TOWN OF HENNIKER, NEW HAMPSHIRE

Town Hall
18 Depot Hill Road
Henniker, NH 03242
Tel: (603) 428-3221

Wastewater Commissioners
STAFF REPORT

DATE: 10/17/2023
TITLE: WWTP Dewatering Award
INITIATED BY: Underwood Engineering; Rich Slager, WWTP Superintendent
PREPARED BY: Diane Kendall, Town Administrator
PRESENTED BY: Diane Kendall

AGENDA DESCRIPTION: Request Board of Selectmen award bid for purchase of dewatering equipment for the WWTP.

LEGAL AUTHORITY: Purchase policy
FINANCIAL DETAILS: $295,000 equipment purchase only.

BACKGROUND:
The sludge dewatering equipment (Belt Filter Press) was identified in the 2019 asset management report as the highest priority for replacement. The previously used belt filter press was bought in 1988. While it is still operational, it has exceeded its estimated useful life, parts are no longer available, and it requires excessive staff time in order to keep it in service. In summer 2023, the press was not operable for several weeks and cost considerable time and funding to repair.

The NH Department of Environmental Services (NHDES) completed its review of the Request for Proposals (RFP) for pre-purchase of dewatering equipment for the WWTF Upgrade Project (Underwood, September 2023) in Henniker, NH, and approved.

Underwood drafted the RFP, it was posted on the website and published in the Union Leader. Bid results were received on October 12 and forwarded to Underwood for review and recommendation.

TOWN ADMINISTRATOR COMMENTS: recommends awarding as stated in attached letter from Underwood.

WASTEWATER SUPERINTENDENT: recommends bid award to BDP Industries.

SUGGESTED ACTIONS / MOTIONS:

Motion: *Motion to award the Screw Press Dewatering System for the Henniker WWTF Upgrade to BDP Industries Inc. of Greenwich, NY in the amount of $295,000.00*

civil &
environmental
engineering

UNDERWOOD
engineers

2801.21

October 16, 2023

Ms. Diane Kendall, Town Administrator
Town of Henniker
18 Depot Hill Road
Henniker, NH 03242

Re: **Dewatering System Award Recommendation**
Henniker WWTF Upgrade
CWSRF No. CS-334118-04

Dear Diane

We have reviewed the bids received for the above-referenced project and have compiled the attached Bid Tabulation. Based on this compilation and our evaluation of the submitted bids, we recommend the Town of Henniker award the dewatering system to **BDP Industries Inc** of **Greenwich, NY** in the amount of **$295,000.00**.

Upon the Town's confirmation to award we will need to obtain approval from NHDES. Once approved the Town can then proceed with the formal purchase order for the equipment.

Please call if you have any questions in the meantime.

Very truly yours,

UNDERWOOD ENGINEERS, INC.

Stephen E. Smith, CEng MICE
Senior Technical Leader

Enclosures

cc: David Mercier - UEI

ph 603.230.9898
fx 603.230.9899
99 North State Street
Concord, NH 03301
underwoodengineers.com

BID TABULATION - HENNIKER WWTF, NH

2801 - PRE-PURCHASE DEWATERING SYSTEM

BID OPENING - THURSDAY OCTOBER 12TH, 2023 @ 2:00PM

Bidder Award

BID ITEM DESCRIPTION	Quantity	Units	BDP		Huber		FKC		BDP	
			UNIT PRICE	COST	UNIT PRICE	COST	UNIT PRICE	COST	UNIT PRICE	COST
Screw Press Dewatering System and Ancillary Equipment	1	LS	$ 295,000.00	$ 295,000.00	$ 315,000.00	$ 315,000.00	$ 323,132.00	$ 323,132.00	$ 367,000.00	$ 367,000.00
TOTAL BID PRICE			**$**	**295,000.00**	**$**	**315,000.00**	**$**	**323,132.00**	**$**	**367,000.00**

Notes :

1. Lowest bid shall be the basis for award of the contract.
2. Bid received from Archie Supply on October 4th, 2023 for $71,500.00 was **REJECTED** in its entirity due to being a non-conforming bid.
3. No errors (other than the informalities listed below) were found when tabulating the bids and there is no change to the lowest bid.
4. The bid received from BDP for $367,000 was submitted to meet the minimum filtration area of 56 SF per specification clause 2.3.C.9. The value quoted in the specification was an error and should have been 25 SF.

Bids Tabulated By:
Stephen Smith, CEng MICE (UK)

ENGINEER 10/16/23 DATE:

Bids Checked By:
David J. Mercier, P.E (NH, VT)

ENGINEER 10/16/23 DATE:

THE INFORMATION IN THE ABOVE TABULATION IS A TRUE AND ACCURATE REFLECTION OF THE BIDS AFTER REVIEW BY THE ENGINEER

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

September 5, 2023

Steve Smith, CEng MICE
Senior Technical Leader
Underwood Engineers
99 North State Street
Portsmouth, NH 03301

Re: Henniker, NH – WWTF Upgrade
NHDES Project No. D2023-0402

EQUIPMENT AUTHORIZATION TO BID

Dear Mr. Smith:

The NH Department of Environmental Services (NHDES) has completed its review of the Request for Proposals (RFP) for pre-purchase of dewatering equipment for the WWTF Upgrade Project (Underwood, September 2023) in Henniker, NH, and hereby approves same. Procurement of the equipment is potentially eligible for NHDES funding assistance under Chapter Env-Wq 500 (State Water Pollution Control Revolving Loan Fund) and the American Rescue Plan Act (ARPA). The project is therefore subject to certain bidding/contract procedures and documentation requirements which require your careful attention, as follows:

1. Bid Date: As cited in the approved RFP, bids are due by 2:00 PM, October 12, 2023, to the Town of Henniker. Please advise this office of any changes to this date.

2. Addenda. Any changes made to the approved RFP during the bid period must be by *addenda*, as reviewed and approved by NHDES and issued at least five (5) days prior to the bid date.

3. American Iron and Steel. This project is subject to an "American Iron and Steel" procurement requirement, which requires the contractor for the WWTF construction contract use iron and steel products produced in the U.S.

4. Contract Award. Upon completion of the bidding process, please forward to NHDES the following information and documentation for our records:

   a. A tabulation of all bids that were received;

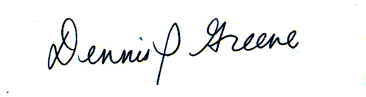
   b. A letter signed by the Town's authorized representative, indicating the name of the bidder to whom a contract will be awarded;

   c. The bid proposal of the bidder to whom a contract will be awarded;

   d. Evidence that results of the bidding process are made available to the public.

Feel free to contact me at the address below, or by e-mail at dennis.greene@des.nh.gov, if you need further assistance regarding this matter.

Sincerely,



Dennis J. Greene, P.E.
Sanitary Engineer
Wastewater Engineering Bureau

cc: *Diane Kendall – Town Administrator, Town of Henniker*
Alysha Clark – NHDES/Grants Mgt. Section
Kathleen Bourret - NHDES/Grants Mgt. Section

TOWN OF HENNIKER, NH

REQUEST FOR BIDS
FOR
SCREW PRESS DEWATERING SYSTEM

FOR THE

HENNIKER WWTF UPGRADE

SEPTEMBER 2023

Prepared and Copyrights by

Underwood Engineers, Inc.
99 North State Street
Concord, New Hampshire 03301

UE FILE NO. 2801

Table of Contents

SECTION 1 – BIDDING REQUIREMENTS

1.1 Request for Bids

The Town of Henniker is requesting submission of bid proposals from select Equipment Manufacturers of screw press dewatering systems for prepurchase followed by installation by a contractor under a separate contract. Equipment Manufacturers that are invited to submit proposals are limited to **BDP, FKC**, and **Huber**. The goal of this bid request package is to select an Equipment Manufacturer from which to prepurchase the equipment upon which installation bidding documents for the Henniker Wastewater Treatment Facility (WWTF) Upgrade project will be based.

The Equipment Manufacturers shall provide one (1) screw press dewatering system and ancillary equipment to replace the existing one (1) belt filter press dewatering system at the Henniker WWTF. The Equipment Manufacturers shall provide a lump sum price for the one (1) screw press unit and all ancillary equipment associated with the screw press dewatering system.

Equipment Manufacturers should submit a sealed bid to the:

Town of Henniker
Attn: Diane Kendall, Town Administrator
18 Depot Hill Road
Henniker, NH 03242

Bids shall be submitted no later than **2:00 p.m. on Thursday, October 12th, 2023.** In lieu of mailed bid packages, manufacturers may submit electronic bid packages to Diane Kendall at the following e-mail address: diane.kendall@henniker.org. E-mailed bids must also be received no later than the date and time stated above.

Written questions or requests for interpretation of the Bidding Documents will be accepted via e-mail no later than **Tuesday October 3rd, 2023, at 4 p.m**. Requests should be sent to:

Stephen Smith, Senior Technical Leader
ssmith@underwoodengineers.com

Responses to questions will be compiled and issued by addendum via e-mail to all parties invited to submit a proposal by **5 pm on Thursday October 5th, 2023**.

The Town of Henniker reserves the right to accept or reject any or all bid proposals submitted and waive informalities and technicalities. The Town will review and analyze each proposal and reserves the right to interview selected Equipment Manufacturers. The Town shall select the Equipment Manufacturer, which in the Town's opinion, has made the proposal best suited to the needs and goals of the Town and its operations and deemed in compliance with the terms of the Bid Documents.

END OF SECTION

1.2 Instruction for Bidders

Manufacturers shall fill in the Bid Schedule in **Section 1.3**, which is a lump sum for the equipment being requested for the Henniker WWTF Upgrade project. The scope of equipment supply includes:

- One (1) Screw Press Unit
- One (1) Polymer Dosing System
- One (1) Polymer Injection Equipment
- One (1) Control Panel

The proposed screw press dewatering system proposals shall also include the following:

- Cutsheets on the recommended screw press to best address the performance criteria listed in the attached Specification 11350. The cutsheets shall also include the equipment weight.
- Dimensional drawings of the screw press unit, polymer dosing system, and control panel. Electrical diagrams shall also be provided.
- How many years your organization has been in business supplying screw presses for wastewater applications, and total number of units sold for wastewater applications.
- List of current New England screw press installations including contact information and noting the type of sludge being dewatered at that installation.
- Discussion on the availability of service representatives to perform maintenance on the screw press as required. Include the locations of these service representatives and the hourly and/or trip rates for service to **Henniker, NH**. Proposals should note the typical durations (hours) between each milestone service, and the approximate time it will take to schedule a service.
- Warranty terms and conditions.
- Payment terms and conditions.
- Delivery schedule once the shop drawing is approved.
- A list of deviations (if any) between the attached Specification 11350 and the proposal.

Interpretations or questions regarding the proposal will be responded to via an Addendum that will be emailed to all parties invited. Questions received less than **7 days** prior to the date on which bids must be submitted by will not be answered. Equipment Manufacturer's must acknowledge receipt of the Addendum.

END OF SECTION

1.3 Bid Schedule

Bid Item	*Est. Qty.*	*Bid Item Description and Unit Price in Words*	*Unit Price in Figures (Dollars and Cents)*	*Extended Total in Figures (Dollars and Cents)*
BID: SCREW PRESS DEWATERING SYSTEM				
1	Lump Sum	Screw Press Dewatering System and Ancillary Equipment: _____ _____Dollars and _____Cents per L.S.	per_____ L.S.	_____

NOTE: BIDS shall include sales tax and all other applicable taxes and fees.

TOTAL BID PRICE:

(In figures) $_____

(In words) _____ Dollars and

_____ Cents

BID CONDITIONS

1. This Proposal shall be filled in by the BIDDER with prices written in both words and numerals and the extensions made by him/her. In case of discrepancy between words and numerals, the amount shown in words shall govern.
2. In the case of discrepancy between the Unit Price given and the Total Price of an Item, the Unit Price shall govern.
3. The BIDDER agrees that the Bid shall be valid and may not be withdrawn for a period of **sixty (60) calendar days** after the scheduled closing time for receiving bids.

END OF SECTION

SECTION 11350

SCREW PRESS DEWATERING SYSTEM

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The screw press equipment specified in this section shall be provided by a single supplier to ensure coordination and compatibility of equipment.

B. The screw press manufacturer is advised to familiarize themselves with the overall plant process in order to evaluate the compatibility of their equipment to dewater the particular sludge generated.

C. The manufacturer shall provide one (1) complete Screw Press dewatering system as specified herein. The system shall include the following: screw press unit, polymer dosing system, and control panel. The screw press dewatering system must be complete and integrated such that it can operate in a fully interlocked manner while achieving the performance requirements as specified in this document.

D. The dewatering system shall be designed to concentrate and dewater wastewater sludge by means of a screw press. The connected ancillary equipment as stated within this specification shall be supplied by the Screw Press Manufacturer to ensure system compatibility and system responsibility.

1.2 DESCRIPTION OF SYSTEM AND PERFORMANCE CRITERIA

A. Screw Press Operational Requirements: The Screw Press (referred to as “screw press” or “press” in the remainder of this document) shall meet the following operating parameters when processing the sludge specified.

1. The screw press unit shall be capable of meeting the performance criteria as set forth below:

a. Performance:

PARAMETER	REQUIREMENT
Sludge Type	Secondary Waste Activated Sludge
Sludge Feed Solids (% wt)	0.5 – 0.8
Solids Throughput (dry lb/hr)	123
Sludge Flow Rate (gpm)	31 to 49
Maximum Polymer Dosage (act. lb/dry ton)	60
Minimum Discharge Cake Solids (% wt)	14
Minimum Solids Capture (%)	95

B. Process Performance Test and Guarantee: Once a representative sludge has been established, the manufacturer shall operate the press at or above the required flow rate and solids loading for a minimum period of 6 hours with samples of feed, discharge cake, and filtrate collected hourly. Samples will be analyzed per ASTM standards for total suspended solids (TSS) and total solids (TS), and the results averaged. The average cake solids and polymer dosage must be better than the above requirements in order to demonstrate compliance. Should the screw press fail to meet the minimum standards specified, the following shall occur:

   1. Plant operating procedures shall be reviewed to determine that the sludge is in fact representative of normal operation and within the design specifications.
   2. If it is determined that the sludge is representative and within these specifications, the manufacturer shall make any modifications necessary to accomplish the specified performance levels.
   3. If the sludge can be demonstrated as representative and within specified parameters and if the manufacturer cannot meet the performance, the owner may elect to have the manufacturer remove the unit and refund any monies paid.

1.3 QUALIFICATIONS

A. The screw press equipment shall be furnished by a single supplier who has a minimum of twenty years' experience in the manufacture of sludge dewatering equipment. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods, and shall be equal to Basis of Design.

B. The equipment manufacturer must meet all of the following criteria:

   1. Equipment manufacturer shall be a certified UL508 panel shop for the last 10 years.
   2. All buy-out items on the screw press shall be standard off-the-shelf mounts. The screw press manufacturer must also supply all of the original part numbers for all original equipment manufacturers' buy-out items as well as a list of local suppliers located near the installed location.

C. These specifications describe equipment of a certain level of quality and process capability. There are specific areas affecting process functions, operation and maintenance, and reliability under which no exceptions shall be allowed. These are as follows:

   1. High Strength Tubular Stainless-Steel Frame Construction with Machined Bearing Pads.
   2. 304 Stainless Steel Construction.

D. The balance of this specification shall determine the quality level under which equipment shall be reviewed.

E. The owner and engineer reserve the right to reject any bid that does not meet all of the machine requirements as detailed in this specification.

PART 2 - MATERIALS AND EQUIPMENT

2.1 GENERAL

A. The equipment covered by these specifications is intended to be screw press dewatering equipment of proven ability as manufactured by reputable concerns having long experience in the production of such equipment. The equipment furnished shall be designed and constructed in accordance with the best practice and methods.

B. All components of the sludge dewatering equipment shall be engineered for long continuous and uninterrupted service. Provisions shall be made for easy lubrication, adjustment, or replacement of all parts. Corresponding parts of multiple units shall be interchangeable. Except as otherwise specified, steel plates and shapes shall have a minimum thickness of 1/4" and bolts shall have a minimum diameter of 1/2".

C. All welding shall be in accordance with the latest acceptable codes of the American Welding Society ANSI/AWS D1.6.

D. All material used in the construction of the sludge dewatering equipment shall be of the best quality and entirely suitable in every respect for the service required. All structural steel shall conform to the ASTM standard specification for structural stainless steel, designation A554-MT304. All iron casting shall conform to the ASTM standard specification for gray iron casting, designation A48-76, and shall be of a class suitable for the purpose intended. Other materials shall conform to ASTM specifications where such specifications exist; the use of such material shall be based on continuous and successful use under the similar conditions of service.

