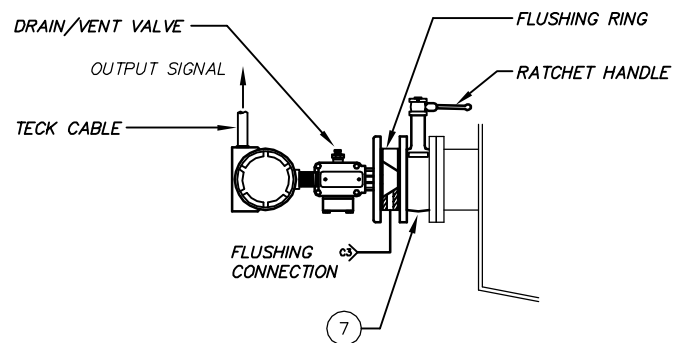


FIG. 3 FLANGE-MOUNTED
LIQUID LEVEL TRANSMITTER (MANUAL FLUSH)

NOTES:

1. PROVIDE REQUIRED CONNECTOR.
2. SENSOR SUITABLE FOR PIPE 50mm DIAMETER AND LARGER ONLY.
3. REFER TO ISD-03 & ISD-04 FOR ADDITIONAL PROCESS CONNECTIONS & ADAPTORS.

ITEM	DESCRIPTION
1	IN-LINE-PRESSURE SENSOR, PMC TYPE PT
2	WELD-ON NIPPLE, SUPPLIED WITH PRESSURE SENSOR
3	AIR SUPPLY INPUT
4	OUTPUT TO TRANSMITTER
5	SET SCREW AND LOCK WASHER IF APPLICABLE
6	TUBING, 10mm DIAMETER, 316SST
7	LEVEL SENSOR KNIFE GATE VALVE, DE ZURIK - MODEL KLS, 3, L1L, S2, C, CSM, MN-RH-CS

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CITY OF WINNIPEG
 NEWPCC NITROGEN REMOVAL FACILITY
 PRESSURE TRANSMITTER AND
 IN-LINE PRESSURE SENSOR
 INSTRUMENT STANDARD DETAIL

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 PROJECT. No. 66303

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 Winnipeg, MB R3M 2M7
 Phone: (204) 477-5381
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 ISD-07

DATE	REVISIONS	APP

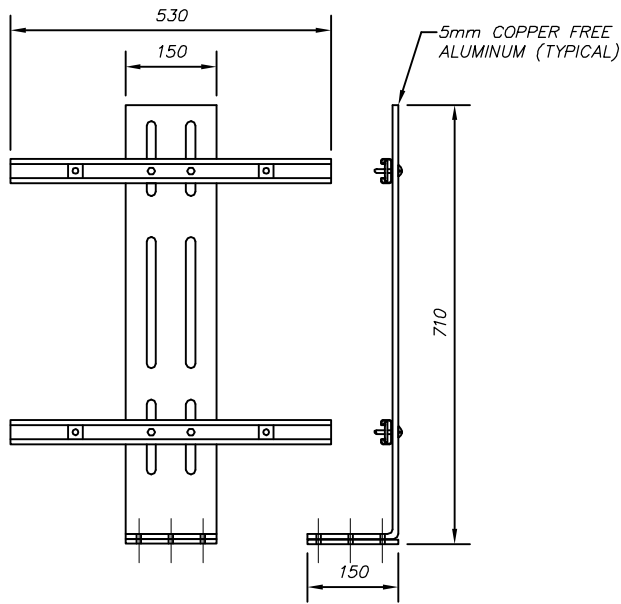


FIG. 1 TYPICAL MOUNTING BRACKET

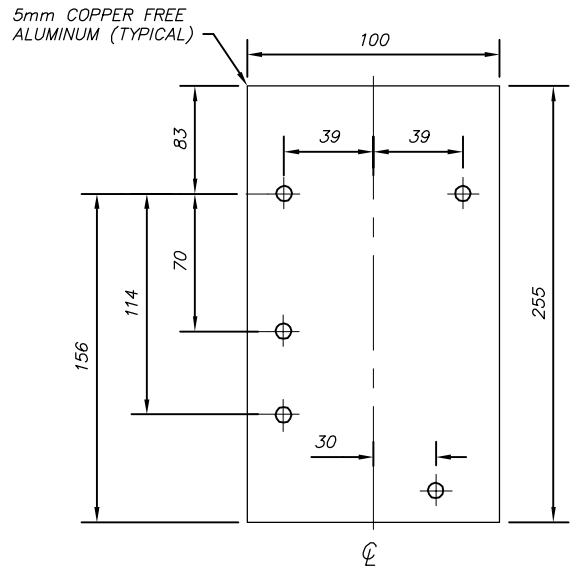


FIG. 2 MOUNTING BRACKET FOR SWITCH BOXES

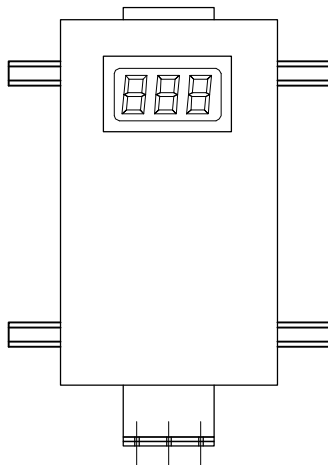


FIG. 3 LARGE CASE INDICATING CONTROLLERS / RECORDER

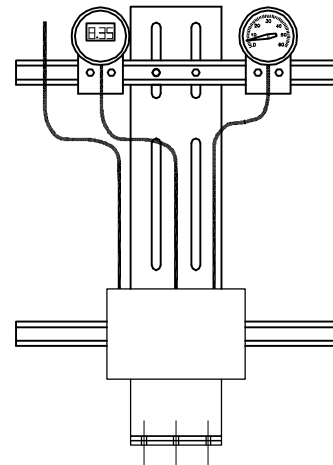


FIG. 4 INDICATING TRANSMITTERS, GAUGES, MANIFOLDS, ETC.

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CITY OF WINNIPEG
NEWPCC NITROGEN REMOVAL FACILITY

INSTRUMENT VERTICAL
BRACKET MOUNTING
INSTRUMENT STANDARD DETAIL

EarthTech
A Tyco International Ltd. Company

Earth Tech (Canada) Inc.
Winnipeg, MB R3M 2M7
Phone: (204) 477-5381
Fax: (204) 284-2040