E. Unless otherwise specified herein, all metal parts in contact with polyelectrolyte or sludge shall be type 304L stainless steel. All fasteners, pins, and anchor bolts shall be type 304L stainless steel.

F. All fiberglass-reinforced plastics (FRP) shall be manufactured in conformance with NBS standards PS15-69.

2.2 SURFACE PROTECTION

A. The main frame and other misc metals, excluding drives, shall be stainless steel per ASTM A554-MT304 specification. Buyout items will be covered with the following paint system:

   1. First coat of Tnemec #66 epoxy of contrasting color to a minimum of four (4) dry mils thickness.

   2. Apply a second coat of Urethane topcoat, finished color, minimum of four (4) mils thickness. Total thickness of the two (2) coats will be a minimum of eight (8) mils dry.

   3. Flame sprayed galvanizing is not acceptable.

B. All pre-painted purchased equipment such as electrical motors, gear boxes, etc., are to be painted with a final coat of the above system.

C. The control panel enclosure shall be Nema 4 X constructed of type 304 stainless steel. Inside of the box shall be white.

2.3 MECHANICAL DETAILS

A. Main Structural Frame

1. The frame shall be fabricated from stainless steel structural members designed to adequately support all components and accessories. Steel shall meet the requirements of ASTM A554-MT304; all welding shall be performed in accordance with ANSI/AWS D1.6. Where frame components are bolted, stainless steel fasteners shall be used.
2. The fabricated steel frame shall be designed to withstand the maximum stresses imposed on the individual members with a safety factor of 5. Specifically, the maximum actual stress on any member, connection, plate, etc., shall not exceed 1/5 of the yield strength of the frame material used. The deflection ratio of any structural member shall not exceed L/600 where L is the member span.
3. Drip pans shall be fabricated of a minimum 14-gauge type 304L stainless steel and shall collect filtrate.
4. The framework shall be constructed in such a manner that it will insure absolute plane parallelism of all rotating elements by machined bearing pads.
5. The framework shall be of welded and/or bolted construction. No disassembled component shall weigh more than 5,000 lbs. Lifting lugs shall be provided as necessary to afford convenient access to maintenance points throughout the screw filter.

B. Flocculation/Conditioning System - To achieve rapid contact between sludge particles and a solution of dilute polyelectrolyte, provide:

1. One (1) 316L stainless steel, venturi mixer. The mixer shall be equipped with a Vortex polymer injection ring with four (4) tangentially mounted polymer injectors. The mixer shall be located upstream of the screw presses. The screw press manufacturer shall recommend the proper layout of the system.

C. Pressure Zone

1. The screw press shall be supplied with a tapered shaft design with a smaller diameter at the inlet and a large diameter at the discharge.
2. Designs that utilize a variable pitch with constant shaft diameter, or designs with two-stage shaft diameters are not allowed.
3. The basket assembly around the screw must be constructed of stainless steel with slotted openings to allow for maximum porosity and avoidance of small diameter holes that tend to plug.
4. Designs that utilize basket assemblies constructed of wedge wire or moving rings will not be allowed.
5. The design of the screw auger shall be a tapered shaft to reduce the volume and therefore provide an increasing pressure profile on the solids. The tapered shaft of the screw is designed to force the sludge closer to the slotted screen, thus reducing the path length for liquid to be expressed from the cake. The tapered shaft reduces the potential of plug formation, where the cake turns with the screw and is not conveyed to the discharge point.

6. The high-pressure section shall consist of a variable pressure cone shaped plate on the discharge opening of the screw press. The cone shall be pneumatically adjustable for automatic operation that avoids binding.
7. Units that do not include a pressure cone will not be considered.
8. The cone shall be actuated pneumatically in both directions.
9. Minimum effective filtration area of the pressure zone of the screw press shall be 56 sq. ft.

D. Shower Wash System

1. A wash station shall wash the screw press. The wash system shall use high-pressure water spray nozzles. The spray assembly shall be housed in an enclosure in a manner that contains the spray pattern and mist within the housing assembly. The housing and nozzle assembly shall be readily removable. The housing shall be fabricated from type 304 stainless steel.
2. The screw shower shall be pneumatically actuated with an adjustable timer setting on the OIT.
3. The screw system shower bar shall have nozzles placed to wash both the basket and the inside of the enclosure for simplified operation.
4. Wash water required shall not exceed an average of 4 GPM per unit at 80 psi.
5. The shower system shall include a dual basket strainer.
6. Each screw press shall be provided with a 3 HP wash water booster pump that will be installed as shown on the contract drawings. The wash water booster pump shall be a Goulds model eSV or approved equal.
7. Each shower header shall include a motorized ball valve for remote control of the shower as well as for pre-set timed intervals to wash the equipment.

E. Drives

1. The screw press drive shall be a 3.0 HP variable speed with a variable frequency AC drive unit. Multiple belt drives shall not be acceptable.
2. The nominal input horsepower rating of each gear or speed reducer shall be at least equal to the nameplate horsepower of the drive motor. Each drive unit shall be designed for 24-hour continuous service.
3. Each gear reducer shall be totally enclosed, water spray proof, oil lubricated with anti-friction bearings throughout. All motors shall be TEFC.
4. The screw auger drive shall be a 3.0 HP, shaft-mounted motor and gear reducer assembly. The drive must be on the discharged end of the screw shaft to reduce wear on the screen and flights due to deflection of the screw shaft.
5. The drives shall be furnished with provisions for use on 480-volt, 60 hertz, 3-phase power supply.

F. Safety Guards -All equipment having exposed moving parts such as fans, V-belts, gears, couplings, chains, and including the pressure roll section, shall be provided with safety guards as required by OSHA standards.

G. Bearings

1. The shafts shall be equipped with heavy-duty greaseable type, self-aligning ball or roller bearings in sealed, splash proof housings. The housing shall be sealed to provide adequate protection from moisture and grime.
2. All bearings shall have a minimum B-10 bearing life of 500,000 hours based on ANSI-B13.6-1972. The B-10 bearing life of 500,000 hours shall be based on the maximum summation of all forces applied to the bearing.
3. Bearings and housings shall be US manufactured and shall be manufactured by FMC Corporation, Link-Belt Division, Indianapolis, Indiana; Reliance Electric Industrial Company, Dodge Division, Greenville, South Carolina, or approved equal.

H. Drainage Pans - Drainage pans shall be supplied as necessary to contain all filtrate and wash water within the unit and to reduce rewetting of downstream cake. Filtrate and wash water pans shall be constructed of minimum 14-gauge type 304 stainless steel. All drainage piping shall be furnished adequately sized for the intended service and rigidly attached to the press frame.

2.4 POLYMER FEED SYSTEM

A. General Requirements

1. The press manufacturer shall provide as a part of the total dewatering equipment package, One (1) polymer feed system capable of automatically metering, diluting, activating and feeding a liquid polymer with water.

B. Polymer Dosing Unit

1. Polymer and water shall be mixed in a chamber designed to create sufficient mixing energy. This design shall include a progressive cavity metering pump, solenoid valve and pressure regulator.
2. The pumps shall have an adjustable speed with a variable frequency drive. The pumps shall be supplied with a 1/2 hp, 120 volt AC motor.
3. A motor driven impeller mixer shall be provided that will mix the polymer and water into solution.

C. Polymer Feed Pump

1. The polymer system shall be equipped with progressive cavity pump each capable of pumping up to 5 GPH.
2. The pump shall be designed with a high viscosity wet end pump capable of pumping neat polymer solution to the mixing chamber.
3. The pump shall be a Seepex, Netzsch, or approved equal.
4. The drive motor shall be a variable speed, 1/2 horsepower, complete with an SCR control unit. The SCR control unit shall have local speed adjustment, ON-OFF switch and

running indication. The control unit shall provide adjustments of feed rate over a range of 20 to 1.

D. Dilution Capability

1. The primary dilution shall feed into the motorized mixing chamber and shall be capable of 1200 GPH.
2. The dilution capability shall be adjustable with a clear rotameter with a stainless steel float.
3. Furnish a solenoid valve or ON-OFF control of dilution water supply

E. Emulsion Unit Control Panel

1. Each polymer system shall be supplied with a NEMA 4X control panel that provides an automated mixing system. The controls for the polymer make-down system shall be supplied in the screw press control panel.
2. The control panel shall include all timers and relay for a complete manual and auto system. The polymer mixer chamber and metering pump shall turn on and the water solenoid valve shall open.
3. The polymer feed pump shall include start/stop indicating lights, potentiometer and local remote control.
4. The polymer mixer and polymer metering pump shall be provided with start/stop pushbuttons, indicating lights and motor starters.
5. Single phase, 120 volt, 60 Hertz power shall be supplied to the main control panel.
6. All devices within the panels shall be permanently identified. Nameplates shall be made of laminated phenolic materials with a black face and white core.

2.5 ELECTRICAL REQUIREMENTS

A. General Requirements

1. Provide one (1) control panel constructed of 304 stainless steel, NEMA 4X construction.
2. The panel shall be a full operating panel complete with all motor control and supervisory devices for press-mounted and ancillary equipment. All electrical work shall be performed in accordance with applicable local and national electric codes. The control panel shall include an Allen Bradley Compact Logix PLC and a 12” color OIT Panel View Plus 7 touch screen. An Ethernet connection shall be provided for communication with plant control system. Allen Bradley AC Power Flex 525 Variable Frequency Drives shall be used for each of the following individual components in the local control panels: Screw Press drive, and the Filtrate Recycle Pump drive.
3. The ancillary equipment to be controlled by this panel includes the sludge feed pumps, polymer blending unit, washwater booster pump, discharge conveyor system. The washwater booster pump will have a motor starter in the control panel. All motor starters and VFDs will be protected by in-line dedicated circuit breakers. The PLC will include logic for all necessary system interlocks and will control process and emergency shutdowns.

4. The controls shall be such that selection of the desired ancillary equipment is easily accomplished at the OIT touchscreen for the Screw Press.
5. Three phase, 460 volt, 60-Hertz power shall be supplied to the control panels. A control transformer will be provided for 120-volt, single phase power source for motor starter coils, lights, relays, timers, controllers, and other related items.
6. The control panel shall be provided with terminal blocks for power wiring to and from the panel. The incoming terminal blocks shall be provided with a single magnetic circuit breaker disconnect switch. Circuit breaker protected motor starters with thermal overloads shall be supplied for each motor furnished with the unit.
7. All electrical equipment controls located on each screw press shall have NEMA 4X enclosures and wired, through PVC conduit, to a single common NEMA 4X terminal box.
8. All devices within the panel shall be permanently identified. Nameplates shall be provided on the face of the panel or on the individual device as required. Nameplates shall be made of laminated phenolic materials with a white face and a black core.
9. The panel shall be designed for manual starting and stopping of all drives. A master manual / auto system switch shall be supplied to override the alarm system and allow operation of any drive through a momentary contact pushbutton. The control panel shall contain start/stop pushbuttons, run lights, and alarm indications for all ancillary equipment.
10. The operator interface terminal (OIT) touchscreen shall be equipped with a start/stop switch and run light for each adjustable piece of equipment. The screw drive, and polymer solution pumps as hereafter specified, shall also incorporate speed control and speed indication. The control panel shall include start/ stop pushbutton, run lights, speed control and 4 to 20 mA signal generators for the polymer solution and sludge pumps controls.
11. Alarm lights, sensors, and related circuitry shall be provided for the following functions: zero speed, emergency stop push button on each side of the press, low water pressure, and low air pressure. In the event of any of the above malfunctions, the machine will shut down and an alarm sound. The alarm system shall include an audible horn rated at 90 DBA at 10'. The system shall include silencing provisions, but the function alarm indicating light shall remain lit until the alarm condition is satisfied. A separate set of alarm contacts shall be provided for remote alarm indication.
12. Arrange control panel to allow either manual or automatic control of screw press equipment. When “MANUAL” operation is selected, all equipment associated with the screw press shall be controlled by “START/STOP” pushbuttons. When “AUTOMATIC” operation is selected, control of equipment shall be “AUTOMATIC/START” and “AUTOMATIC/STOP” pushbuttons, and programmable controller:
    a. Local screw press control panel shall include OIT touchscreens with the following:
        1) One control mode selector switch marked “AUTOMATIC/ MANUAL.” When “MANUAL” operation is selected, all equipment associated

with screw press shall be controlled by "START/STOP" pushbuttons. Provide one "START" and one "STOP" pushbutton for each of the following:

a) Screw Press Drive.

b) Sludge Pump

c) Polymer Pump

d) Discharge Conveyor.

2) One speed potentiometer for manual adjustment of each drive speed.

3) Digital indicators for sludge feed flow rate. Indicators shall accept 4 to 20 mA DC field input and shall be calibrated in gpm.

4) Green indicating lights for "RUNNING" status for each unit operated from panel, including wash water solenoid valve energized indication.

5) Red indicating lights for "OFF" status for each unit operated from panel, including wash water solenoid valve de-energized indication.

6) One each "AUTOMATIC/START" and one "AUTOMATIC/STOP" momentary pushbuttons, for automatically starting and stopping each screw press system. Sludge cake conveyor shall be manually controlled when screw press control mode selector switch is in the "MANUAL" position.

7) One "EMERGENCY STOP" red mushroom pushbutton.

13. Automatic Controls and Sequencing:

a. General:

1) Program the PLC for automatic control of screw press, system sequencing, and interlock functions as specified.

2) Configuration and programming of PLC system shall be the responsibility of screw press manufacturer. System documentation including memory loading, I/O configuration and programming shall be provided.

3) Provide and install auxiliary relays and wiring for equipment and devices specified in this Section required for implementing functional requirements specified.

b. "AUTOMATIC START/AUTOMATIC STOP" Cycle (typical for all screw presses):

1) Automatic start cycle request to PLC shall be initiated by "AUTOMATIC/START" pushbutton.

2) Control logic for an "AUTOMATIC/START" cycle shall start screw press in the following order after "AUTOMATIC/START" command has been initiated and interlocks are complete.

a) Wash water motorized ball valve.

b) Screw Shower "Pre-Wash"

c) Discharge conveyors.

d) Screw press drive.

e) Polymer solution pump drive.

f) Sludge feed pump drive.

3) Each drive shall not start until previous drive is running and necessary time delay has elapsed. The screw press manufacturer shall determine where time delays are required and shall program settings to provide smooth start-up of equipment.

4) Once all drives are confirmed running by motor run contacts from their respective starters, PLC shall cause the run indicating light to illuminate. Loss of run status contact for a drive once cycle logic is complete shall shut down screw press and associated equipment.

5) Upon "AUTOMATIC /STOP" command, system shall shut down in order that is reverse of specified start-up order with necessary time delays.

c. Interlocks: The following interlocks shall be satisfied when control mode selector switch is in either "AUTOMATIC" or "MANUAL" position. Failure of any one signal during start cycle or after cycle is complete shall shut down all associated screw press equipment.

1) Sludge cake conveyors servicing the screw press shall be operating and confirmed by conveyor zero speed switches.

2) Washwater must be on and sufficient washwater pressure must be sensed at a specified level.

3) Air pressure must be sensed at a specified level.

4) Polymer activation tank level must be at specified level.

5) Control mode selector switch shall be in "AUTOMATIC" position.

6) "EMERGENCY STOP" pushbutton shall be in operating position.

14. Annunciation and Alarms:

a. Provide audible alarm and detailed alarm history in screw press control panel for alarming of the following:

1) Screw drive failure.

2) Local emergency stop initiated at either screw press control panel, screw press frame-mounted buttons or conveyor pull cord switches.

3) Pump/VFD fail at sludge feed pump.

4) Low wetwell level for sludge feed.

5) Low washwater pressure.

6) Low air pressure.

7) Discharge conveyors zero speed switches.

8) Polymer pump failure.

9) Sludge pump failure.

10) Polymer activation tank low level alarm.

b. Wire all alarms to PLC system for relaying to remote location.

15. Additional stations shall be included as hereinafter specified for other ancillary drives or systems.

B. Electric Motors furnished with this equipment shall meet the following requirements:

1. Rated for continuous duty at 40^{o}C ambient and insulated with a minimum of Class F insulation, with Class B temperature rise. All motors shall be totally enclosed, fan cooled or non-ventilated. All motors supplied shall be rated at 150% nameplate horsepower of the required horsepower maximum service condition.

2.6 AIR COMPRESSOR

A. A complete pneumatic system shall be provided and shall include an air compressor and air drier. This package shall include pump, motor, valves, air tank, all controls and piping as necessary to provide a complete and operating system. The unit shall include a low-pressure switch, system pressure gauge, and pressure relief.

B. The air compressor shall be an Ingersoll Rand T30 2 stage compressor with a 5 HP TEFC motor.

C. The air drier shall be an Ingersoll Rand D31EC.

D. The air compressor unit will be floor mounted away from the press to eliminate wash down spray.

E. The installation contractor shall supply air tubing from the air compressor unit to the press. The contractor shall include quick disconnects for air hose connections.