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PROJECT. No. 66303

DWG. No.
 ISD-08

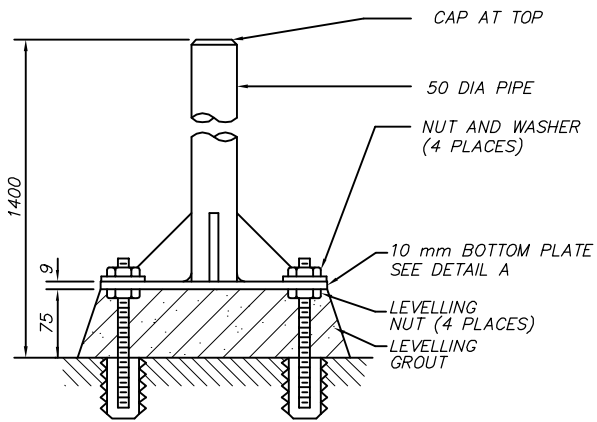


FIG. 1 FLOOR MOUNT

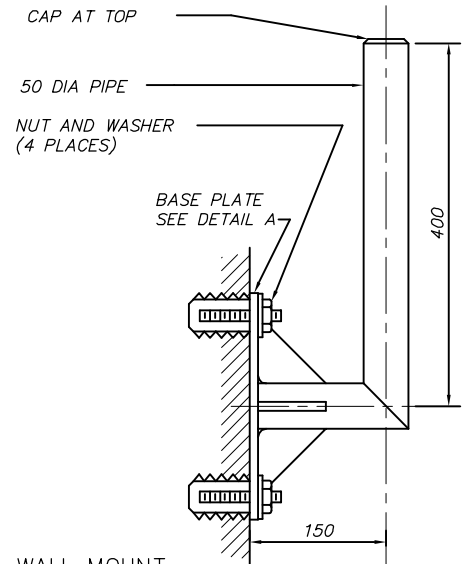


FIG. 2 WALL MOUNT

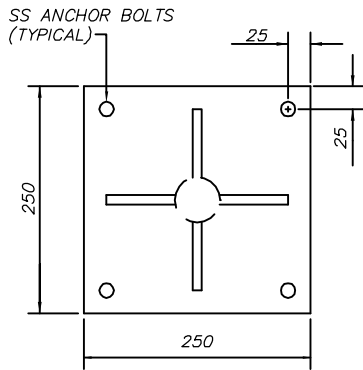


FIG. (a) DETAIL 'A' MOUNTING PLATE

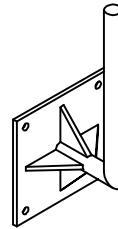


FIG. (b) WALL MOUNT EXTERNAL VIEW

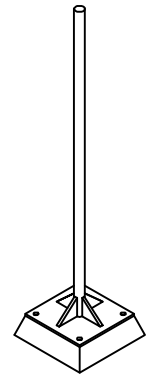


FIG. (c) FLOOR MOUNT EXTERNAL VIEW

NOTES:

1. PIPE AND MOUNTING PLATE COPPER FREE ALUMINUM.
2. TOP OF PIPE TO BE 1400 (NOMINAL) ABOVE SERVICE FLOOR.
3. GROUTING TO BE POURED ONCE FLOOR MOUNT STAND PLUMBED FASTENED IN PLACE.

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CITY OF WINNIPEG
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INSTRUMENT MOUNTING STANDS
FOR WALL/FLOOR MOUNTING
INSTRUMENT STANDARD DETAIL

 **EarthTech**
A Tyco International Ltd. Company

Earth Tech (Canada) Inc.
Winnipeg, MB R3M 2M7
Phone: (204) 477-5381
Fax: (204) 284-2040

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PROJECT. No. 66303

DWG. No.
ISD-09

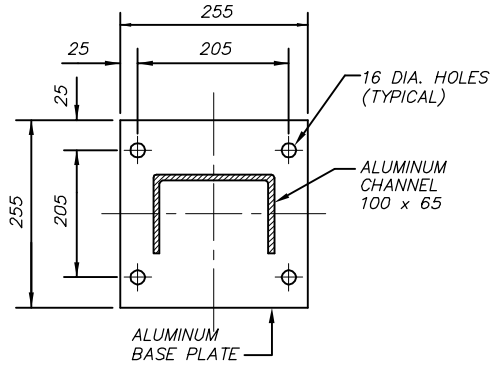


FIG. 1 BASE PLATE

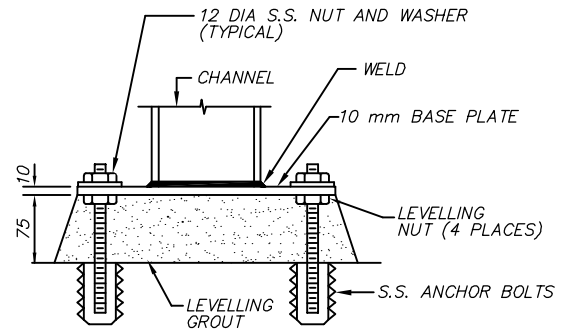


FIG.(a) DETAIL 'A'

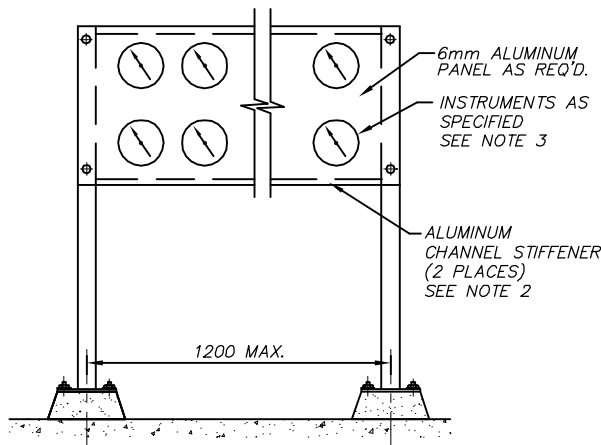


FIG. (b) FRONT VIEW

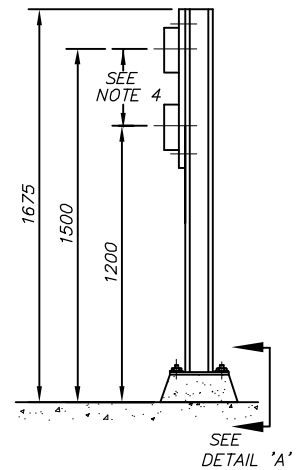


FIG. (c) SIDE VIEW

NOTES:

1. GROUTING TO BE POURED ONCE FLOOR MOUNT STAND PLUMBED FASTENED IN PLACE.
2. PROVIDE ALUMINUM CHANNEL STIFFENERS AS REQUIRED, WELD STIFFENER TO PANEL.
3. SEE INSTALLATION DETAILS FOR MOUNTING OF INSTRUMENTS.
4. MOUNT INSTRUMENTS SUCH THAT INDICATION OR ADJUSTMENTS ARE 1200mm TO 1500mm ABOVE FLOOR.

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NEWPCC NITROGEN REMOVAL FACILITY

TYPICAL
INSTRUMENT LOCAL PANEL MOUNTING STAND
INSTRUMENT STANDARD DETAIL

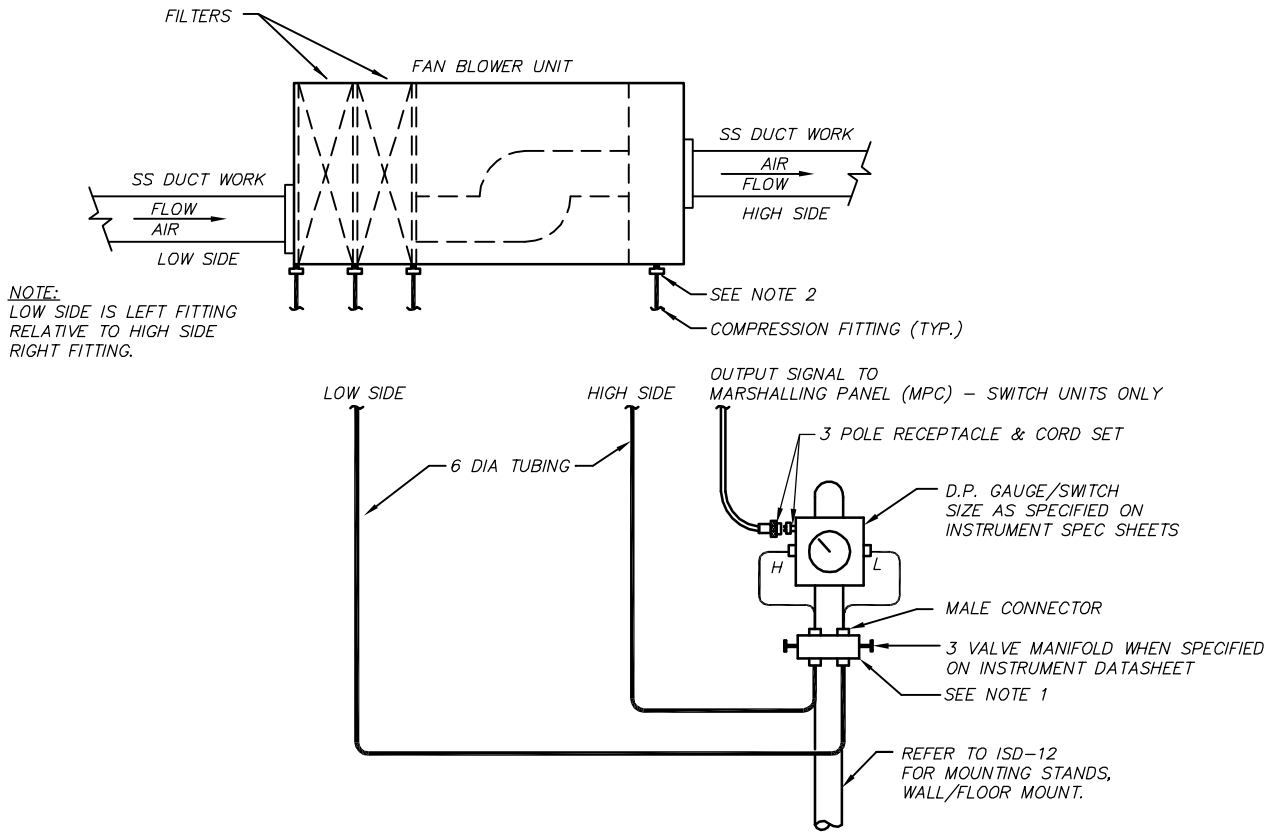
 **EarthTech**
A Tyco International Ltd. Company