2.7 FLOW METER

A. The screw press manufacturer shall supply a totalizing flow meter for the screw press, as supplied by Siemens or approved equal. Each flow meter shall include a 3” ANSI flange connection, a digital display, and 30 feet of display cord.

B. The electromagnetic induction flow meter shall generate a voltage linearly proportional to flow for full-scale velocity setting from 2 to 33 feet per second. Standard accuracy of plus output shall be +/- 0.5% of rate for all meters.

C. The meter shall incorporate a high impedance amplifier of 1012 ohms or greater, eliminating the need for electrode cleaning systems the meter shall utilize bipolar pulsed DC coil excitation with auto-integrated zeroing each half-cycle. Manual zero adjustments shall not be required – even at start-up. Power consumption shall be no more than 15 VA, independent of meter size. Input power required will be from 85 to 260 VAC, 46-65 Hz, with DC input option available.

D. The magnetic flow meter shall be microprocessor based with integral electronics. The electronics shall be interchangeable for all sizes from 1/12” to 78”. The housing is to be powder coated cast aluminum with a NEMA 4X rating.

E. The meter's analog and pulse outputs shall be independently selected by push buttons. The analog output shall be an isolated 4-20mA DC into 700 ohms load. The pulse output shall be an open collector output with a maximum frequency of 1,000 Hz with configurable pulse width (0.5 to 2 sec). An open collector status output shall indicate either system or process error or flow direction. An auxiliary input shall be available to positive zero return. A low flow cutoff will be standard which can be turned on or off by pushbuttons.

F. A 2-line, 16-digit LCD backlit display shall indicate flow rate and/or total flow. The totalizer value is protected by EEPROM during power outages, and utilizes an overflow counter. The display shall also be capable of indicating error messages such as empty pipe condition, error condition and low flow cutoff.

PART 3 - INSTALLATION

3.1 INSTALLATION SUPERVISION

A. The manufacturer shall provide the services of a qualified factory representative to advise the installing contractor on proper installation, setting, piping, and wiring procedures. The installing contractor is responsible for all interconnections between the supplied equipment and plant utilities, including but not limited to, all piping, valves, wiring, conduits, foundation work, building and concrete work. The manufacturer shall provide two (2) days onsite over one (1) trip for installation supervision.

3.2 OPERATION & MAINTENANCE MANUALS

A. Two (2) paper copies and an electronic copy (in .pdf format) of operation and maintenance manuals shall be furnished. The manuals shall be prepared specifically for this installation and shall include detailed operating and maintenance instructions and specifications relative to the assembly, alignment, checking, lubrication, placing in operation, adjustment, and maintenance of each unit of equipment and auxiliaries furnished under this contract, together with complete parts lists, copies of dimension drawings, electrical drawings, and a copy of the manufacturer's start-up report.

3.3 START-UP SERVICES

A. Before the equipment is started up, the manufacturer shall make a thorough inspection of the installation to make sure the press has been installed properly and that all equipment relating to it has been installed according to the needs of the press. The equipment manufacturer shall provide two (2) days onsite over one (1) trip for mechanical check-out and pre-startup inspection.

B. The manufacturer shall provide three (3) days over one (1) trip of onsite services of a qualified factory representative to place the units in operation and conduct performance testing. The owner shall assist the manufacturer by starting up and operating all support systems such as water, sludge feed pumping, polymer mixing, electrical power and instrumentation, and other ancillary equipment as needed. The services provided by the manufacturer shall be as detailed in the O&M manuals and shall include at least the following:

   1. Check equipment alignment and assure that there are no unusual internal stresses.
   2. Calibrate all instrumentation.

3. Check systems to insure proper operation.
4. Check lubrication in all drives.
5. Check Motor rotations, etc.
6. Adjust spray wash angles and discharge cone pressure system.
7. Start the drives and assure they are operating properly with no binding and with correct rotation.
8. Ensure that all ancillary systems have been properly adjusted, including polymer and sludge feed.

3.4 TRAINING SUPERVISION

A. During the start-up procedures, the equipment manufacturer shall provide training to the owner's employees for proper operation and maintenance of the sludge dewatering equipment.

B. At a minimum, the manufacturer shall make an additional two (2) follow-up training and inspection trips after the equipment has been in operation at least 90 days at the owner's request.

PART 4 - MISCELLANEOUS

4.1 SPARE PARTS

A. The screw press manufacturer shall provide the following spare parts to the Owner.
   1. Ten (10) spare spray nozzles.
   2. Two (2) relays of each type and size.
   3. One (1) full set of screw wipers.

END OF SECTION

INDUSTRIES, INC.

Dewatering Screw Press Equipment Proposal

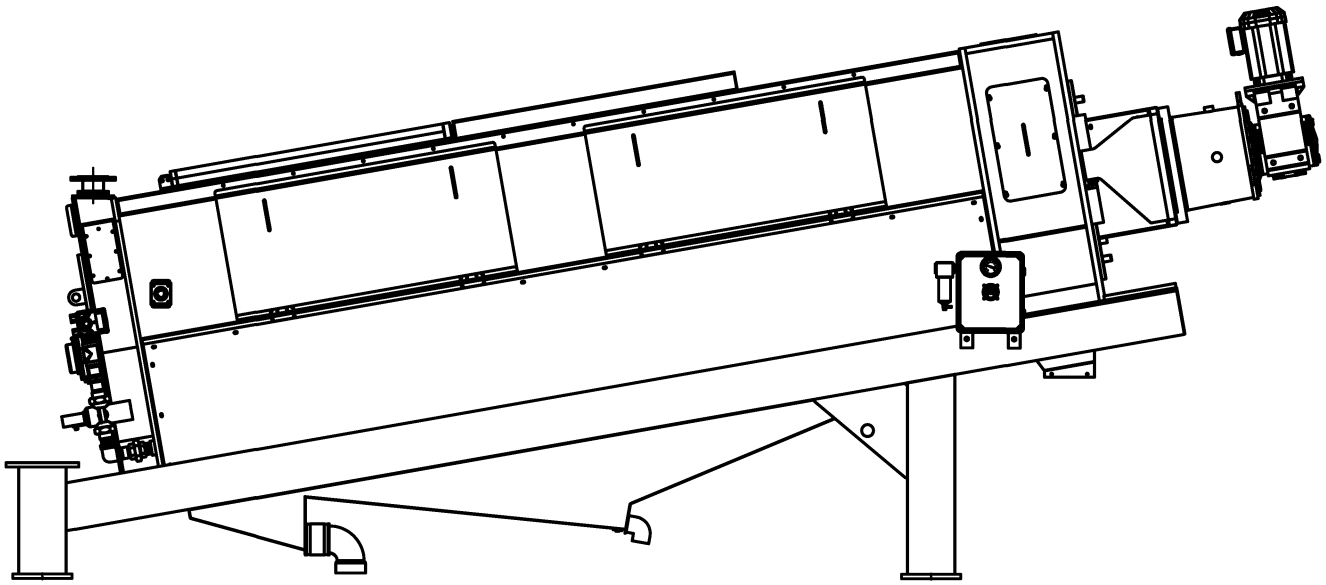
Henniker WWTF Upgrade
Town of Henniker, NH

Screw Press Manufacturer:

BDP Industries, Inc.
354 State Route 29
Greenwich, NY 12834
A.J. Schmidt
PH: (518) 695-6851
aj@bdpindustries.com

Local Representative:

Carlsen Systems
41 Crossroads Place
West Hartford, CT 06117
Michael Sullivan
(508) 878-1016
msullivan@carlsensystems.com



BDP Industries, Incorporated

Screw Press Dewatering System

Model DSP 12

354 State Route 29 Greenwich, New York 12834
Phone No 518-695-6851
E-mail: dan@bdpindustries.com

Table of Contents

354 State Route 29, Greenwich, New York 12834
Phone No 518-695-6851
E-mail: dan@bdpindustries.com

Date: Thursday, October 12, 2023

To: Town of Henniker
18 Depot Hill Road
Henniker, NH 03242

Re: Henniker WWTF Upgrade
Screw Press Dewatering System and Ancillary Equipment
DSP 12
Cover Letter

BDP Industries, Inc., has reviewed the Request for Bids document for the Henniker WWTF Upgrade project and is pleased to present our bid and support information as well as express our interest in being selected for this work. We would like to call attention to the following items as they relate to our bid offering.

Filtration Area:

This proposal includes a 12" diameter screw press which meets the specified performance requirements, but does not meet the required filtration area as listed in section 2.3.C.9 of the specification. This size screw press is the exact same size as the pilot unit that performed an onsite pilot demonstration in August of 2022. During the onsite pilot, the DSP 12 Screw Press demonstrated that it can achieve the specified throughput, discharge cake solids, solids capture and polymer dosage.

USA Manufactured:

The BDP Screw Press is fully designed, fabricated, assembled, programmed and tested at our factory in Greenwich, NY. The factory is two hours and forty minutes (125 miles) away from Henniker. The screw press is manufactured "from scratch" completely in the USA. All metal is received in raw structural steel shapes, plate and sheetmetal. BDP manufacturers the screw press through the entire process, from cutting, to machining, welding, bending, forming, assembling and final testing. BDP is a UL rated panel shop, and we build and program all control panels at the main factory. BDP is the only manufacturer that fabricates the rotating element of the screw press in the United States. Buy-out items such as cylinders, gearboxes, bearings, motors and electrical switches are standard items with the OEM part numbers provided by BDP for local sourcing by the customer.

BDP has been in business, manufacturing dewatering equipment since 1978. BDP first built a screw press in 2000 and designed the current model screw press in 2009.

Reference Installations:

BDP takes great pride that our screw press installations have all met the performance requirements that were specified. The throughput capacity of screw press equipment is important in that it decides the size and number of units offered in the bid. Meeting the specified discharge cake solids, polymer dosage and solids capture is important, but only if achieved while also operating at the required hydraulic and solids loading rate.

354 State Route 29, Greenwich, New York 12834
Phone No 518-695-6851
E-mail: dan@bdpindustries.com

BDP has 53 screw press installations with 7 additional screw presses currently in production. In New England BDP has 67 Biosolids installations, 2 being screw press installations. Within 400 miles of Henniker BDP has 22 screw press installations.

Service: Replaceable Flights / Wipers:

BDP's main, and only factory in Greenwich, NY is our main service center. The BDP Screw Press includes wipers that act as a "lip seal" between the tips of the flights and the slotted screen basket. The **wipers increase the drainage rate** for filtrate to flow through the basket screen, allowing for a higher filtration rate in the screw press. The wipers need to be changed between every 3,000 – 5,000 hours depending on the sludge type, the amount of grit, and the RPM of the screw.

Reduced Maintenance Time and Space:

The BDP Screw Press has a unique **pivoting basket design**. This allows the screw press basket to be opened easily for screw wiper changes, without having to remove or lift the basket halves out of the way and without having to remove the screw core. With this recent development, the time and cost of wiper changes has been significantly reduced (Reduces time to one person, 5 hours). Also, the wiper change can be accomplished with less required maintenance space adjacent to the screw press. The equipment spacing shown in our recommended layout drawing is adequate for performing the screw wiper changes.

Warranty:

BDP Industries is providing a three (3) year machine warranty period as part of this bid. BDP will warrant the screw baskets for five (5) years and the screw core, frame, frame coating, inlet box and outlet box for a period of ten (10) years.

Original Part Numbers:

BDP supplies all original part numbers so that buyout items can be purchased from the plant local suppliers without having to purchase through BDP.

We appreciate this opportunity to extend our bid and if we can answer questions or supply additional information, please do not hesitate to contact Mike Sullivan at (508) 878-1016 or myself at (518) 695-6851.

Sincerely,

Dan Fronhofer, P.E.
Vice President
BDP Industries, Inc.

1.3 Bid Schedule

Bid Item	*Est. Qty.*	*Bid Item Description and Unit Price in Words*	*Unit Price in Figures (Dollars and Cents)*	*Extended Total in Figures (Dollars and Cents)*
BID: SCREW PRESS DEWATERING SYSTEM				
1	Lump Sum	Screw Press Dewatering System and Ancillary Equipment: Two Hundred Ninety Five Thousand Dollars and Zero Cents per L.S.	per $295,000.00 L.S.	$295,000.00

NOTE: BIDS shall include sales tax and all other applicable taxes and fees.

TOTAL BID PRICE:

(In figures) $ $295,000.00

(In words) Two Hundred Ninety Five Thousand Dollars and Zero Cents

BID CONDITIONS

1. This Proposal shall be filled in by the BIDDER with prices written in both words and numerals and the extensions made by him/her. In case of discrepancy between words and numerals, the amount shown in words shall govern.
2. In the case of discrepancy between the Unit Price given and the Total Price of an Item, the Unit Price shall govern.
3. The BIDDER agrees that the Bid shall be valid and may not be withdrawn for a period of **sixty (60) calendar days** after the scheduled closing time for receiving bids.

END OF SECTION

ADDENDUM NO. 1
DATED THURSDAY OCTOBER 5th, 2023
TOWN OF HENNIKER, NH
REQUEST FOR BIDS
SCREW PRESS DEWATERING SYSTEM

The following changes and information are hereby incorporated into the Request for Bids document:

BIDDING REQUIREMENTS:

Changes to Section 1.1 Request for Bids:

1. No changes.

Changes to Section 1.2 Instruction for Bidders:

2. No changes.

Changes to Section 1.3 Bid Schedule:

3. No changes.

TECHNICAL SPECIFICATIONS:

Changes to Technical Specifications:

1. **Specification 11350 Screw Press Dewatering System:** Clause 1.3.B.1 **DELETE** the words "Equipment manufacturer" and **REPLACE** with "Equipment manufacturer or their designated panel supplier".
2. **Specification 11350 Screw Press Dewatering System:** Clause 2.2.C **DELETE** the words "Inside of the box shall be white"
3. **Specification 11350 Screw Press Dewatering System:** Clause 2.3.C.4 **DELETE** the words "Designs that utilize basket assemblies constructed of wedge wire or moving rings will not be allowed" and **REPLACE** with "Designs that utilize basket assemblies constructed of wedge wire or moving rings are acceptable".
4. **Specification 11350 Screw Press Dewatering System**: Clause 2.3.D.2 **DELETE** the words "The screw shower shall be pneumatically actuated with an adjustable timer setting on the OIT" and **REPLACE** them with "The screw shower shall be pneumatically or electrically actuated with an adjustable timer setting on the OIT.".

ADDITIONAL INFORMATION:

1) Below are responses to questions raised during the bidding period:

Question #1 *– Does the engineering team have an estimation for substantial completion date for this project?*

Answer #1 – The construction contract is estimated to be awarded May / June 2024 with a 12-month duration for substantial completion.

Question #2 *– Paragraph 1.3.B.1: Please revise this to "Equipment manufacturer or their designated panel supplier shall be certified…."*

Answer #2 – Specification clause amended, see changes to technical specifications.

Question #3 *– Paragraph 2.2.C: Stainless steel enclosures are typically not painted, and this would require a custom enclosure without tangible benefit for the customer. May an enclosure be supplied that meets construction requirements while omitting the requirement for white internal painting?*

Answer #3 – Non painted stainless-steel finish is acceptable, see changes to technical specifications.

Question #4 – *Paragraph 2.3.B.1: This outlines the injection/mixing design of another manufacturer and cannot be supplied as written. We are requesting confirmation that our standard injection ring and mixing equipment that meets the design intent of the specifications be accepted, please confirm.*

Answer #4 – The standard injection ring and mixing equipment provided by all manufacturers are acceptable**.**

Question #5 *- Paragraph 2.3.C.4: HUBER's basket/screen design utilizes wedge wire, which is referenced as not allowed. Can you please confirm or rewrite the section allowing for our design.*

Answer #5 – Hubers basket / screen using wedge wire is acceptable, see changes to technical specifications.

Question #6 *- Paragraph 2.3.D.2: This section calls for a pneumatically actuated shower. HUBER's design is an electrically actuated spray wash shower. Is this acceptable in lieu of what is stated? Please confirm.*

Answer #6 – Electrically actuated spray wash shower is acceptable, see changes to technical specifications.

Question #7 *- Paragraph 2.3.D.4: HUBER's design uses a spray wash system with instantaneous flow rate of approx. 45 gpm. Is suitable water available for this design? What is the site pressure, so that we can properly size booster pump. Will our design be accepted for supply?*

Answer #7 – Yes suitable water is available and the equipment supplier shall assume the pressure to be in the range of 40 to 60 psi.