Earth Tech (Canada) Inc.
Calgary, Alberta T2X 1P1
Phone: (403) 254-3301
Fax: (403) 254-3333

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 ISD-10

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AIR FLOW INSTALLATION

NOTES:

1. SECURE TO PIPE MOUNT OR MOUNTING PLATE.
2. TAPPINGS BY DIV. 15 AS REQUIRED TO SUIT MATERIAL AND CONSTRUCTION.

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CITY OF WINNIPEG
NEWPCC NITROGEN REMOVAL FACILITY

AIR - LOW RANGE
DIFFERENTIAL PRESSURE GAUGE/SWITCH
INSTRUMENT STANDARD DETAIL

EarthTech
A Tyco International Ltd. Company

Earth Tech (Canada) Inc.
Calgary, Alberta T2X 1P1
Phone: (403) 254-3301
Fax: (403) 254-3333

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 ISD-11

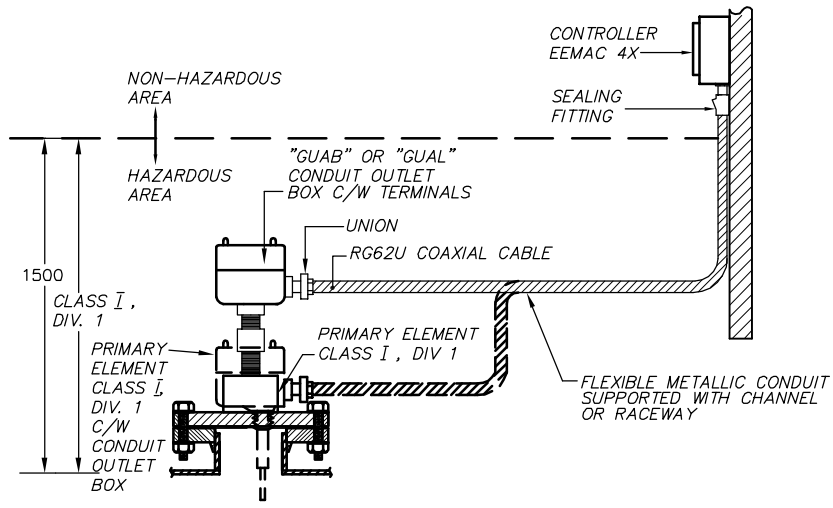


FIG. 1 SUMP LEVEL SENSOR AND CONTROLLER

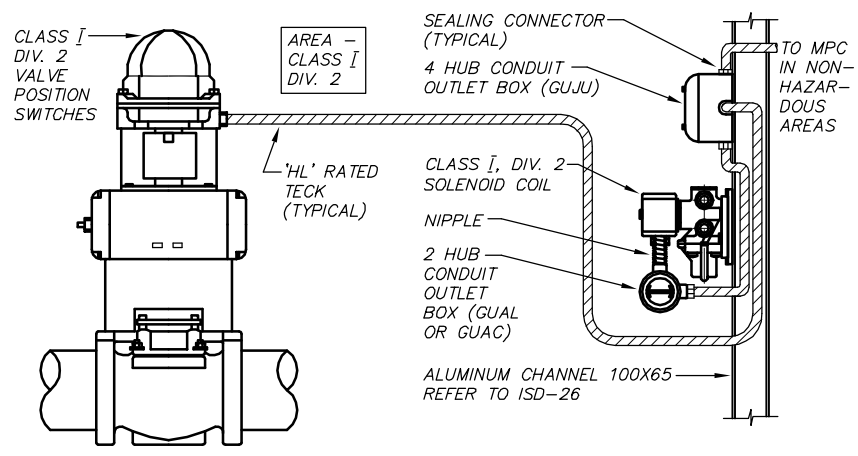


FIG. 2 VALVE POSITION SWITCHES & SOLENOID

NOTES:

1. REFER TO DIVISION 16 FOR HAZARDOUS AREA CLASSIFICATIONS.

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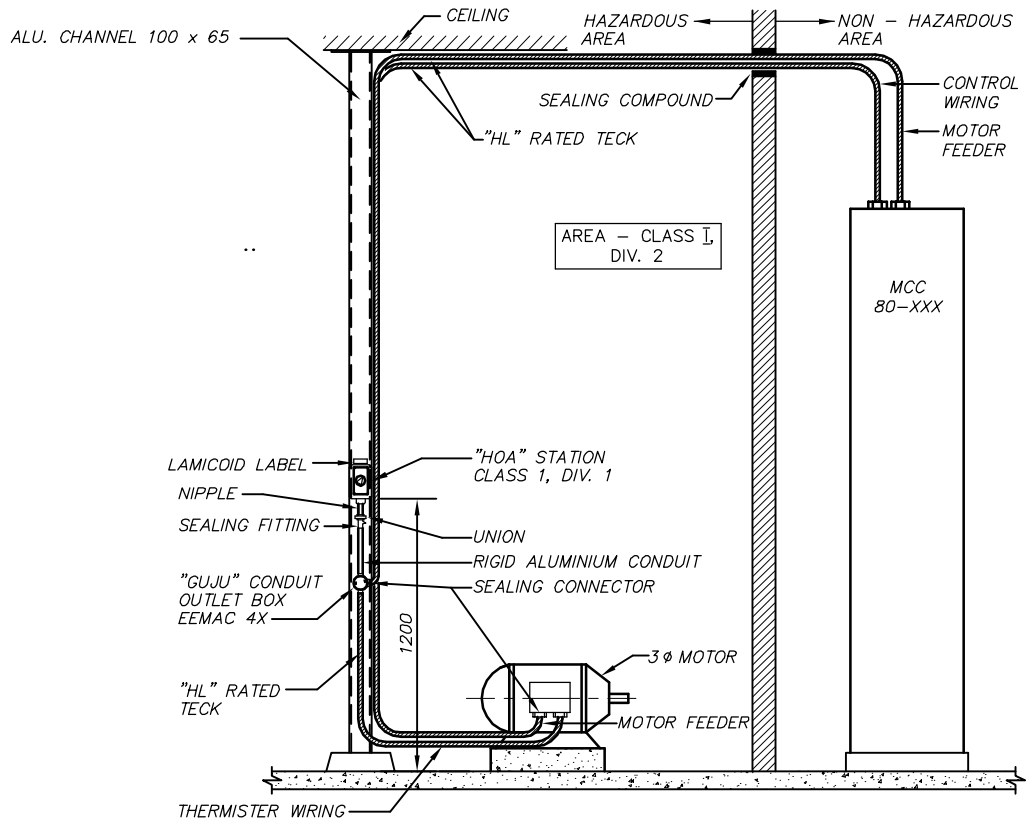
CITY OF WINNIPEG
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 HAZARDOUS AREAS INSTRUMENT
 INSTALLATION DETAILS SHT 1 OF 2
 INSTRUMENT STANDARD DETAIL


EarthTech
 A Tyco International Ltd. Company

Earth Tech (Canada) Inc.
 Winnipeg, MB R3M 2M7
 Phone: (204) 477-5381
 Fax: (204) 284-2040