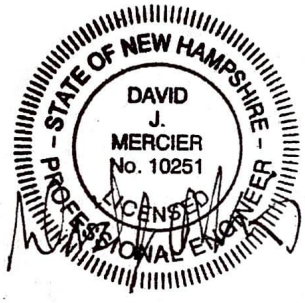
Question #8 *- Paragraph 2.5.A.3: HUBER requests information of the sludge feed pump being used to ensure/confirm the pump can overcome backpressure associated with manufacturers mixing device. Please confirm the maximum pressure for the pump or please provide pump type and pump curve if available.*

Answer #8 - The existing sludge feed pumps are Penn Valley double disc pumps and have a design point of 80 gpm at 27 feet TDH. These pumps send sludge to a day tank, after which a separate progressive cavity pump transfers the sludge from the day tank to the existing belt filter press. The existing pumps will either be modified or replaced to provide the required sludge feed for the selected dewatering equipment.

Question #9 *- Paragraph 2.5.A.9: Full manual operation bypasses safety interlocks and has the possibility to damage the screw press if operated for extended periods. HUBER will supply Hand control, but this operation is intended only for maintenance on the machines, not for complete operation of a dewatering system. HUBER's strategy for operation is automatic only. Please confirm this will be acceptable for consistent operation in automatic mode.*

Answer #9 - The above is acceptable and the screw press will be operated in automatic mode during normal operating conditions. The control panel shall be designed for a manual starting and stopping of all drives per Section 2.5.A.9 to allow the operators to have full control for maintenance purposes, noting that this will not be for extended periods.

UNDERWOOD ENGINEERS, INC.



David J. Mercier, P.E
Vice President

Dated October 5th, 2023.

ACKNOWLEDGEMENT

In order to acknowledge this addendum, please fill out the below noted information and fax this page upon receipt to (603) 431-4733 or email to **concord@underwoodengineers.com.**

Receipt of this Addendum No. 1 (3 pages) is acknowledged:

Signature	Date: 10/12/23
Name (printed): Dan Fronhofer	Company: BDP Industries

354 State Route 29, Greenwich, New York 12834
Phone No 518-695-6851
E-mail: dan@bdpindustries.com

Date: Thursday, October 12, 2023

To: Town of Henniker
18 Depot Hill Road
Henniker, NH 03242

Attn: Diane Kendall
Town Administrator

Re: Henniker WWTF Upgrade
Screw Press Dewatering System and Ancillary Equipment
Acknowledging Addendum #1
BDP Bid Proposal #: 100923-0831

BDP Industries, Inc. is pleased to offer our quotation for One (1) DSP 12 Screw Press and accessories for Henniker, NH. Below is a summary description of our proposed scope of supply.

EQUIPMENT DESCRIPTION

The Screw Press equipment package includes a complete press and appurtenant equipment described as follows:

1. One (1) 316L stainless steel polymer injection and polymer/sludge mixing system consisting of an injection ring, variable vortex mixer, and reducing fittings.

2. One (1) 12” Screw Presses, with the following design features:
    a. 304 stainless steel frame.
    b. 304 stainless steel wetted parts.
    c. 304 stainless steel hardware.
    d. Replaceable wear flights.
    e. Automatic, intermittent oscillating screen shower.
    f. Pneumatically adjustable discharge cone.
    g. TEFC IP65 severe duty variable speed motor.
    h. PVC conduit.
    i. NEMA 4X pre-wired junction box.

3. One (1) complete electrical control panel for all Screw Press control functions and drives.
    a. NEMA 4X
    b. 304 Stainless Steel.
    c. UL508
    d. 12” Color Allen Bradley Panelview Plus 7 OIT.
    e. Allen Bradley Compact Logix PLC.
    f. Allen Bradley 525 Variable Frequency Drives.
    g. IEC motor starters.
    h. 460/3/60
    i. 120-volt transformer.
    j. Ethernet Communication.

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4. One (1) Ingersoll Rand Air Compressor, 5 HP, 80 Gallons.
5. One (1) Ingersoll Rand D31EC Air Drier.
6. One (1) Washwater Booster Pumps, Goulds model eSV, vertical multistage pump. 304 stainless steel construction, 3 HP TEFC motor, 3500 RPM.
7. One (1) Emulsion polymer blending unit with 2 GPH progressive cavity neat polymer pump and 1200 GPH dilution water capability.
8. One (1) 3" Diameter Siemens Magnetic Flow Meter.
9. One (1) Lot of spare parts per section 4.1.
10. All start-up, mechanical checkout and operator training as specified. Service to include five (5) separate trips with nine (9) days of on-site service.
11. Three-year equipment warranty. Five-year warranty for the screw baskets. Ten-year warranty for the frame, frame coating, screw core, and inlet and outlet boxes
12. Freight to the jobsite.

The Screw Press will come completely factory-assembled, tested and will be shipped as a single piece. The polymer injection device, booster pump, air compressor, polymer system and electrical control panel will all be packed separately. This quotation is for furnishing equipment only and does not include any installation labor or field services other than checkout, start up and testing services as listed above. All installation, on-site assembly, anchorage, pads and other work required to facilitate the setting of the equipment is to be by others. All materials and labor for interconnecting between the press and the auxiliary equipment is to be completed by others applicable taxes or installation.

ITEMS NOT INCLUDED IN SCOPE OF SUPPLY

1. **Unloading at the jobsite.**
2. **Installation.**
3. **Operator platforms.**
4. **Sump grating.**
5. **Sludge feed pump.**
6. **Conveyance.**
7. **Temporary or mobile dewatering.**
8. **Anchor bolts.**
9. **Applicable taxes of any kind.**
10. **Interconnecting plumbing and wiring.**
11. **Valves or instrumentation not listed above.**

354 State Route 29, Greenwich, New York 12834
Phone No 518-695-6851
E-mail: dan@bdpindustries.com

SUBMITTAL DATA

Submittals will be made in the number of copies specified and will be available within 8 to 10 weeks after firm purchase order and all information is received at the factory.

SHIPMENT

Approximate shipping weight of the unit is 5,000 pounds. Estimated shipping time is 30 to 40 weeks after submittal approval.

FIELD SERVICE

Installation observation, testing and operator instruction services as listed above will be supplied. Additional service can be supplied at a service rate of $1,400 per day plus travel expenses.

BID PRICING

The total price for the above equipment is listed in Section 1.4 of the bid forms. This price includes the shipping cost to the job site or nearest unloading point. The price does not include unloading cost and applicable taxes of any kind. This quotation will be valid for sixty (60) days from the date of this proposal.

TERMS

Terms of payment are 30% upon submittal approval, 60% upon shipment of equipment and 10% upon start up. The attached Conditions of Sale are hereby made a part of this proposal.

We appreciate this opportunity to extend our quotation. If we can answer questions or supply additional information, please do not hesitate to contact Michael Sullivan of Carlsen Systems at 508-878-1016.

Sincerely,

Dan Fronhofer, PE
BDP Industries, Inc.

cc: A.J. Schmidt, BDP Industries, Inc.
&
Michael Sullivan
msullivan@carlsensystems.com
cell – 508-878-1016
www.carlsensystems.com

354 State Route 29, Greenwich, New York 12834
Phone No 518-695-6851
E-mail: dan@bdpindustries.com

CONDITIONS OF SALE - COS 5-86

GENERAL -- This contract will exist between BDP Industries, Inc. (hereafter referred to as BDP) and the buyer only when accepted in writing by an officer of BDP. The prices quoted herein are firm for a period of 180 days if a contract is entered within thirty (30) days from the date on the face of this proposal. Any amendment to this contract must by in writing and acknowledged by both parties.

TERMS OF PAYMENT – Payment is to be made on a net basis within thirty (30) days after invoice, subject to credit approval by BDP. The buyer's payment obligation is not dependent upon the buyer's receipt of payment from any other party. BDP reserves the right to invoice on partial shipments. Any balance owed by the buyer beyond thirty (30) days or more after due is subject to delinquency charges of 1.5% per month or any fraction thereof. This shall be in addition to any other amounts due and buyer shall reimburse BDP for all collection costs, including attorney's fees BDP may incur with respect to collection of past due amounts from the buyer.

TAXES -- This proposal does not include any Federal, State or Local Sales, Privilege, Use or any other taxes of any kind applicable to the sale of the equipment covered under this agreement. These taxes shall be paid by the buyer or the buyer shall provide BDP with a tax exemption certificate applicable to proper taxing authority.

SHIPMENT -- All shipment will be F.O.B. factory. Shipping estimates contained herein are based on time of receipt at BDP's factory of all details pertaining to the order which are essential to contract completion.

FORCE MAJEURE -- BDP shall not be liable for any loss or damage of any nature whatsoever incurred or suffered as a result of any failures or delays in performance due to any cause or circumstances beyond its, or its subcontractors= or suppliers= control, including, but not by way of limitation, failure or delays in performance caused by strikes, lockouts or labor disputes, acts of purchaser, fires, acts of God or the public enemy, riots, incendiaries, interferences by civil or military authorities, compliance with the laws of the United States or with the orders or policies of any Governmental authority, delays in transit or delivery on the part of transportation companies or communication facilities or failure of sources of raw material. In the event of such delay, the time of delivery or completion shall be extended by a period of time equal to the period of delay plus such time as needed for start-up and/or remobilization, provided however, should the Force Majeure situation extend beyond six months the contract may be canceled by either party. Purchaser shall reimburse BDP for all costs and expenses including overhead costs which BDP may have reasonably incurred in terminating the contract, plus an amount as reasonable profits on that portions to the contract which has been completed.

WARRANTY -- BDP warrants the equipment manufactured by it to be free from defects in materials and workmanship for a period of 18 months from the date of shipment or 12 months from the date of start-up, whichever occurs first. BDP will repair or replace, at its option, F.O.B. its factory, any defective part or material, provided prompt notification is rendered in writing. The repair or replacement of items such as light bulbs, grease, oil, drive belts or chains, pump seals, etc. are not covered by this warranty and are considered normal consumption and routine maintenance items. In addition to the replacement of defective parts, BDP will also provide such labor as it deems necessary, to repair a defect in the main frame structure. BDP will not assume the cost of any modification or repair of its equipment unless it specifically gives authority for such action. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHERS. BDP MAKES NO WARRANTY AS TO FITNESS OF ITS PRODUCTS FOR PARTICULAR PURPOSE OR MERCHANTABILITY.

LIMITATION OF LIABILITY -- A. In no event, be it due to breach of any warranty hereunder or any other cause rising out of performance or non-performance of the obligations herein, whether any such breach or cause be or sound in tort, contract or otherwise, shall BDP be liable for indirect, special or consequential damages (such as, but not limited to, loss of profits, plant downtime, fines, penalties, or cost of replacement services) or suet by third parties against the purchaser (excluding suits regarding patents on title to the goods furnished hereunder). B. BDP's total cumulative liability for any and all reasons shall not exceed an amount equal to the contract price.

CLAIMS -- The buyer shall immediately inspect equipment within ten (10) days after receipt, BDP is not obligated to consider any claim for shortages or non-conformance unless notified by the buyer within ten (10) days after his receipt of the goods in question, BDP is not responsible for loss or damage in transit, however they will lend any possible assistance to the buyer in his pursuit of claim recovery.

CANCELLATION -- BDP will accept cancellation of this order upon receipt of payment for percentage of the contract equal to a percentage of the work completed. This shall be, at a minimum, 20% of the contract price.

STORAGE -- If the buyer delays shipment, then the buyer agrees to pay all invoices as they become due. The buyer further agrees to pay, in addition, storage charges computed at 1.5% per month of the invoice price of equipment stored.

PERMITS -- The buyer shall assume full cost and responsibility to obtain all permits or licenses with respect to the installation and operation of the equipment covered under this agreement. This shall include all requirements by Federal, State and Local governmental bodies.

OTHER -- This contract shall be governed in accordance with the laws of the State of New York. These conditions and terms are the only terms and conditions that will be binding upon the parties unless amended, and acknowledged, in writing by both parties. No assignment of this proposal or any purchase order resulting here from shall be binding on BDP unless accepted in writing by BDP.

BDP INDUSTRIES INC.
354 State Route 29 • P.O. Box 118 • Greenwich, NY 12834 • Tel. (518) 695-6851 • Fax: (518) 695-5417

PERFORMANCE AFFIDAVIT

Henniker WWTF Upgrade
DSP 12 Screw Press

BDP Industries has examined the Contract Documents and hereby state that the DSP 12 Screw Press meets in every way the performance requirements set forth or implied in Specification Section 11350 of the Contract Documents.

Parameter	**Requirement**
Sludge Type	Secondary Waste Activated Sludge
Sludge Feed Solids (% wt)	0.5 – 0.8
Solids Throughput (dry lb/hr)	123
Sludge Flow Rate (gpm)	31 – 49
Maximum Polymer Dosage (act. lb/dry ton)	60
Minimum Discharge Cake Solids (% wt)	14
Minimum Solids Capture (%)	95

A.J. Schmidt
A.J. Schmidt
President

Route 29 Greenwich, New York 12834
Phone No 518-695-6851

SCREW PRESS PILOT DEMONSTRATION

Henniker Wastewater Treatment Plant

Henniker, NH

August 1st – 3rd, 2022

Presented for:

Underwood Engineering
&
Henniker Wastewater Treatment Plant

Conducted by:

Luke Fronhofer & Damon Brownell
BDP Industries

Route 29 Greenwich, New York 12834
Phone No 518-695-6851

Contents

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Phone No 518-695-6851

1. EXECUTIVE SUMMARY

The Henniker Wastewater Treatment Plant located in Henniker, NH currently uses one belt filter press to process their solids. Underwood Engineering is evaluating an upgrade to their dewatering system including the addition of screw press units. As part of the study, BDP Industries was invited to operate the Model DSP Screw Press during an onsite pilot test from August 1st – 3rd, 2022. The DSP offers the latest in dewatering technology including a filtrate recycle system and slotted screen basket design. The design is based on over forty years of experience and ongoing improvements to BDP dewatering equipment.

The BDP Screw Press Pilot was able to demonstrate the ease of operation, maintenance requirements, and unique features of the DSP screw press design.

The following parameters were deemed to be of interest in the pilot study:

1. Cake Dryness
2. Accessibility of spare parts and service.
3. Automation
4. Hydraulic/Dry Solids Loading
5. Polymer Dosage

Table 1: Performance for the 12" diameter DSP Screw Press while dewatering aerobically digested sludge:

Operating Parameter	DSP - 12 Range	DSP - 12 Average	Expected Benefits of DSP
Hydraulic, gpm	11.2 – 50.7	21.6	Independent rotary drum provides higher hydraulic throughput
Dry Solid, lb/hr	31 – 122	50	Independent rotary drum provides higher solids throughput for given screw diameter
Cake Dryness, wt %	14.47 – 25.57	18.91	Pre-thickening, tapered shaft, and variable pneumatic cone pressure achieves higher solids
Polymer Dosage, lb/ton	25.6 – 45.5	35.5	Improved conditioning and dewatering technology optimizes polymer use and discharge solids
Solids Capture, %	96.8 – 98.6	97.64	Screen slot design and filtrate recycle system result in higher solids capture rates

In summary, the pilot test demonstrated the capabilities and operability of the Model DSP Screw Press. The DSP can produce the desired discharge cake solids at high loading rates. The rugged construction, coupled with a modern and improved press design, provides for low operator attention and optimized dewatering performance.

2. *INTRODUCTION*

The BDP pilot trailer unit includes a Model 3012 DSP Screw Press with a 30" diameter optional rotary drum thickener and a 12" diameter screw press. The unit is skid mounted on a trailer with all of the accessories to provide a complete dewatering system. The skid

includes a 5 HP MXQ progressive cavity sludge feed pump, an emulsion polymer blending unit, a filtrate recycle system, a washwater booster pump, a small belt conveyor, and a control panel providing automatic control of the entire system. The control panel includes an Allen Bradley Compact Logix PLC and HMI touchscreen set up for single button start and single button shutdown. The system is programmed to run unattended in batch mode; when the desired number of gallons is reached the system goes into a cleanout cycle and shuts itself down.

The BDP Screw Press is fully designed, fabricated, assembled, programmed and tested at our factory in Greenwich, NY. All parts of the screw press and rotary drum thickener are made in-house at BDP's factory. BDP is a UL rated panel shop, and we build and program all control panels at the main factory. Buy-out items such as cylinders, gearboxes, bearings, motors and electrical switches are standard items with the OEM part numbers provided by BDP for local sourcing by the customer.

3. SET UP & TEST PROCEDURES

The screw press trailer was delivered to the site on Friday, July 29th. A three-inch hose was lowered into the sludge holding tank. Polymer was fed and metered from the emulsion polymer blending unit on the screw press skid into the sludge line. All filtrate was collected in the skid-mounted dropbox and piped via four-inch hose lines to a man-hole near the trailer that returned to the head of the plant.

The solids loading, polymer dosage, polymer type, and cone pressure were varied during the testing to produce a range of results for analysis. Samples were collected after these settings had reached steady state for at least 30 minutes. BDP Industries collected feed solids and cake solids utilizing two O'Haus moisture analyzers for quick results and feedback on the trailer. BDP Industries collected feed solids, filtrate and cake solids samples for analysis at a laboratory using Standard Method. The Plant Staff collected duplicate samples to be analyzed in the laboratory at the plant.

Day 1 – The first day included the setup of the screw press trailer on site. Water, sludge and filtrate lines were all plumbed into the piping at the treatment facility while power was hooked up to the breaker panel provided by the plant staff. The screw press, sludge pump and polymer unit were tested and the unit processed solids for 3 hours.

Day 2 – The first day of testing included varying polymer dosages and polymer addition points at lower solids throughputs to identify the conditioning characteristics of the sludge/polymer mixture. Samples were collected for analysis by the laboratory.

Day 3 – The third day of testing included more testing with lower solids loading rates. Higher solids loading rates were also tested while varying polymer dosage. Samples were collected for analysis by the laboratory. The trailer was cleaned and packed up.

4. DISCUSSION OF RESULTS

4.1. SOLIDS LOADING

Discharge cake solids concentrations are dependent on the sludge characteristics, polymer type and conditioning, the amount of free water present, the amount of pressure and shear applied to the material, and the residence time in the press to

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allow the free water to be expressed. Figure 1 below shows a direct relationship between cake solids and solids loading whereas solids loading was increased the cake solids decreased.

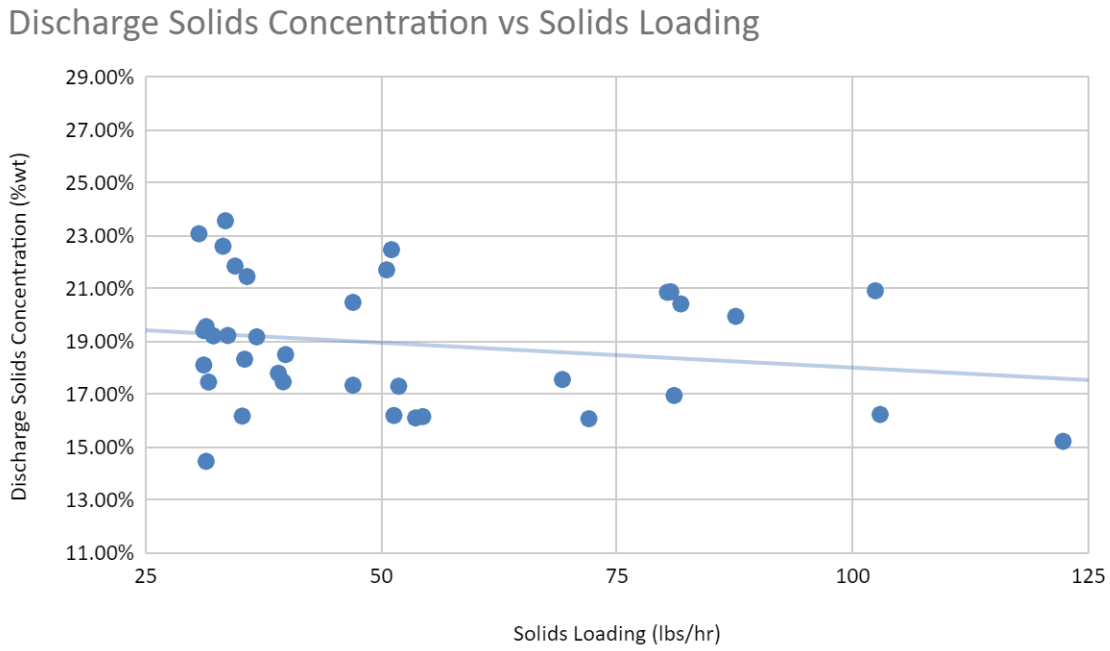

Figure 1 *- Discharge Solids Concentration vs. Solids Loading*

4.2. POLYMER DOSAGE

Typical mechanical dewatering shows increased cake solids with increased polymer dosage, or an optimal polymer dosage with a bell-shaped curve. However, Figure 2 below shows a straight curve with an average polymer dosage around 36 lbs/dt. This is the result of a variation of solids loading rates with different polymer dosages.

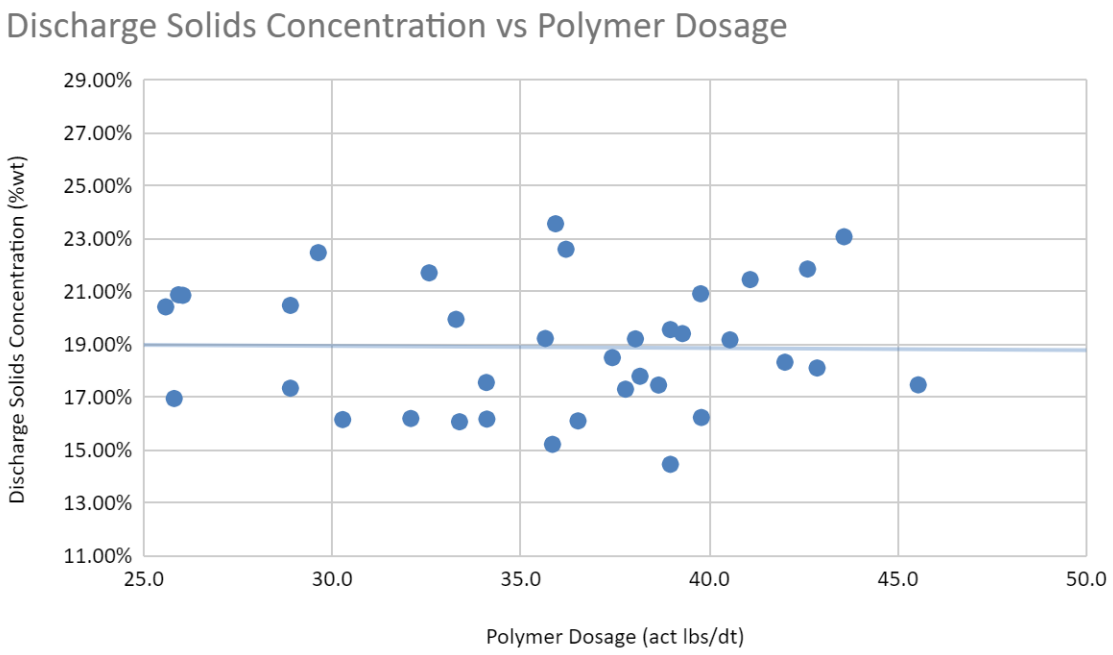

Figure 2 *- Discharge Solids Concentration vs. Polymer Dosage*

4.3.SOLIDS CAPTURE

Solids Capture can be interpreted as the "efficiency" of the dewatering equipment for removing solids from the plant. The Solids Capture represents the percentage of material that makes it through the dewatering equipment and out for disposal, instead of being recycled to the head of the plant. The filtrate recycle system on the DSP Screw Press allows the operator to increase the solids capture beyond what is typically achieved in a screw press.

Solids Capture was recorded by sending filtrate samples to the laboratory for analysis. The average solids capture for the duration of the pilot was 97.64%. Maintaining a clear filtrate returning to the head of the plant was critical and was a key point of discussion with the plant staff.

$$Percent\ Capture = \frac{C}{F} * \frac{F - (E * \frac{Q+S}{Q})}{C - (E * \frac{Q+S}{Q})} * 100$$

5. CONCLUSIONS AND RECOMMENDATIONS

The pilot activity at the Henniker Wastewater Treatment Plant demonstrated the operability and features of the Model DSP Screw Press. The screw is able to process high hydraulic and solids loading rates while yielding high discharge solids concentrations and very high solids capture rates.

BDP would like to thank Underwood Engineering and the Henniker Wastewater Treatment Plant staff for the invitation to pilot and for their hospitality and support during the pilot activities. Please feel free to contact us at any time with questions regarding the screw press design, operation or performance.

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Filtrate from the BDP Screw Press (no shower water)

Discharge Cake from the BDP Screw Press

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APPENDIX I – OPERATING AND TEST DATA

BDP Screw Press Data Sheet:

				Blending Unit							Blending Unit					
Time	Sludge Pump	Feed Flow Rate	Inlet Consist.	Polymer Pump Frequenc	Single Dilution Water	Drum Speed	Screw Speed	Drum Transfer Speed	Cone Pressure	Solids Loading	Polymer Flow Neat	Active Polymer Dosage	BDP Lab Sample	Plant Lab Sample	Filtrate Sample	Percent Capture
(hh:mm)	(%)	(gpm)	(% wt)	(HZ)	(gpm)	(%)	(%)	(%)	(psi)	(lb/hr)	GPH	(lb/dry ton)	(%)	(%)	(Mg/l)	(%)
8/1/2022											2.00					
2:00	33	24.8	0.71	9.4	2	70	6	20	30	81	0.31	25.8	16.96%	16.30%		
2:15	33	25.0	0.71	9.4	2	70	5	20	30	82	0.31	25.6	20.43%			
2:30	33	24.7	0.71	9.4	2	70	11	20	40	81	0.31	25.9	20.89%			
2:45	33	24.6	0.71	9.4	2	70	10	20	40	80	0.31	26.0	20.87%			
8/2/2022																
8:00	22	16.0	0.51	6.6	2		10		40	36	0.22	41.1	21.46%			
8:30	22	15.5	0.51	6.6	2		5		40	34	0.22	42.6	21.86%			
8:45	22	15.8	0.51	5.4	2		5		40	35	0.18	34.1	16.18%			
9:15	22	15.1	0.51	5.4	2		5		50	33	0.18	35.9	23.57%			
9:30	22	15.2	0.51	5.4	2		10		50	34	0.18	35.7	19.23%		64	98.62%
10:00	22	15.0	0.51	5.4	2		5		50	33	0.18	36.2	22.61%			
10:30	28	20.4	0.51	6.1	2		12		50	47	0.20	28.9	20.49%			
10:45	28	20.4	0.51	6.1	2		9		50	47	0.20	28.9	17.35%			
11:30	30	22.0	0.51	6.8	2		11		60	51	0.23	29.6	22.48%	21.60%		
11:45	30	22.1	0.51	7.4	2		12		60	51	0.25	32.1	16.21%			
12:00	30	21.8	0.51	7.4	2		6		60	51	0.25	32.6	21.72%			
12:15	30	23.3	0.51	7.4	2		16		60	54	0.25	30.3	16.17%			
12:45	30	22.3	0.51	8.8	2		7		60	52	0.29	37.8	17.32%			
1:15	30	23.0	0.51	8.8	2		9		60	54	0.29	36.5	16.12%			
1:45	40	30.2	0.51	10.8	2		12		60	72	0.36	33.4	16.08%			
2:15	20	14.6	0.51	5.5	2		5		60	32	0.18	38.0	19.22%		148.00	96.79%
2:30	20	14.4	0.51	5.5	2		6		60	32	0.18	38.7	17.47%			
2:45	20	14.3	0.51	5.5	2		7		60	31	0.18	39.0	19.57%			
8/3/2022																
8:00	20	14.2	0.51	5.5	2		6		60	31	0.18	39.3	19.42%			
8:15	20	14.3	0.51	5.5	2		5		60	31	0.18	39.0	14.47%			
8:30	20	14.2	0.51	6.0	2		6		60	31	0.20	42.9	18.12%			
8:45	20	14.0	0.51	6.0	2		5		60	31	0.20	43.6	23.08%			
9:15	40	29.1	0.51	10.6	2		12		60	69	0.35	34.1	17.57%			
9:30	49	36.8	0.51	13.1	2.5		15		60	88	0.44	33.3	19.96%			
9:45	58	42.6	0.51	18.3	2.5		14		60	102	0.61	39.8	20.93%			
10:15	58	42.8	0.51	18.4	2.5		22		60	103	0.61	39.8	16.25%		135.00	97.28%
10:30	67	50.9	0.51	19.7	3		28		60	122	0.66	35.8	15.23%			
11:00	22	15.9	0.51	6.7	2		5		60	35	0.22	42.0	18.34%			
11:15	22	16.4	0.51	6.7	2		7		60	37	0.22	40.5	19.18%			
11:30	25	17.6	0.51	6.7	2		7		60	40	0.22	37.4	18.51%		100.00	97.88%
11:45	25	17.3	0.51	6.7	2		11		60	39	0.22	38.2	17.80%			
12:00	25	17.5	0.51	8.1	2		10		60	40	0.27	45.5	17.48%			

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mike@bdpindustries.com

WARRANTY

BDP Industries, INC., warrants the equipment supplied in this scope to be free from defects in materials and workmanship for a period of 36 months from the date of startup or 42 months from the date of shipment, whichever occurs first. BDP warrants the screw baskets for five (5) years from the date of startup. BDP warrants the screw press frame, frame coatings, screw press core, screw press inlet and outlet boxes for a period of ten (10) years from the date of startup. BDP will repair or replace, at its' option, FOB Greenwich Factory, any defective part or material provided prompt notification is rendered.

BDP will warrant the bearings, drives, etc. for the warranty period. The buyout items will be replaced at no cost to the owner as long as the equipment is operated and maintained per the maintenance manual provided by BDP.

The repair or replacement of items such as light bulbs, grease, oil, drive belts or chains, pump seals, etc., are not covered by this warranty and are considered normal consumption and routine maintenance.

BDP will not assume the cost of any modification or repair of its equipment, unless it specifically gives authority for such action. BDP disclaims any responsibility as a result of changes or additions by others made to its' equipment after shipment from the factory.

In no event shall BDP be responsible for special or consequential damages of any nature, including, but not limited to loss of profits or revenues, loss of any equipment, cost of capital, cost of temporary facilities, downtime costs, or other claims brought as a result of breach of contract, warranty, or negligence.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHERS. BDP MAKES NO WARRANTY AS TO FITNESS OF ITS' PRODUCT(S) FOR ANY PARTICULAR PURPOSE OF MERCHANTABILITY.

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Email:dan@bdpindustries.com

Corporate Overview:

BDP Industries employs 60 people in the design and fabrication of thickening, dewatering, and compost equipment. All manufacturing is done "in house" at our Greenwich, NY facility, with the latest in manufacturing equipment including CNC lathes, CNC machining centers, Laser cutting, and waterjet cutting machines. BDP manufacturers and coats all rollers in house. BDP is also a UL certified panel shop with complete engineering and programming design. This combination of engineering, manufacturing and service allows BDP to have complete control over our production capabilities, quality and schedule, while providing exceptional service and industry leading product improvements. BDP's relatively small size and focus on the dewatering marketplace allows us to focus our energy completely on product development and customer service.

DESIGNED AND MANUFACTURED IN THE USA

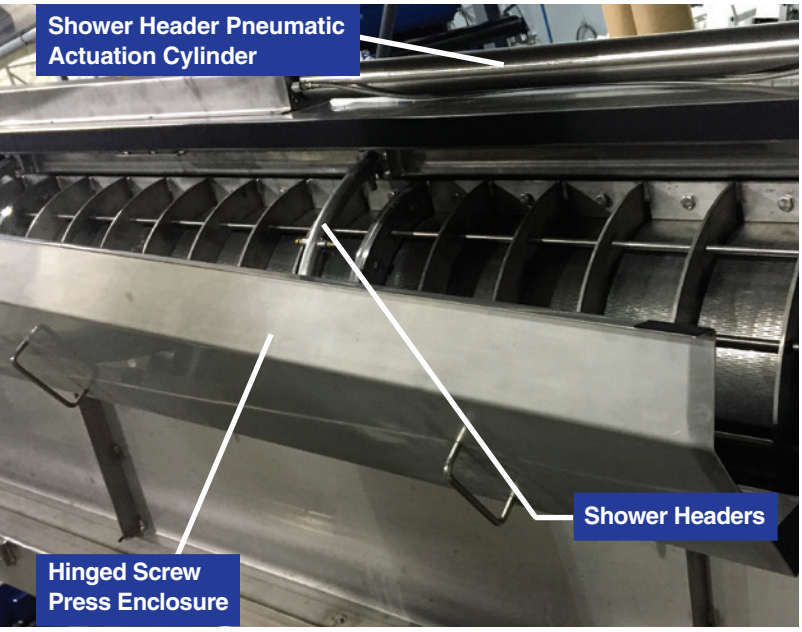
BDP INDUSTRIES

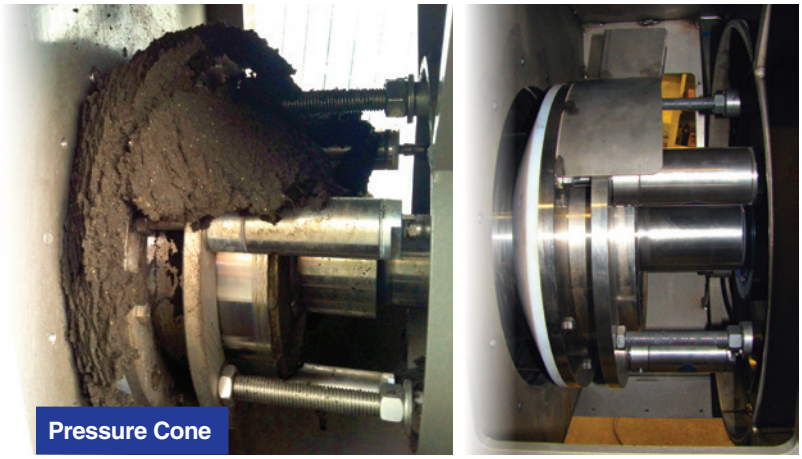
www.bdpindustries.com

Model DSP Screw Press

Industry Leader in Design and Manufacture of Thickening, Dewatering, and Composting Systems

BDP Model DSP Screw Press





PRESSURE CONE:

- Self-compensating, pneumatically actuated discharge cone enhances dewatering
- Maximize cake solids with adjustment of pneumatic regulator
- Actuates in both directions via selector switch for fast hassle-free clean up

Developed especially for:

biosolids and challenging dewatering applications.