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ISD-12



GAS EQUIPMENT ROOM
MOTOR CONTROLS

NOTES:

1. REFER TO DIVISION 16 FOR HAZARDOUS AREA CLASSIFICATIONS.

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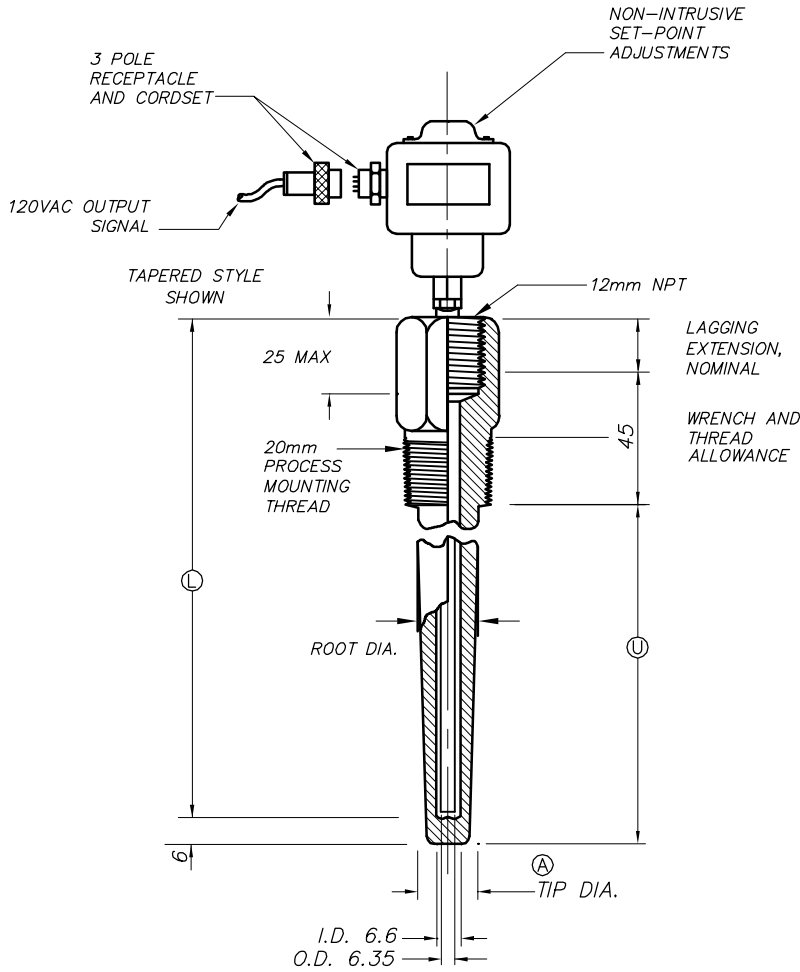
HAZARDOUS AREAS INSTRUMENT
INSTALLATION DETAILS SHT 2 OF 2
INSTRUMENT STANDARD DETAIL

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A Tyco International Ltd. Company

Earth Tech (Canada) Inc.
Winnipeg, MB R3M 2M7
Phone: (204) 477-5381
Fax: (204) 284-2040

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DWG. No.
 ISD-13



(A) = } SPECIFIED ON
 (L) = } INSTRUMENT
 (U) = } SPEC SHEET

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CITY OF WINNIPEG
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TEMPERATURE SWITCH
 INSTRUMENT STANDARD DETAIL



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 Winnipeg, MB R3M 2M7
 Phone: (204) 477-5381
 Fax: (204) 284-2040

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 PROJECT. No. 66303

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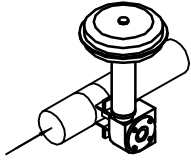
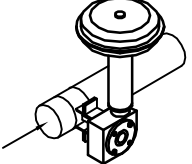
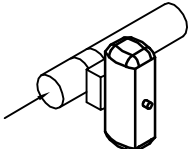
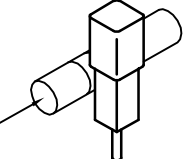
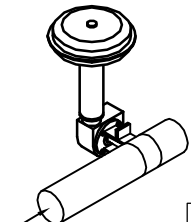
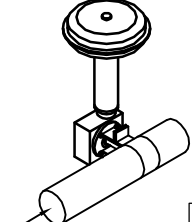
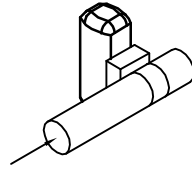
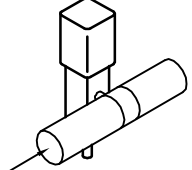
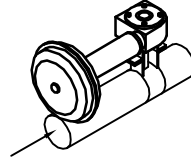
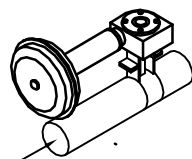
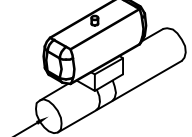
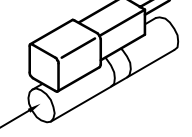
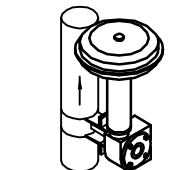
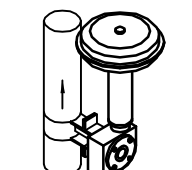
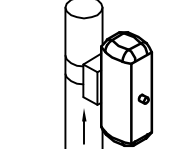
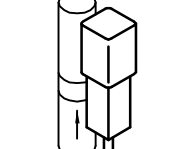
ACTUATOR		ACTUATOR TYPE			
ORIENTATION	LOCATION	DIAPHRAGM - PDTD	DIAPHRAGM - PDTG	RACK AND PINION	SCOTCH YOKE
PERPENDICULAR ACTUATOR	RIGHT HAND MOUNTING (HORIZONTAL SHAFT)				
	LEFT HAND MOUNTING (HORIZONTAL SHAFT)				
PARALLEL ACTUATOR	ON TOP MOUNTING (VERTICAL SHAFT)				
	FLOW DOWN OR UP (HORIZONTAL SHAFT)				

FIG. 1 MOUNTING ARRANGEMENTS

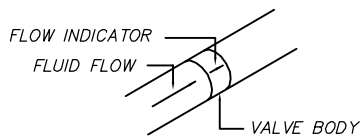


FIG. (a) VALVE INSTALLATION NORMAL FLOW

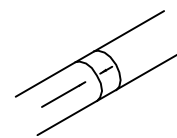


FIG. (b) VALVE INSTALLATION REVERSED FLOW

NOTES:

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TYPICAL ROTARY VALVE
MOUNTING ARRANGEMENTS
INSTRUMENT STANDARD DETAIL

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Winnipeg, MB R3M 2M7
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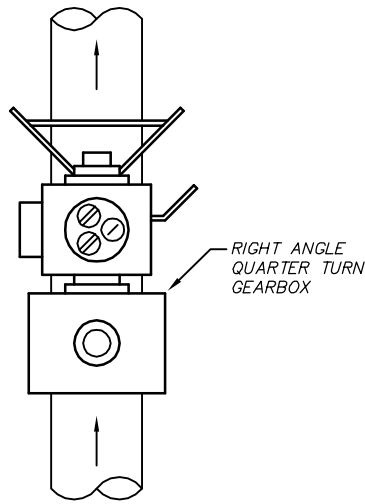


FIG. 1 ROTARY VALVE VERTICAL TYPE

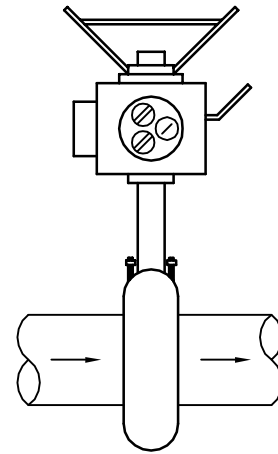


FIG. 2 SLIDE GATE HORIZONTAL PIPE

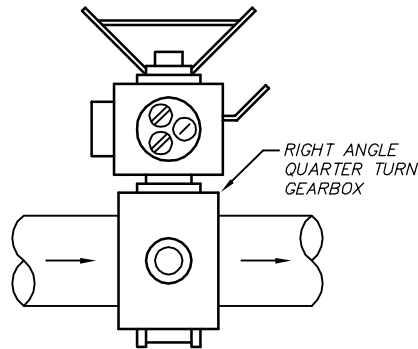


FIG. 3 ROTARY VALVE HORIZONTAL PIPE

NOTES:

1. FRONT VIEW IS DEPICTED AS 'OPERATIONS' SIDE OF PIPE.
2. INSTALL ACTUATOR WITH OPERATOR CONTROLS ON 'OPERATIONS' SIDE.

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TYPICAL ELECTRIC ACTUATOR
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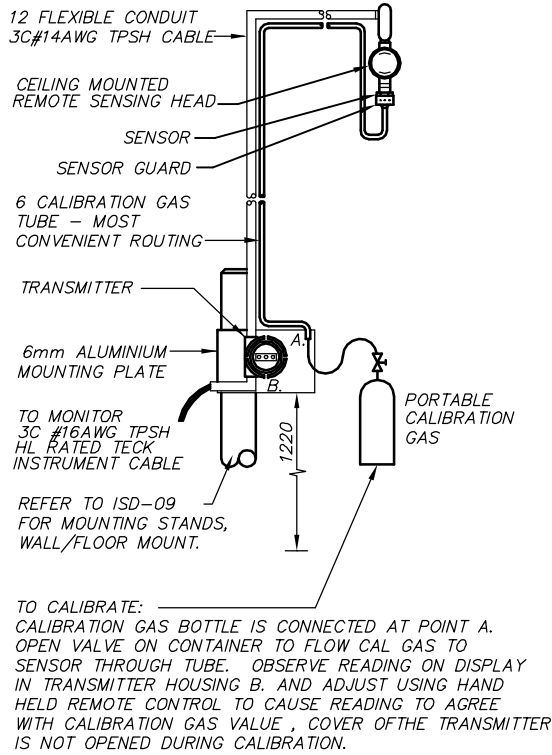
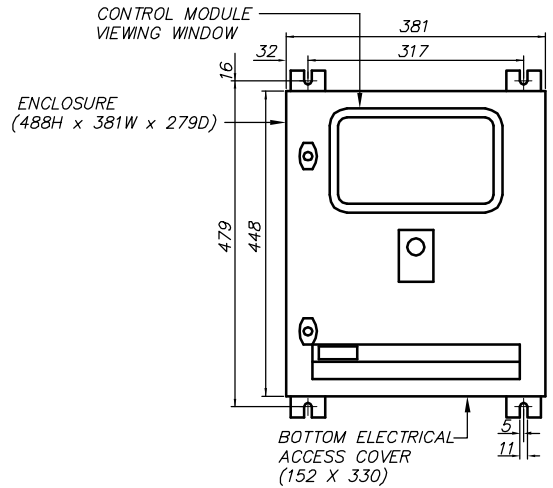
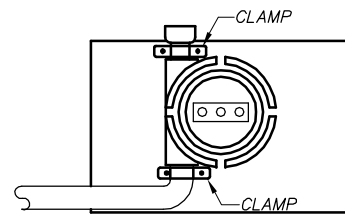


FIG. 1

COMBUSTIBLE GAS SENSOR



GAS MONITOR



MOUNTING PLATE DETAIL

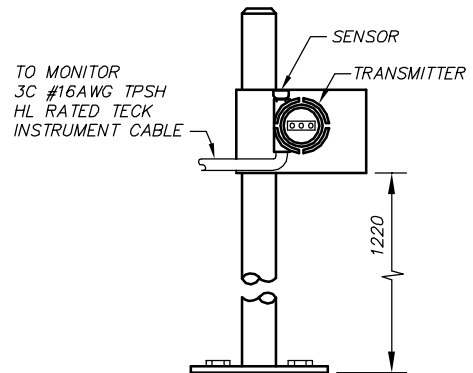


FIG. 2

H₂S AND O₂ GAS SENSOR

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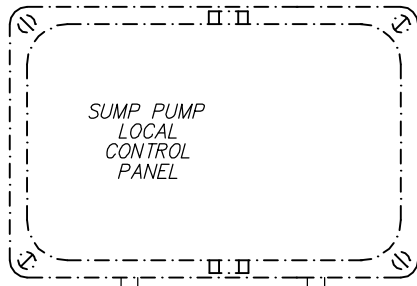
GAS DETECTION
SENSORS AND MONITOR
INSTRUMENT STANDARD DETAIL

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POWER AND CONTROL
CONDUITS

460 mm
(18")

CONDUIT SEAL (TYP.)

GUA OUTLET BOX (TYP.)

PROVIDE TERMINAL BLOCK
FOR CONTROL AND BUT
SPLICE FOR POWER WIRING.

TFF

U/S LEVEL
SENSOR

PUMP

SUMP PIT

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SUMP PUMP
INSTRUMENT STANDARD DETAIL

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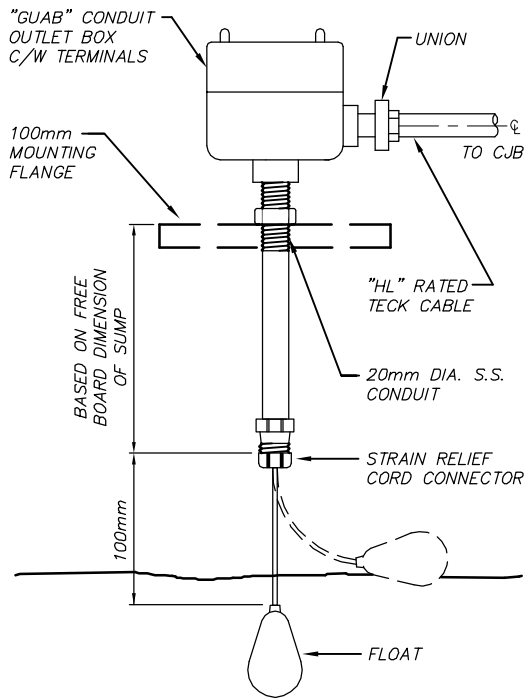


FIG. 1 FLOAT-TYPE LEVEL SWITCH
NON-HAZARDOUS AREA

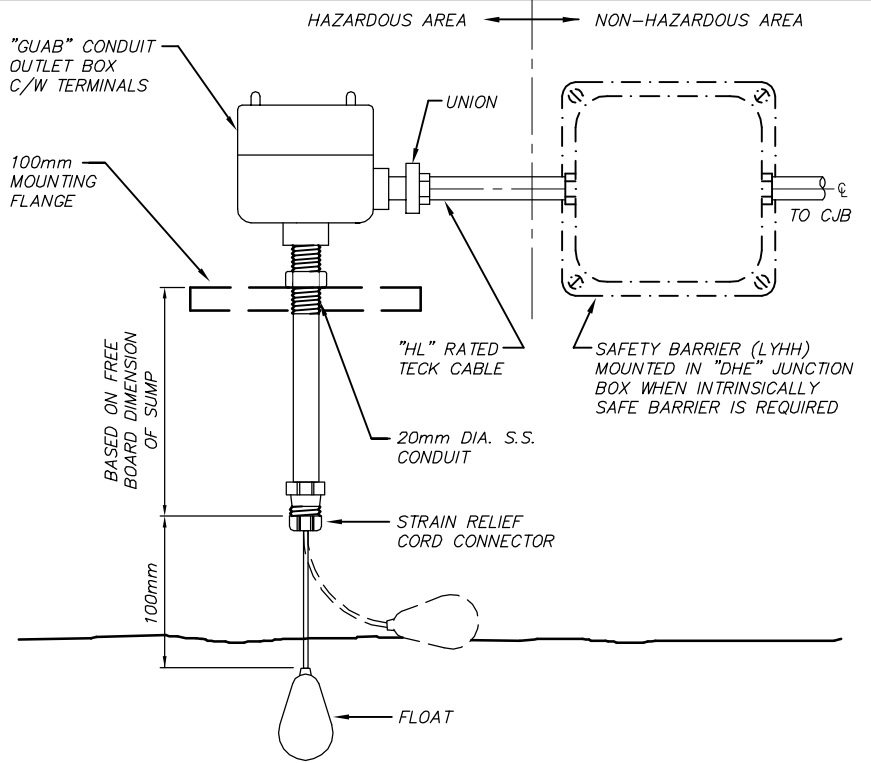


FIG. 2A FLOAT-TYPE LEVEL SWITCH
HAZARDOUS AREA

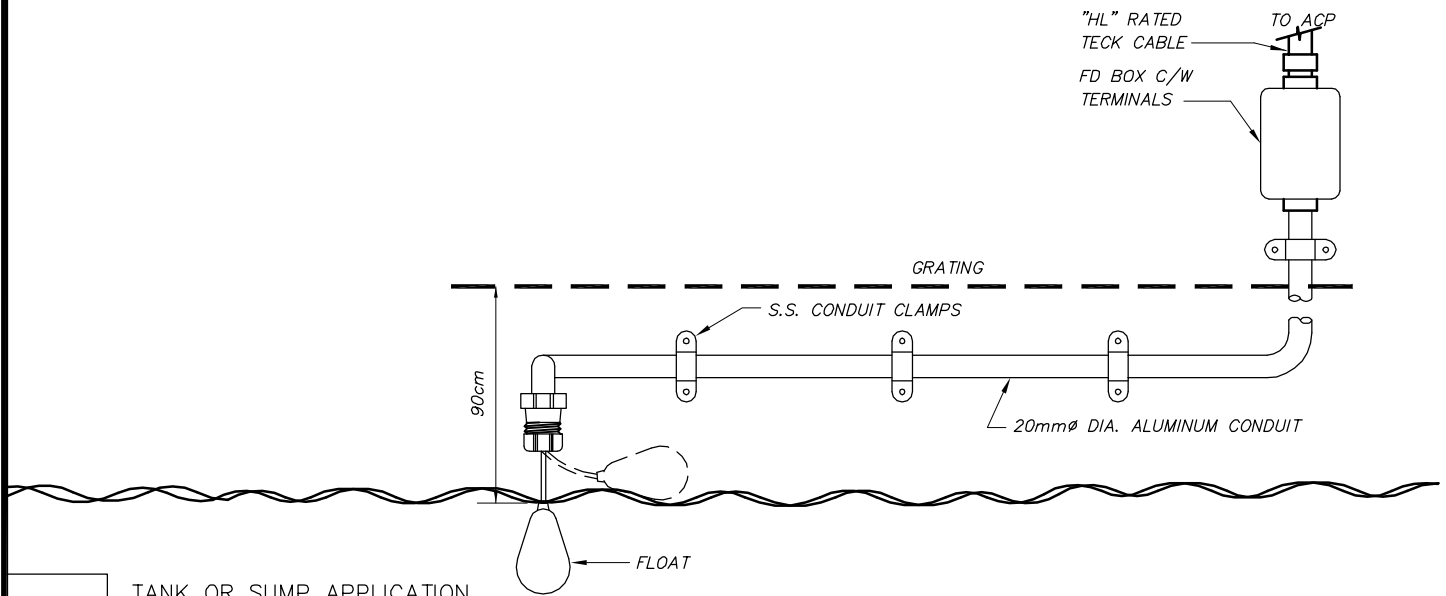


FIG. 2B TANK OR SUMP APPLICATION
LEVEL SWITCH-HAZARDOUS AREA

NOTES:

1. REFER TO DWG'S ISD-12 AND ISD-13 FOR HAZARDOUS AREA INSTALLATION.

2006-05-14 11:25pm By: chad.deisnider
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CITY OF WINNIPEG
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FLOAT LEVEL SWITCHES
INSTRUMENT STANDARD DETAIL

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ISD-19

BILL OF MATERIALS

ITEM	QUANTITY	MAKE	MODEL	DESCRIPTION
1	2	ALLEN BRADLEY	800H-HR2B	30.5MM TYPE 4X, 2 POSITION SELECTOR SWITCH, MAINTAINED POSITIONS ACCORDING TO CONTACT TABLE THIS DRAWING. C/W LEGEND PLATE.
2	1	WEIDMULLER	WDU 4	FEED THROUGH TERMINAL BLOCK
3	1	WEIDMULLER	TS35	35MM DIN RAIL
4	2	WEIDMULLER		END PLATE
5*	1	ALLEN BRADLEY	800H-2HZ4Y	FIBERGLASS 4X ENCLOSURE, 203.2MM(H)x114.3MM(W)x131.8MM(D) C/W BACK PANEL.
6	1			LAMACOID NAMEPLATE, WHITE LETTERING, BLACK BACKGROUND. TAG PER DEVICE. EX *F550-SV*.

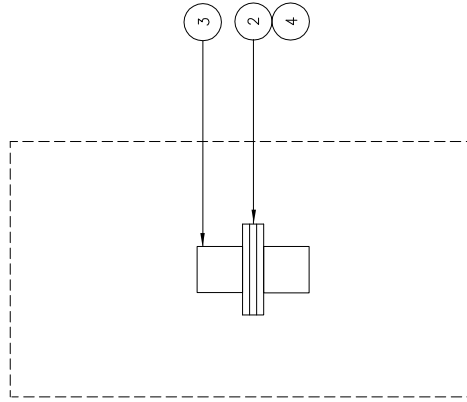
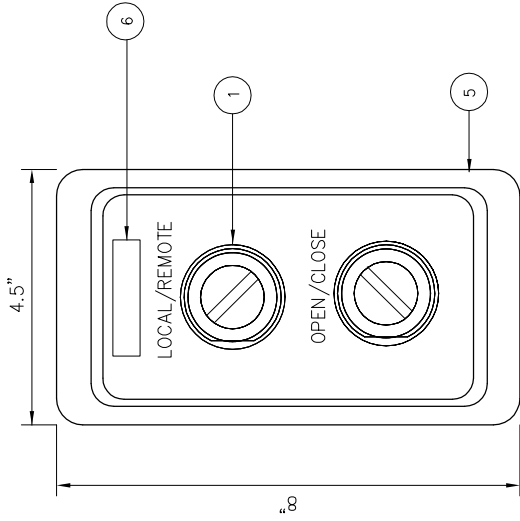
* OR APPROVED EQUAL

2-WAY SWITCH CONTACT TABLE

	A	L
1	X	O
2	O	X

X- CLOSED
O- OPEN

1



THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT
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DRAWING NO.
ISD-20

SOLENOID VALVE LOCATION CONTROL STATION
 LOCAL CONTROL STATION / LAYOUT & BILL OF MATERIALS

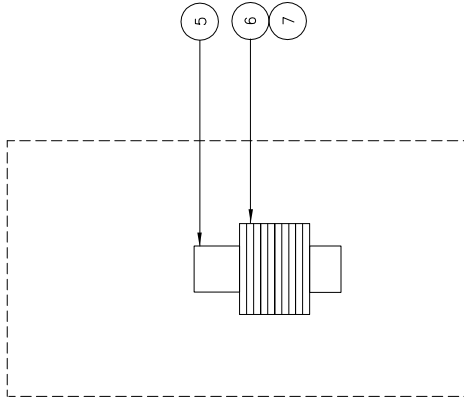
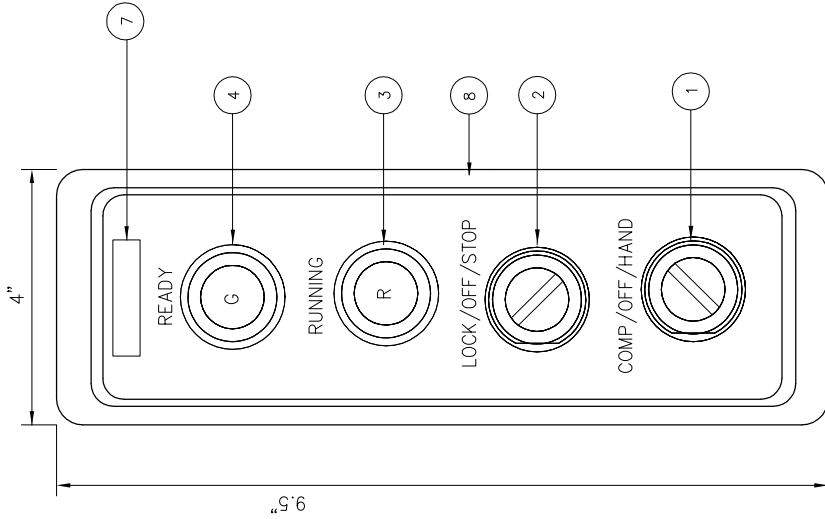
BILL OF MATERIALS