High capacity and excellent solids capture in a fully enclosed system for simplified operation.

- Odor Hoods trap odor and vents pull
- Three Screw Press diameters available – 12", 18" and 30"
- Stainless steel construction for excellent corrosion resistance
- External bearings for easy access and contamination control
- Enclosed design for odor and moisture control
- PLC control for unattended operation
- Superior solids handling – all with a small footprint

FILTRATE POLISHING SYSTEM:

- Increases solids capture by recycling filtrate from the screw press high pressure section back to the inlet of the RDT
- Capture rates above 95%

TAPERED SCREW DESIGN:

- Reduced plugging: tapered screw core compresses cake against the screen rather than the flights
- Consistent pressure profile
- Accelerated filtrate extraction: tapered core reduces cake thickness as it progresses toward discharge

BASKET SCREEN DESIGN:

- Unique slotted dewatering screen
- Multiple patterns for custom dewatering
- Tapered profile slots for optimized solids capture and eliminates plugging
- Split basket design allows for flight maintenance without removal of screw auger

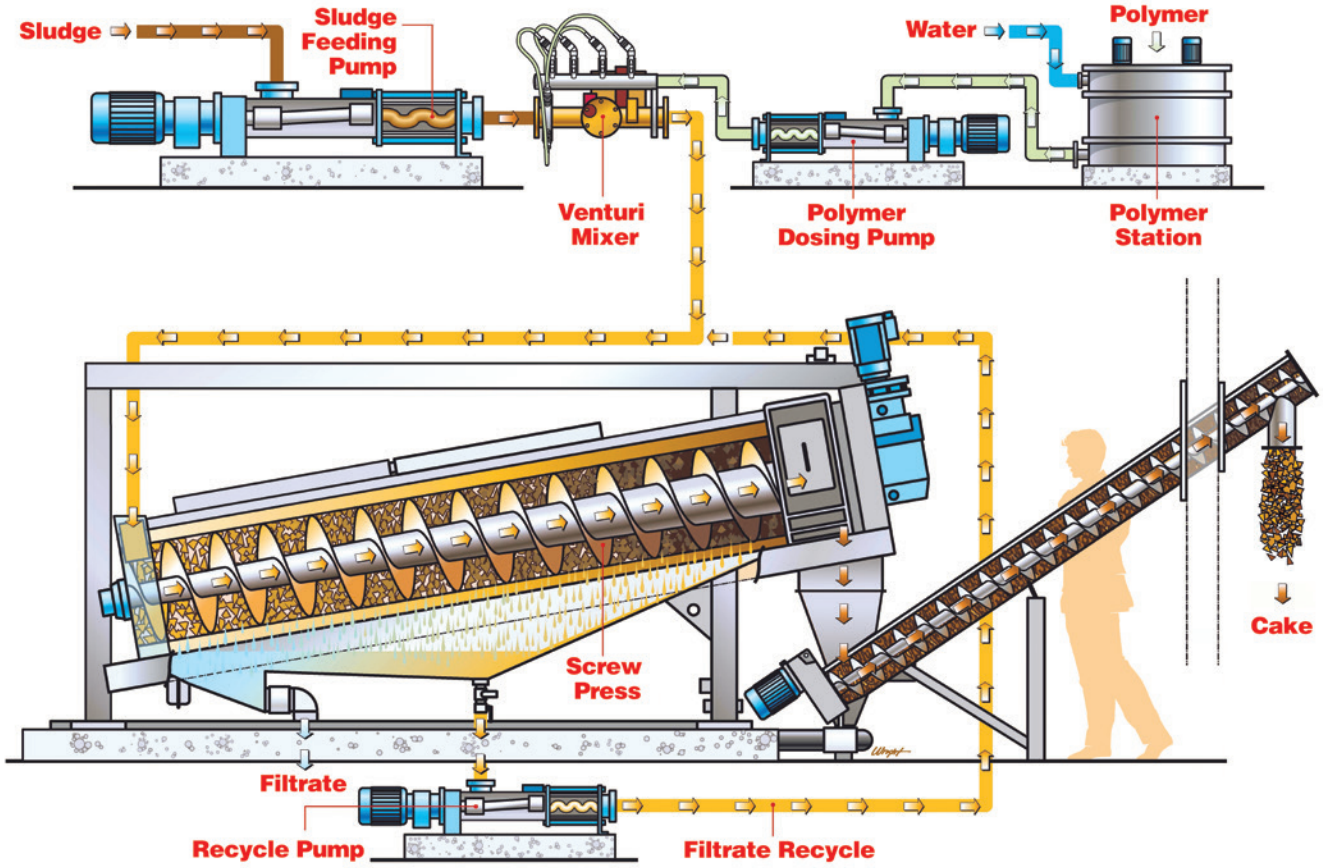
SCREW SHOWER SYSTEM: Low water usage.

- Optional RDT Filtrate Recycling: filtrate from RDT recycled to reduce wash water consumption
- Automated Wash System: showers use preprogrammed cycle to eliminate shut down of flow to screw press
- Pneumatically actuated showering system
- Nozzle designed to wash baskets and enclosure interior

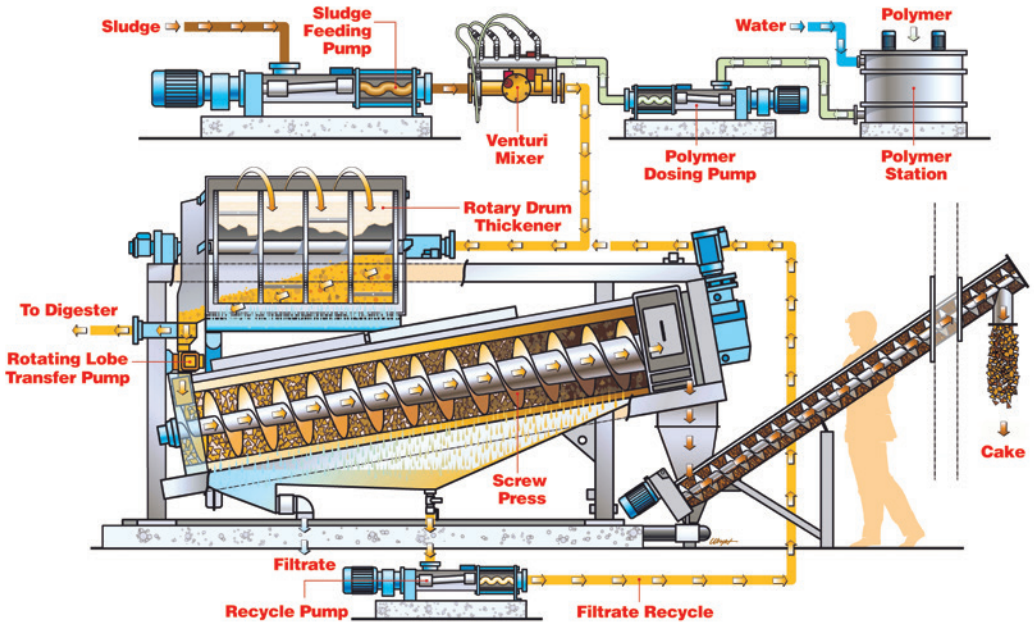
REPLACEABLE FLIGHTS:

- Simplified maintenance
- Custom material design
- Extended life of the flight

Standard **Screw Press Configuration**



Optional **Configuration with Rotary Drum Thickener**



OPTIONAL **INDEPENDENT PRE-THICKENING:**

- Enhanced capacity and dewatering performance
- Pre-thickens slurry, reducing volumetric flow to screw
- Higher hydraulic throughputs
- More time under pressure resulting in higher discharge cake solids
- Dual Mode operation – operate as a thickening or dewatering system

BDP Contacts:

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Email: info@bdpindustries.com

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Greenwich, NY 12834

BDP INDUSTRIES

www.bdpindustries.com

Henniker, NH
Screw Press Support Services

BDP SERVICE PERSONNEL

NAME	YEARS OF EXPERIENCE	TITLE	PHONE	LOCATION
A.J. Schmidt	27	President - Owner of BDP - Clarkson University, BS Chemical Engineering - Process Engineer - Manufacturing Supervisor	(518) 796-2344 (cell)	Greenwich, NY
Dan Fronhofer	17	Vice President - Owner of BDP - Marketing Manager - Process Engineer - R&D Support - P.E. NY state - Cornell University, BS Environmental Engineering	(518) 796-1440 (cell)	Greenwich, NY
Mike Gratton	18	Design Engineer - Mechanical and Electrical Design - Process Support - Rensselaer Polytechnical Institute, BS Mechanical Engineering	(518) 796-2256 (cell)	Greenwich, NY
Socrates Fronhofer	34	Vice President - Composter Support - University of Albany, BS Computer Science	(518) 796-5246 (cell)	Greenwich, NY
Steve Dobert	27	Design Engineer - R&D Design - Rochester Institute of Technology, BS Mechanical Engineering	(518) 695-6851 (office)	Greenwich, NY
Mike Jaworski	12	Assembly Foreman - Startup Services - Suny Oneonta, BS Environmental Science	(845) 594-1342 (cell)	Greenwich, NY
Jim Phillips	34	Assembly	(518) 796-5321 (cell)	Greenwich, NY

Henniker, NH
Screw Press Support Services

BDP SERVICE PERSONNEL

NAME	YEARS OF EXPERIENCE	TITLE	PHONE	LOCATION
Kelly Brown	37	Marketing and Process Support - University of Utah, BS Mineral Processing, MBA Business Management	(518) 527-5417 (cell)	Salt Lake City, UT
Carl Fronhofer	45	R&D Manager - Product and Process Support - Manufacturing Support - Previous Owner of BDP	(518) 796-2331 (cell)	Greenwich, NY
Alex Whitaker	8	Support Engineer - Waterjet Programmer - Inventory Manager - Clarkson University, BS Mechanical Engineering	(518) 695-6851 (office)	Greenwich, NY
Wyatt Wesner	6	Process Engineer / Field Service - Startup Services - Lab Sampling - Suny ESF, BS Environmental Engineering	(518) 339-2936 (cell)	Greenwich, NY
Daryl Harper	5	Electrical Technician / Spare Parts - Spare Parts Department - Electrical Troubleshooting - PLC/OIT Programmer	(518) 695-6851 (office) (716) 935-7620 (cell)	Greenwich, NY
Dan Sartell	16	Electrical Technician / Spare Parts - Electrical Support - Spare Parts Department - Field Service / Equipment Rebuilds	(518) 742-6232 (cell)	Greenwich, NY
Dave Deaton	36	Field Service Technician - Startup Services - 14 years experience in contract dewatering	(937) 313-9314 (cell)	Eaton, OH
Jim Roell	33	Field Service Technician - Startup Services - 24 years experience in contract dewatering	(937) 903-5733 (cell)	Eaton, OH

Henniker, NH
Screw Press Support Services

BDP SERVICE PERSONNEL

NAME	YEARS OF EXPERIENCE	TITLE	PHONE	LOCATION
Roger Gracey	43	Project Startup Engineer - Class AA license - Hazardous waste certified - City of Conroe TX employee 10 years	(832) 928-4661 (cell)	Conroe, TX
Luke Fronhofer	5	Process Engineer / Field Service - Startup Services - Lab Sampling - Worcester Polytechnic, BS Civil Engineering	(518) 415-5161 (cell)	Greenwich, NY
Brady Labarron	5	Field Service Technician - Startup Services - Field Service / Equipment Rebuilds	(518) 320-2122 (cell)	Greenwich, NY
Jared O'Connor	5	Field Service Technician - Startup Services - Field Service / Equipment Rebuilds	(518) 4157284 (cell)	Greenwich, NY
Jake DeFoe	3	Process Engineer / Field Service - Startup Services - Composter Field Service	(413) 441-5047 (cell)	San Diego, CA
Gerry Morris	5	Computor Programer - Startup Services - PLC/OIT Programmer	(518) 396-6408 (cell)	Greenwich, NY

BDP Industries, Inc.
Reference Installation List
New England

Plant Name	State	QTY	Model	Size	Start Up Date	Sludge Type	Contact	Cell Phone	Plant Phone	Email
Town of Orange WWTF	MA	1	RDT	Dual 4x10	9/27/2023	WAS	Oscar Rodriguez		(978) 544-1114	wwtp@townoforange.org
St. Johnsbury WWTP	VT	1	DSP	18x12	9/18/2023	Anaerobic	Jim Brimblecombe		(802) 748-9124	
Town of Orleans WWTF	MA	1	RDT	Dual 4x10	3/13/2023	SBR and Septage Blend	Edwin McAuliffe		(781) 206-5256	edwin.mcauliffe@veolia.com
Kingston WWTP	MA	1	GBT	1.0m	2/22/2023	RBC	Dave Walsh	(781) 706-2591	(781) 422-2253	
Town of Kent WWTP	CT	1	2VP	0.5m	1/4/2021	Aerobic	Lyle Sommers	(860) 309-7535	(860) 927-4075	lsommers@kentsewer.org
West Side Bridgeport WWTP	CT	1	RDT	Dual 4x10	6/12/2020	WAS	Joe Covati	(516) 315-5930		
City of Montpelier WWTP	VT	2	RDT	4x10	3/20/2020	WAS,Primary,Recuperative	Chris Cox		(802) 223-9511	ccox@montpelier-vt.org
City of Montpelier WWTP	VT	2	DSP	3630	3/20/2020	Anaerobic,Septage	Chris Cox		(802) 223-9511	ccox@montpelier-vt.org
Milford WWTP	MA	2	RDT	Dual 4x10	8/29/2019	Primary and Secondary	John Manini Sr		(508) 473-2054	
Lowell WWTP Duck Island	MA	1	RDT	Dual 4x10	2/21/2019	WAS	Evan Walsh		(978) 674-1638	
Newport WWTP	RI	2	RDT	4x10	5/1/2017	WAS	Tom Ciolfi		(401) 845-2000	
Krofta	MA	1	RDT	30x5	5/1/2016	Industrial	Jelte Lanting		(651) 795-5932	jelte.lanting@ecolab.com
Charles River WWTP	MA	1	GBT	3.0m	4/16/2016	Primary and Secondary	Daniel Pickering		(508) 533-6762	dpickering@charlesriverpcd.org
Great Barrington WWTP	MA	2	3DP	1.5m	9/1/2015	Primary and Secondary	Shea Gibbs		(413) 528-0650	SGibbs@Townofgb.org
Leominster WWTP	MA	2	RDT	Dual 4x10	8/24/2015	Primary and Secondary	Bob Chalifoux		(978) 537-5720	
Waterbury WWTP	VT	1	RDT	4x6	10/1/2014	MBR	Peter Krolczyk	(802) 598-3450	(802) 244-7792	pkroczyk@waterburyvt.com
Bucklin Point WWTP	RI	2	GBT	2.0m	8/13/2013	WAS	Dave Brouillard		(401) 461-8848	
Biddeford WWTP	ME	1	RDT	4x6	7/1/2013	WAS	Alex Buechner		(207) 282-1579	
Danvers WTP	MA	1	GBT	1.5m	6/9/2013	Water Treatment	Jason McCarthy	(978) 689-5864	(978) 774-5054	jdmccarthy.watertreatment@gmail.com
Fitchburg Easterly WWTF	MA	2	EGBT	2.0m	11/12/2012	WAS	Ken Letourneau	(978) 265-2479	(978) 345-9626	kletourneau@fitchburgma.gov
Putnam WPCF	CT	1	3DP	1.5m	10/24/2012	Anaerobic	Stan Daniels		(860) 963-6824	putnamwastewater@putnamct.us
Heritage Village WWTF	CT	1	GBT	1.0m	6/12/2012	WAS	Andrew Skully	(860) 391-1164	(203) 264-8100	
New Milford WWTP	CT	2	3DP	1.0m	8/9/2011	Oxidation Ditch	Robert Pudelka	(860) 354-3758	(860) 355-1049	
LAWPCA	ME	2	GBT	2.0m	5/11/2011	WAS	Travis Peaslee	(207) 450-3824	(207) 782-0917	tpeaslee@lawpca.org
South Windsor WPCF	CT	2	GBT	2.0m	12/10/2010	WAS	Jeff Lemay		(860) 289-0185	jeff.lemay@southwindsor-ct.gov
Westborough WWTP	MA	2	GBT	3.0m	9/10/2010	WAS	Christopher Gordon		(508) 366-7615	christopher.gordon@veolia.com
Stratford WPCF	CT	2	GBT	2.0m	8/1/2009	WAS	Tom Buzelle	(203) 953-1075	(203) 385-4065	
Lenox WWTP	MA	1	3DP	1.0m	2/26/2009	Primary and Secondary	Jeff White	413-822-505	(413) 637-5547	lenoxwwtp@townoflenox.com
Georgetown WWTP	CT	1	GBT	1.0m	4/8/2008	WAS	George Ciccone		(203) 544-7017	
Beaver Brook WWTP	CT	1	3DP	2.0m	11/27/2007	Anaerobic	Ed Kozlowski JR	(203) 988-2468	(203) 783-3277	ekozlowski@ci.milford.ct.us
Housatonic WWTP	CT	2	3DP	2.0m	11/27/2007	Anaerobic	Ed Kozlowski JR	(203) 988-2468	(203) 783-3277	ekozlowski@ci.milford.ct.us
Simsbury WWTP	CT	2	3DP	2.0m	3/27/2007	Primary and Secondary	Tony Piazza		(860) 658-1380	apiazza@simsbury-ct.gov
Adams WWTP	MA	1	3DP	1.5m	9/13/2005	Primary and Secondary	Robert Rumbolt		(413) 743-8370	rrumbolt@town.adams.ma.us