ITEM	QUANTITY	MAKE	MODEL	DESCRIPTION
1	1	ALLEN BRADLEY	800H-J2A	30.5MM TYPE 4X, 3 POSITION SELECTOR SWITCH, MAINTAINED POSITIONS ACCORDING TO CONTACT TABLE THIS DRAWING. C/W LEGEND PLATE.
2	1	ALLEN BRADLEY	800T-N10	30.5MM TYPE 4X, PUSH BUTTON W/ PADLOCKING ATTACHMENTS. FOR FLUSH HEAD PUSH BUTTONS.
3	1	ALLEN BRADLEY	800H-QRTH10R	30.5MM TYPE 4X, INDICATING LIGHT, RED.
4	1	ALLEN BRADLEY	800H-QRTH10G	30.5MM TYPE 4X, INDICATING LIGHT, GREEN.
5	1	WEIDMULLER	WDU 4	FEED THROUGH TERMINAL BLOCK
6	1	WEIDMULLER	TS35	35MM DIN RAIL (AS REQUIRED)
7	2	WEIDMULLER		END PLATE
8*	1	ALLEN BRADLEY	800R	FIBERGLASS 4X ENCLOSURE, 241MM(H)x97MM(W)x100MM(D) C/W BACK PANEL.
9	1			LAMACOID NAMEPLATE, WHITE LETTERING, BLACK BACKGROUND. TAG PER DEVICE. EX "F550-SV".

3-WAY SWITCH CONTACT TABLE

	C	O	H
1	X	O	O
2	O	X	O
3	O	O	X

X- CLOSED
O- OPEN



* OR APPROVED EQUAL

NOTE:



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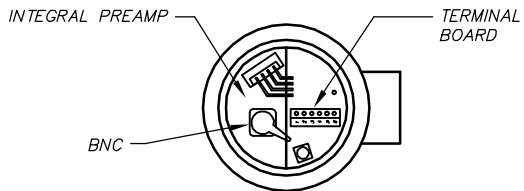
THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT
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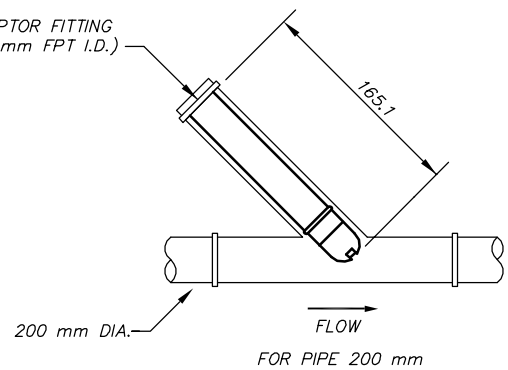
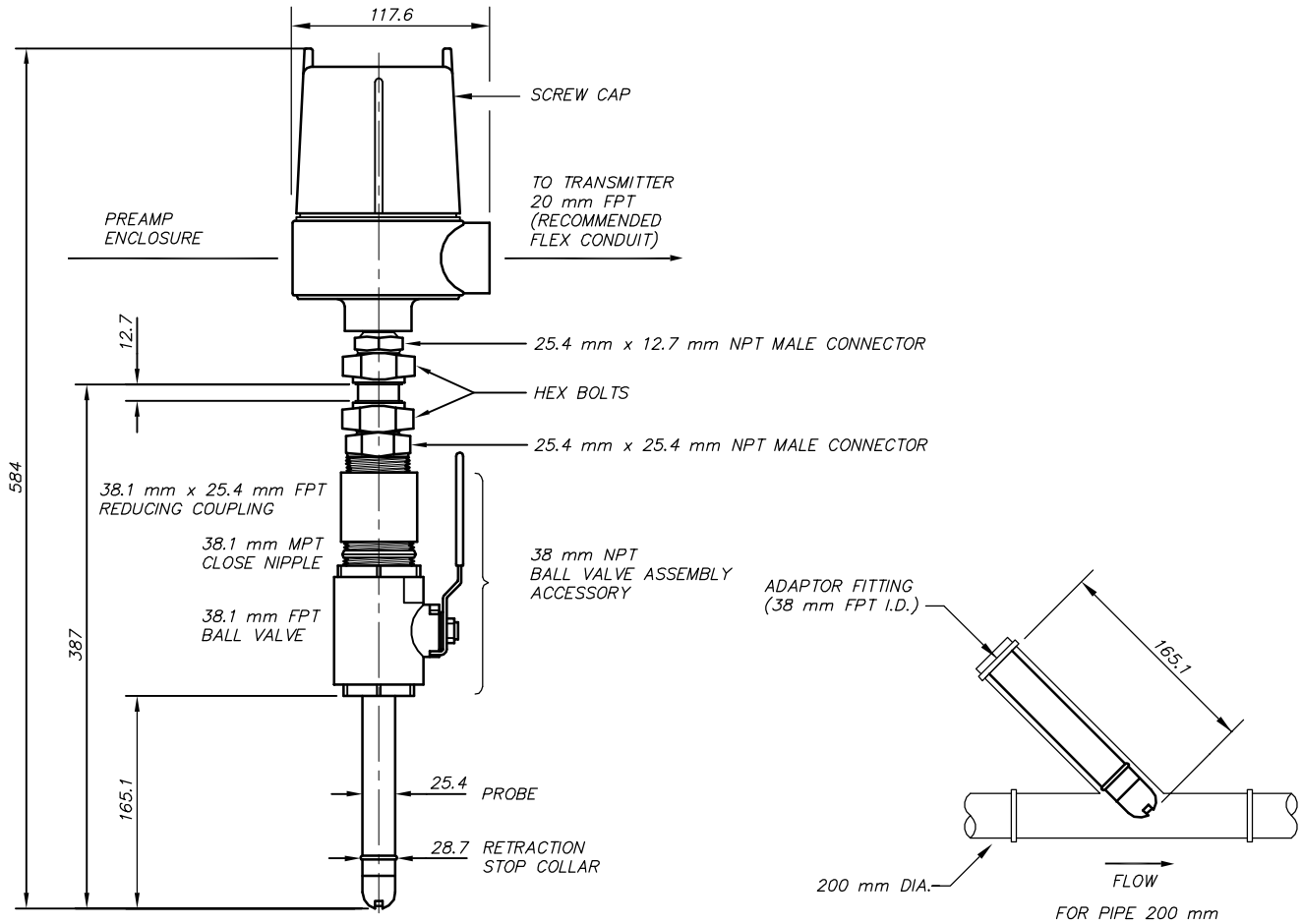
FIXED SPEED DRIVES LOCAL CONTROL STATION
 LAYOUT & BILL OF MATERIALS

DRAWING NO.
 ISD-21

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TOP VIEW
(SCREW CAP OMITTED FOR CLARITY)