BDP Industries, Inc.
Reference Installation List
New England

Androscoggin Mill	ME	1	3DP	2.0m	6/21/2005	Primary and Secondary	Chuck Kraske	(207) 931-8636	(207) 897-1336	charles.kraske@pixelle.com
Springfield WWTP	VT	1	BDP	1.5m	5/3/2005	WAS	Rick Chambers	(802) 732-7021	(802) 885-2584	
Chester WWTP	VT	1	RDT	4x10	4/4/2005	WAS	Jeff Holden	(802) 384-3000	(802) 875-4325	wastewater@chestervt.gov
Scarborough WWTP	ME	1	GBT	1.5m	3/5/2005	WAS				
Springfield WWTP	VT	1	GBT	1.0m	9/4/2004	WAS	Rick Chambers	(802) 732-7021	(802) 885-2584	
Pepperell WWTF	MA	1	EGBT	0.8m	8/8/2004	WAS	"Richard ""Pez"" Pezzolesi"	(781) 697-6008	(978) 925-4431	rpezzolesi@town.pepperell.ma.us
Winchendon WWTP	MA	1	2VP	2.0m	6/6/2004	WAS	Chip Gagne		(978) 297-0536	chip.gagne@veolia.com
Borough of Jewett City WWTF	CT	1	GBT	1.0m	6/4/2004	WAS	David Drobiak		(860) 376-2955	
Norwich WWTP	CT	1	3DP	1.5m	6/1/2004	Anaerobic	Eric Dungan	(860) 823-4136	(860) 823-4506	
Hoosac WQD WWTP	MA	1	3DP	2.0m	5/10/2004	Primary and Secondary	Bradley Furlon	(413) 884-4192	(413) 458-8423	brad.furlon@verizon.net
Bennington WWTF	VT	1	BDP	2.0m	4/7/2004	Anaerobic RBC	Jon D'Amour	(802) 733-1079		jdamour@benningtonvt.org
Westfield WPCP	MA	2	GBT	2.0m	4/4/2004	WAS	Jeff Gamelli		(413) 572-6268	j.gamelli@cityofwestfield.org
Linden Pond WWTP	MA	1	EGBT	0.75m	2/4/2004	WAS	Dick Gould			rgould@woodardcurran.com
Norwich WWTP	CT	1	RDT	Dual 4x10	10/1/2003	WAS	Dave Grundwalski	(860) 887-2555	(860) 823-4506	
Stowe WWTP	VT	1	RDT	Dual 4x6	8/1/2002	WAS	Bryan Longe		(802) 253-6135	
Branford WWTP	CT	1	GBT	3.0m	7/2/2002	WAS	Dan Gregory		(203) 488-3125	
Kingston WWTP	MA	1	GBT	1.0m	3/2/2002	RBC	Dave Walsh	(781) 706-2591	(781) 422-2253	
Acton Wastewater	MA	1	EGBT	0.8m	8/7/2001	WAS				
Erving WWTP	MA	1	HO	2.0m	3/1/2001	Primary and Secondary	Ethan Covloi	(413) 544-3519		
Norwalk WWTP	CT	2	GBT	1.0m	8/10/1998	BNR	Pete Veterosa	(203) 943-1267	(203) 939-6881	
New Canaan WWTP	CT	2	GBT	2.0m	4/6/1998	WAS	James Rogers	(203) 594-3700		james.roger@newcanaanct.com
Hoosac WQD WWTP	MA	1	BDP	2.0m	1/5/1998	Primary and Secondary	Carl Dickenson		(413) 458-8423	
Uconn	CT	1	GBT	2.0m	4/4/1995	WAS	Ken Pelza		(860) 486-4235	kenneth.pelzar@uconn.edu
Barre WWTP	VT	1	GBT	2.0m	1/2/1995	WAS	Brandon Guyette		(802) 793-6579	wwt.teamlead@barrecity.org
Barre WWTP	VT	1	BDP	2.0m	1/2/1995	Primary and Secondary	Brandon Guyette		(802) 793-6579	wwt.teamlead@barrecity.org
Hoosac WQD WWTP	MA	1	BDP	2.0m	1/8/1992	Primary and Secondary	Bradley Furlon	(413) 884-4192	(413) 458-8423	brad.furlon@verizon.net
Ahlstrom Nonwovens	CT	1	BDP	2.0m	8/8/1989	Industrial	Steve Doherty	(860) 986-9618	860654855	steve.doherty@ahlstrom.com
Winsted WPCF	CT	2	BDP	1.0m	1/1/1989	Primary and Secondary	Alex Combes		(860) 379-4905	winstedwpcf@gmail.com
Crane & Company	MA	1	BDP	1.0m	3/5/1985	Paper Fiber				
Seaman Paper	MA	1	BDP	1.0m	7/8/1982	Paper Fiber	David Mallet		(413) 824-1408	david.mallet@seamanpaper.com
Spencer WWTP	MA	1	RDT	Dual 4x10	In Production	WAS				
Seamans Paper	MA	1	HO	1.0m	In Production	Paper Fiber	David Mallet		(413) 824-1408	david.mallet@seamanpaper.com
Hooksett WWTP	NH	2	DSP	18V	In Production	WAS	Ken Conaty		(603) 485-7000	ken.hooksettwastewater@gmail.com

BDP Industries, Inc.
Screw Press Reference Installation List

Plant Name	State	QTY	Model	Size	Start Up Date	Sludge Type	Contact	Cell Phone	Plant Phone	Email
St. Johnsbury WWTP	VT	1	DSP	18x12	9/18/2023	Anaerobic	Jim Brimblecombe		(802) 748-9124	
City of Montpelier WWTP	VT	2	DSP	3630	3/20/2020	Anaerobic,Septage	Chris Cox		(802) 223-9511	ccox@montpelier-vt.org
Hooksett WWTP	NH	2	DSP	18V	In Production	WAS	Ken Conaty		(603) 485-7000	ken.hooksettwastewater@gmail.com
Sherman WWTP	NY	1	DSP	12x8	9/19/2023	Aerobic	Jay Irwin	(716) 581-3397		
Dundee WWTP	NY	1	DSP	12V	7/26/2023	SBR	Nate	(607) 382-6391		wwtp@dundeevillageny.com
Village of Middleburgh WWTP	NY	1	DSP	12x8	8/31/2022	Aerobic	Nicholas Dunscombe	(518) 231-0328		
Castleton on Hudson WWTP	NY	1	DSP	12x8	12/2/2021	Aerobic	Kenneth Meyer	(518) 701-8045	(518) 732-2752	
Hudson Valley Fish Farm	NY	1	DSP	12x4	11/29/2021	MBR,Fish Waste	Ed Tribe			edtribe@gmail.com
Naples WWTP	NY	1	DSP	12x4	9/28/2021	Fixed Film Secondary	Kyle Kuner	(585) 746-5291		wastewater@naplesny.us
Mexico WWTP	NY	1	DSP	12x8	5/21/2021	Aerobic	Jason Cusyck	(315) 440-0333	(315) 298-2673	omipulaski@frontiernet.net
Ontario WWTP	NY	1	DSP	3618	1/21/2021	Aerobic	Brian Whipple	(585) 857-0756		bwhipple@ontariotown.org
Watkins Glen Montour Falls WWTF	NY	1	DSP	30x12	9/15/2020	Aerobic	Terry Wilcox	(607) 742-6871		twilcox@watkinsglen.us
Alden WWTP	NY	1	DSP	18x12	11/21/2019	Anaerobic	Daniel Czelusta		(716) 937-4497	danc@aldenvillage.org
Sodus Point WWTP	NY	1	DSP	12x4	8/15/2019	Aerobic	Jeff Cook		(315) 483-9454	
Town of Hanover WWTP	NY	1	DSP	18x12	7/1/2019	Aerobic	Rob Weiskerger	(716) 640-4311	(716) 934-2250	
Village of Potsdam WWTP	NY	1	DSP	3630	4/2/2019	Anaerobic	James Blackmore		(315) 265-8670	jblackmore@vi.potsdam.ny.us
Coeymans WWTP	NY	1	DSP	3012	9/19/2018	Aerobic	Keith Geraldsen	(518) 331-6444	(518) 756-6180	wwtp@coeymans.org
Hastings WWTP	NY	1	DSP	3012	1/26/2018	Aerobic	Dustin Clark	(315) 415-4041		dcmaverick24@gmail.com
Village of Bergen WWTP	NY	1	DSP	12x8	5/17/2017	WAS	Chris Fay	(585) 202-0326	(585) 202-0326	cfay@villageofbergen.com
Village of Medina WWTP	NY	1	DSP	18x12	10/10/2016	Anaerobic RBC	Steve Rodland	(585) 230-0521		stevenrodland@frontier.com
Waverly WWTP	NY	1	DSP	3618	7/7/2016	MBR with BNR	Doug Kinsley	(607) 738-5696	(607) 565-5203	waverlywwtp@gmail.com
Walton WWTP	NY	1	DSP	3630	5/5/2016	Aerobic	Shane Boyce	(607) 267-6871	(607) 865-6993	waltonwste@stny.rr.com
Caneadea WWTP	NY	1	DSP	3012	5/5/2015	Anaerobic Trickling Filter	Jeff Tubolino			
Penn Yan WWTP	NY	1	DSP	3012	10/21/2014	Anaerobic RBC	Yvonne Tucker	(315) 418-5353	(315) 536-3023	ytucker@villageofpennyan.com
Williamson WWTF	NY	1	DSP	3012	9/2/2014	Aerobic	John Manahan	(585) 766-9333	(315) 589-9371	wastewaterplant@towilliamson.com
Village of Suffern WWTP	NY	2	DSP	3012	11/8/2013	Anaerobic Trickling Filter	Aramis Morris	(845) 263-2349		amorris@suffern.ny.gov
Macedon WWTP	NY	1	DSP	3012	4/24/2013	Anaerobic Trickling Filter	Jerry Locey	(315) 310-5016	(315) 538-0715	macedonwwtp@gmail.com
Groton WWTP	NY	1	DSP	3012	3/3/2010	Aerobic SBR	Village of Groton		(607) 898-5185	
Pottsboro WWTP	TX	1	DSP	3012	9/14/2023	Aerobic	Mike Thompson	(903) 814-1201		mthompson@cityofpottsboro.com
Sellersburg WWTP	IN	2	DSP	3630	5/2/2023	WAS	Lori Kearney	(502) 376-4962		lkearney@sellersburg.org
Erie North WTF	CO	2	DSP	30x12	3/13/2023	ATAD	Jon Coyle	(303) 434-1334		jcoyle@erieco.gov
Security Sanitation District WWTP	CO	1	DSP	3630	9/14/2022	WAS,Anaerobic	Nick Sipe	(719) 492-0255		n.sipe@securitywsd.com
Anniston Choccolocco Creek WWTP	AL	1	DSP	3630	10/21/2021	ATAD	Clif Osborne		(205) 987-7411	clif.osborne@krebseng.com
Nipomo WWTP	CA	1	DSP	30x12	8/3/2021	WAS	Derek Calleja	(805) 459-3798		dcalleja@ncsd.ca.gov

BDP Industries, Inc.

Screw Press Reference Installation List

Gregg Township WWTP	PA	1	DSP	3630	2/11/2021	Aerobic SBR with BNR	Jason Koch	(570) 850-9338	(570) 538-3313	jwk@gtma.comcastbiz.net
Christian County WRD	IL	2	DSP	30x12	11/5/2020	Primary and Secondary	Bob Willard		(217) 824-6833	
Beardstown WWTP	IL	1	DSP	3618	12/12/2019	Aerobic Oxidation Ditch	Wells Petersen	(217) 371-1081	(217) 323-3521	treatit@casscomm.com
Arcanum WWTP	OH	1	DSP	3012	8/5/2019	Anaerobic Trickling Filter				
Calls Creek WRF	GA	1	DSP	3618	8/27/2018	WAS	Erin Carlton	(706) 521-1925	(706) 769-3963	ecarlton@oconee.ga.us
Miamisburg WRF	OH	1	DSP	3630	6/3/2018	Anaerobic	Dave Reinker	(937) 847-6651		
Baldwin City	KS	1	DSP	3012	5/6/2018	Aerobic	Steve Gorden		(785) 594-3261	
Wilmore WWTP	KY	1	DSP	3012	1/18/2018	Aerobic Oxidation Ditch	James Zweifel	(859) 285-9602		
Scappoose WWTP	OR	1	DSP	3618	5/1/2017	Aerobic	Kevin Turner		(971) 246-6189	kturner@cityofscappoose.org
Fountain WWTP	CO	1	DSP	3012	1/17/2017	Aerobic	Tim Long	(719) 491-6864	(719) 382-5303	fsdfieldsuper@fsd901.org
Macon WWTP	MO	1	DSP	3618	7/16/2016	Primary and Secondary	Ronny Smith	(660) 346-0418	(660) 385-2532	mmuwwtf@cvalley.net
Kentucky State Reformatory WWTP Oldham County	KY	1	DSP	3618	5/5/2016	Aerobic	Jim Hagerty	(502) 548-0598		jhagerty@hagertyco.us
MWH Global- Boeing	CA	1	DSP	3012	2/8/2016	Water Treatment	John Parkes	(714) 719-6873	(818) 466-8011	
Union WWTP	OH	1	DSP	3618	12/14/2015	Aerobic	John Applegate	(937) 477-2442	(937) 836-8624	japplegate@union.oh.org
Georgetown WWTP	CO	1	DSP	3618	4/15/2015	Aerobic	John Curtis	(303) 888-3900	(303) 569-2867	towntreas@townofgeorgetown.us
Brookville WWTP	OH	1	DSP	3012	9/9/2013		John Weist	(937) 473-9323	(937) 833-2515	
Paradise Cove	CA	1	DSP	3012	Onsite Pending Startup	SBR	Barbara Bradley			
Brady WWTP	TX	1	DSP	18x12	Onsite Pending Startup					
Wellington WWTP	CO	2	DSP	30x12	In Production		Ryan White	(970) 420-4324		
Taylor WWTP	AL	1	DSP	12x4	Onsite Pending Startup					
Slab Creek WWTP	AL	1	DSP	30V	Onsite Pending Startup					
Calls Creek WRF	GA	1	DSP	18V	In Production	WAS	Erin Carlton	(706) 521-1925	(706) 769-3963	ecarlton@oconee.ga.us
Grantham WWTP (Upper Allen Municipal Authority)	PA	1	DSP	30V	In Production					
O'Fallon WWTP	IL	2	DSP	30V	Onsite Pending Startup					
Blossburg Municipal Authority WWTP	PA	1	DSP	18V	In Production					
Destin Wastewater Treatment Plant	FL	2	DSP	30V	In Production					
Forest Creek WWTP	TX	1	DSP	30V	In Production					

PROJECT FACT SHEET

City of Montpelier WWTP | Montpelier, VT

Facility Contact: Chris Cox (802)-223-9511
Local Representative: Mike Sullivan - Carlsen Systems (508)-878-1016

Two (2) DSP 3630 Screw Presses
Start Up: April 2020

The Montpelier Wastewater Treatment Plant was looking to make a change to their mechanical dewatering. The plant wanted equipment that was enclosed and could offer solids containment, while also being able to run unattended. BDP's Screw Press offered all of these qualities, as well as drier cake. Two 30" Screw Presses were supplied along with two integrated rotary drum thickeners. The facility runs two different sludge types: anaerobically digested and septage.The screw presses run unattended 10 - 16

Sludge Type	Average Loading	Performance
Anaerobic	30 - 40 GPM	• 3.0% Inlet Feed • 24 - 26% Discharge Solids
Septage	70 - 100 GPM	• 1.0 - 1.5% Inlet Feed • 26 - 30% Discharge Solids

Manufacturer of Systems for Solids Dewatering
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BDP PROJECT FACT SHEET

Bergen WWTP
Bergen, NY

The Village of Bergen wastewater treatment plant piloted screw presses and rotary chamber presses with the intent of replacing their drying beds. BDP Industries Model 12" x 8' DSP Screw Press was selected as the basis of design after completing the pilot test and efficiently dewatering the plants aerobically digested solids. The BDP screw press was determined to be the best overall value because of its features and abilities to get high cake solids, low maintenance, unattended operation and BDPs equipment reliability and service.