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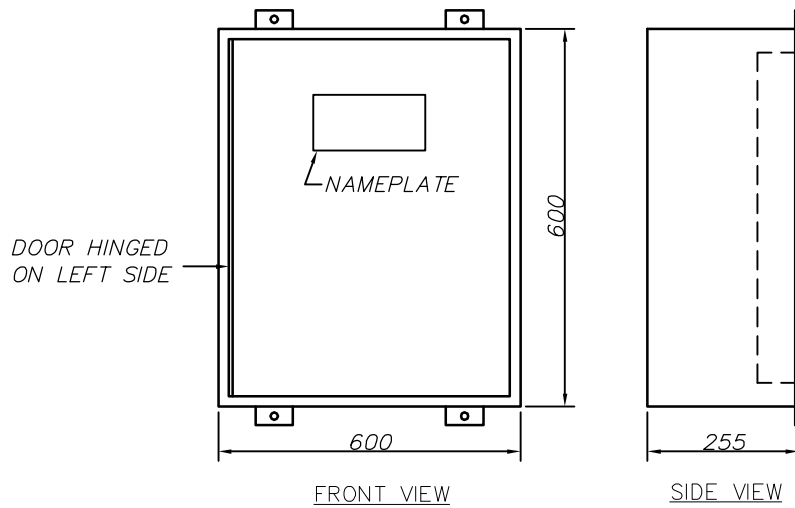
pH TRANSMITTER
INSTRUMENT STANDARD DETAIL

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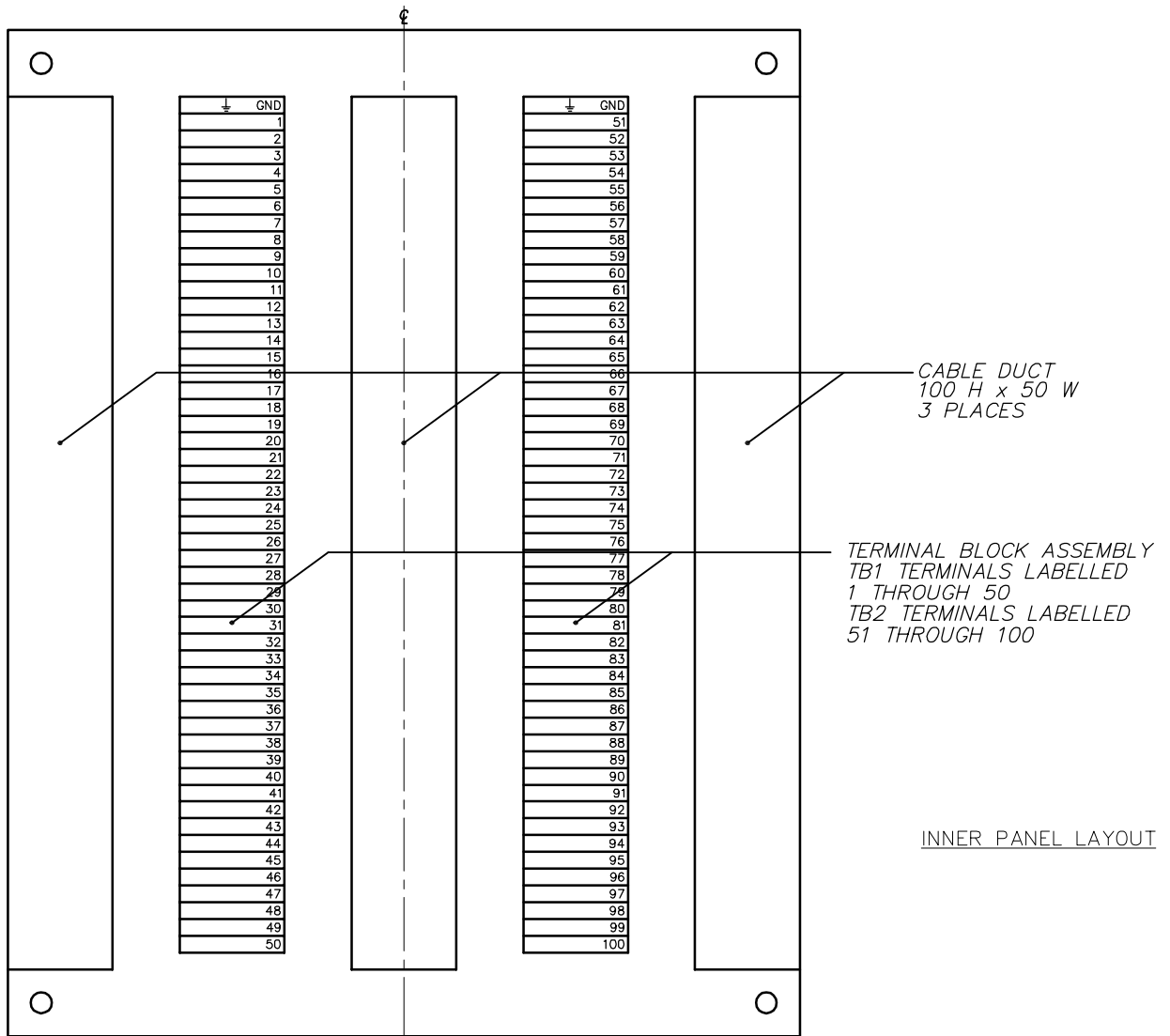
Earth Tech (Canada) Inc.
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Fax: (204) 284-2040

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 ISD-22



ENCLOSURE - EEMAC TYPE 4X
 HINGED DOOR
 WITH NEOPRENE GASKET, 12 GA FLANGED
 STEEL INNER PANEL



2006-04-27 1:13pm By: chad.deisnider
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CITY OF WINNIPEG
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'100' TERMINAL JUNCTION BOX
 INSTRUMENT STANDARD DETAIL

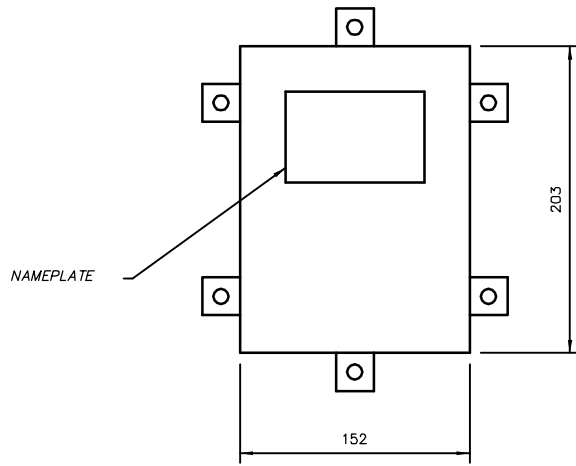
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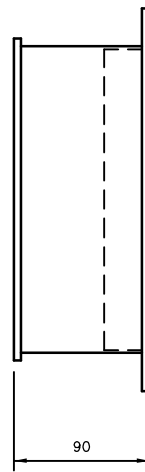
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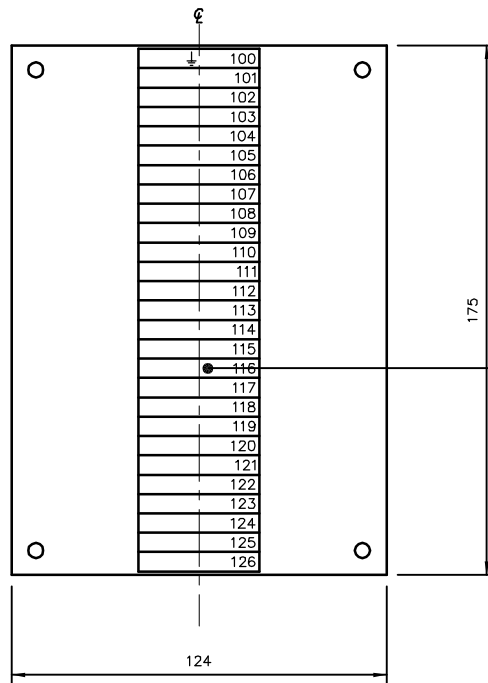


FRONT VIEW



SIDE VIEW

ENCLOSURE - EEMAC TYPE 4, WELDED ALUMINUM CONSTRUCTION, REMOVABLE COVER WITH NEOPRENE GASKET, 14 GA STEEL INNER



TERMINAL BLOCK ASSEMBLY
DO NOT USE RAIL
STAND OFF.

INNER PANEL LAYOUT

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CITY OF WINNIPEG
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'25' TERMINAL JUNCTION BOX
INSTRUMENT STANDARD DETAIL

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