Average Daily Flow	0.113 MGD
Start Up	April 2017
Type of Equipment	12" x 8' DSP Screw Press
Sludge Type	Aerobically Digested Blend
Performance & Capability	0.8% Inlet Feed 20 GPM 16 - 19% Discharge Cake
Facility Contact	Chris Fray 585-202-0326
Local Representative	Mark Koester- Koester Associates 315-727-0836
Special Features	BDP Belt Conveyor

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PROJECT FACT SHEET

Christian County WRD | Taylorville, IL

Facility Contact: Bob Willard (217)-824-6833
Local Representative: Brian Gorniak - Vandevanter (636)-343-8880

Two (2) 30 x 12 DSP Screw Press
Start Up: November 2020

The Christian County Water Reclamation District previously used belt presses as their primary dewatering equipment. The facility started looking for replacement dewatering equipment that would offer better solids containment and ease of access for maintence. The BDP Screw Press offered both. BDP provided two screw presses along with the sludge pumps, washwater pump, polymer blending unit, stainless steel polymer age tank, polymer solution pumps, discharge conveyors and control panel for a fully integrated system.

The BDP Screw Press offered the best overall value based on the following:

-High Cake Solids
-Unattended Operation
-Low Maintenance
-BDP Equipment Reliability
-BDP Equipment Service
-Completely Integrated System

Dry Tons per Year	1,000
Sludge Type	WAS
Performance & Capability	• 5 - 6% Inlet Feed • 30 - 40 GPM • 24 - 26% Discharge Solids • 25 lbs/dt Polymer Dosage • 95%+ Solids Capture

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BDP PROJECT FACT SHEET

Watkins Glen Montour Falls Regional WWTP
Watkins Glen, NY

The communities of Watkins Glen and Montour Falls both had aging wastewater treatment facilities that were no longer meeting their permits. A 1.2 MGD regional facility was designed and constructed to discharge clean water into Seneca Lake. The aerobically digested solids are handled on a 30" diameter BDP Screw Press. The screw press processes 30 - 40 GPM while achieving 18 - 22% discharge solids.

Average Daily Flow	1.2 MGD
Start Up	September 2020
Type of Equipment	DSP 30 Screw Press
Sludge Type	Aerobically Digested
Performance & Capability	2.0 - 3.0% Inlet Feed Solids 30 - 40 GPM 18 - 22% Discharge Cake 97%+ Solids Capture
Facility Contact	Terry Wilcox (937) 535-9962
Engineering Reference	Bradley Sick - Larson Engineering (607) 936-7076
Local Representative	Mike Ademovic - Koester Associates (315) 790-0561

Manufacturer of Systems for Solids Dewatering

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354 State Route 29, Greenwich, New York 12834
Phone No 518-695-6851

Subject: Operations and Maintenance

The DSP Screw Press is made of 304 stainless steel for excellent corrosion resistance. All bearings are located outside the press for easy greasing. The most major maintenance task, changing the screw flights, only requires removing one half of the screw basket (250 lbs) and can be performed by BDP personnel or plant staff with sufficient training every 3000-5000 hours. The press only requires 3 feet of clearance on one side to perform maintenance tasks; it is convenient to have 3 feet of space on both sides, but not mandatory. It is nice to have 2-3 feet of clearance on the inlet and discharge ends of the screw, but not necessary. See the Maintenance and Lubrication Schedules in this section for further information.

All components (drives and bearings included) other than the screw flights may be replaced with off the shelf equivalents. Part numbers will be provided for any such item for ease and speed of replacement.

BDP's production facility is located in Greenwich, NY. The entire manufacturing process from raw steel reception through fabrication and assembly all occur at this one central location. Should there be an emergency issue with any component fabricated by BDP, we can ensure 2 day turnaround from receipt of request to shipping the replacement item. Please see BDP Support Staff sheet under the Company Track Record and Availability tab for a service staff roster with experience listed.

IX. Maintenance of the Screw Press

A. General

The best method to continued operation of the press is through an effective preventative maintenance program. This will greatly minimize any remedial maintenance work on the press. The following program is presented to serve as a guide for proper maintenance of the screw press unit.

Check the Following Once Per Week

Hoses - for minor leak

Cylinders - operability

Shafts and Bearings - for any shaft movement

E-stop pushbutton - operability

Check the Following Once Per Month

Check screw shaft for wear

Check slotted screen basket for wear

Check belt closures and fabrics

Check pivot points and pins

Check Per Original Equipment Instruction

Bearings

Motors

Drives

Wash water booster pump (optional)

Air compressor (optional)

Polymer System

Sludge Pump

B. Bearings

There are two bearings, located on either end of the screw shaft that require periodic greasing. Please refer to the Lubrication & Maintenance Schedule in this section as well as to the bearing manufacturer's instructions.

C. Motors and Gearboxes

There are two motors and gearboxes on the screw press unit: The Screw drive and Recycle pump drive. There may also be ancillary equipment supplied with this system that includes motors and gearboxes. The motors do not require regular maintenance. The gearboxes often do require periodic oil changes. Please refer to the Lubrication & Maintenance Schedule in this section as well as to the gearbox manufacturer's instructions.

D. Replacing the Screw Flights

On all screw presses, the tips of the flights will wear over time and eventually will require rebuilding or replacement to maintain the proper tolerance to the screw basket. The BDP unit utilizes a unique replaceable flight to prevent the need of having to remove the screw for this work. Depending on the abrasiveness of the material to be dewatered, this replacement should be done anywhere from every 3,000 to 5,000 hours. In order to complete this work, follow the instructions below:

1) Lock-out / Tag-out the equipment and ensure a safe working area and environment.
3) Remove all screw housing doors and corner supports.
4) Disconnect main water feed to shower, remove shower clips from track, then remove entire shower assembly, and shower track.
5) Remove all bolts from the screw clam baskets.
6) Remove the shim from the center of the screw basket ***before*** lifting the top screw baskets.
7) Remove top screw baskets.
8) Replace the individual parts of the screw flights.
9) Replace all items and re-install in the opposite order as listed above.

ITEM	LUBRICANT	FREQUENCY	METHOD	REMARKS
GEAR REDUCERS – SCREW DRIVE & SLUDGE PUMP	KENDALL INDUSTRIAL GEAR OIL – ISO GRADE 220	CHANGE AFTER FIRST 500 HOURS, THEN EVERY 10,000 HOURS OR 2 YEARS	DRAIN AND FILL	SEE MFG. INSTRUCTIONS
BEARINGS	KENDALL L- ,OMNIGUARD 778589	EVERY 1500 HRS RUN TIME OR 10 WEEKS	GREASE GUN, ADD SLOWLY PURGE ROTATE SAFELY – DO NOT OVER GREASE	SEE MFG. INSTRUCTIONS
C-FACED DRIVE MOTORS (IF REQUIRED)	KENDALL L- POLYTAC NLGI GRADE 2 OR . EQUAL	EVERY 4,750 HRS RUN TIME	GREASE GUN, ADD SLOWLY PURGE ROTATE SAFELY – DO NOT OVER GREASE	SEE MFG. INSTRUCTIONS

EQUIVALENT LUBRICANT REFERENCE

Company	Gear Oil (ISO VG 220)	All Purpose Grease (NLGI 2)	Hydraulic Oil
Kendall	Industrial Gear Oil - ISO 220	L-427 Super Blue Hi Temp Grease	Four Season AW-46
Mobil	Mobilgear 630	Mobilux EP 2	Mobil D. T. E. 25
BP	Energol HL-C 220	Energrease LS-EP 2	Energol HLP-HM 46
Chevron	AIO ISO 220	Duralith Grease EP	Rykon AW 46
Phillips 66	Magnus 220	Philube Hi-temp EP	Magnus 46
Shell	Tonna Oil V 220	Anvania Grease EP 2	Tellus Plus oil 46
Sunoco	Sunep 1070	Sunaplex 992 EP	Sunvis 831 WR
Texaco	Meropa 220	Multifak EP	Rando Oil HDB 46

LUBRICANTS

The approximate lubricant in US gallons and liters per mounting position is as follows:

Gear Unit	Mounting Position											
	M1		M2		M3		M4		M5		M6	
	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters
F27	0.16	0.60	0.21	0.80	0.17	0.65	0.18	0.70	0.16	0.60	0.16	0.60
F37	0.25	0.95	0.33	1.25	0.18	0.70	0.33	1.25	0.26	1.00	0.29	1.10
F47	0.40	1.50	0.48	1.80	0.29	1.10	0.50	1.90	0.40	1.50	0.45	1.70
F57	0.69	2.60	0.92	3.50	0.55	2.10	0.92	3.50	0.74	2.80	0.77	2.90
F67	0.71	2.70	1.00	3.80	0.50	1.90	1.00	3.80	0.77	2.90	0.84	3.20
F77	1.55	5.9	1.95	7.3	1.15	4.30	2.10	8.0	1.60	6.0	1.65	6.3
F87	2.85	10.8	3.45	13.0	2.05	7.7	3.65	13.8	2.85	10.8	2.90	11.0
F97	4.90	18.5	5.9	22.5	3.35	12.6	6.7	25.2	4.90	18.5	5.3	20.0
F107	6.5	24.5	8.4	32.0	5.1	19.5	9.9	37.5	7.1	27.0	7.1	27.0
F127	10.7	40.5	14.4	54.5	9.0	34.0	16.1	61.0	12.2	46.3	12.4	47.0
F157	18.2	69.0	27.5	104.0	16.6	63.0	27.7	105.0	22.7	86.0	20.6	78.0
FF27	0.16	0.60	0.21	0.80	0.17	0.65	0.18	0.70	0.16	0.60	0.16	0.60
FF37	0.26	1.00	0.33	1.25	0.18	0.70	0.34	1.30	0.26	1.00	0.29	1.10
FF47	0.42	1.60	0.49	1.85	0.29	1.10	0.50	1.90	0.40	1.50	0.45	1.70
FF57	0.74	2.80	0.92	3.50	0.55	2.10	0.98	3.70	0.77	2.90	0.79	3.00
FF67	0.71	2.70	1.00	3.80	0.50	1.90	1.00	3.80	0.77	2.90	0.84	3.20
FF77	1.55	5.9	1.95	7.3	1.15	4.30	2.15	8.1	1.60	6.0	1.65	6.3
FF87	2.85	10.8	3.50	13.2	2.05	7.8	3.70	14.1	2.90	11.0	2.95	11.2
FF97	5.00	19.0	5.9	22.5	3.35	12.6	6.8	25.6	5.00	18.9	5.4	20.5
FF107	6.7	25.5	8.4	32.0	5.1	19.5	10.2	38.5	7.3	27.5	7.4	28.0
FF127	11.0	41.5	14.7	55.5	9.0	34.0	16.6	63.0	12.2	46.3	12.9	49.0
FF157	19.0	72.0	27.7	105.0	16.9	64.0	28.0	106.0	23.0	87.0	20.9	79.0
FA/FH/FV27 FAF/FHF/FVF27 FAZ/FHZ/FVZ27	0.16	0.60	0.21	0.80	0.17	0.65	0.18	0.70	0.16	0.60	0.16	0.60
FA/FH/FV37 FAF/FHF/FVF37 FAZ/FHZ/FVZ37 FT37	0.25	0.95	0.33	1.25	0.18	0.70	0.33	1.25	0.26	1.00	0.29	1.10
FA/FH/FV47 FAF/FHF/FVF47 FAZ/FHZ/FVZ47 FT47	0.40	1.50	0.48	1.80	0.29	1.10	0.50	1.90	0.40	1.50	0.45	1.70
FA/FH/FV57 FAF/FHF/FVF57 FAZ/FHZ/FVZ57 FT57	0.71	2.70	0.92	3.50	0.55	2.10	0.90	3.40	0.77	2.90	0.79	3.00
FA/FH/FV67 FAF/FHF/FVF67 FAZ/FHZ/FVZ67 FT67	0.71	2.70	1.00	3.80	0.50	1.90	1.00	3.80	0.77	2.90	0.84	3.20
FA/FH/FV77 FAF/FHF/FVF77 FAZ/FHZ/FVZ77 FT77	1.55	5.9	1.95	7.3	1.15	4.30	2.10	8.0	1.60	6.0	1.65	6.3
FA/FH/FV87 FAF/FHF/FVF87 FAZ/FHZ/FVZ87 FT87	2.85	10.8	3.45	13.0	2.05	7.7	3.65	13.8	2.85	10.8	2.90	11.0
FA/FH/FV97 FAF/FHF/FVF97 FAZ/FHZ/FVZ97 FT97	4.90	18.5	5.9	22.5	3.35	12.6	6.7	25.2	4.90	18.5	5.3	20.0
FA/FH/FV107 FAF/FHF/FVF107 FAZ/FHZ/FVZ107	6.5	24.5	8.4	32.0	5.1	19.5	9.9	37.5	7.1	27.0	7.1	27.0
FA/FH/FV127 FAF/FHF/FVF127 FAZ/FHZ/FVZ127	10.3	39.0	14.4	54.5	9.0	34.0	16.1	61.0	11.9	45.0	12.3	46.5
FA/FH/FV157 FAF/FHF/FVF157 FAZ/FHZ/FVZ157	18.0	68.0	27.2	103.0	16.4	62.0	27.5	104.0	22.4	85.0	20.3	77.0

For additional information on F-Series mounting positions, refer to the SEW Catalog.

LUBRICANTS

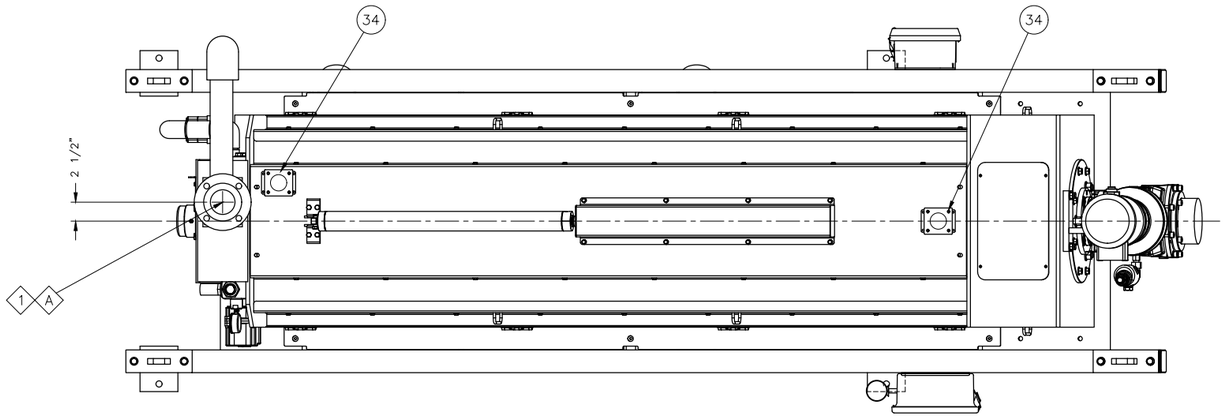
The approximate lubricant in US gallons and liters per mounting position is as follows:

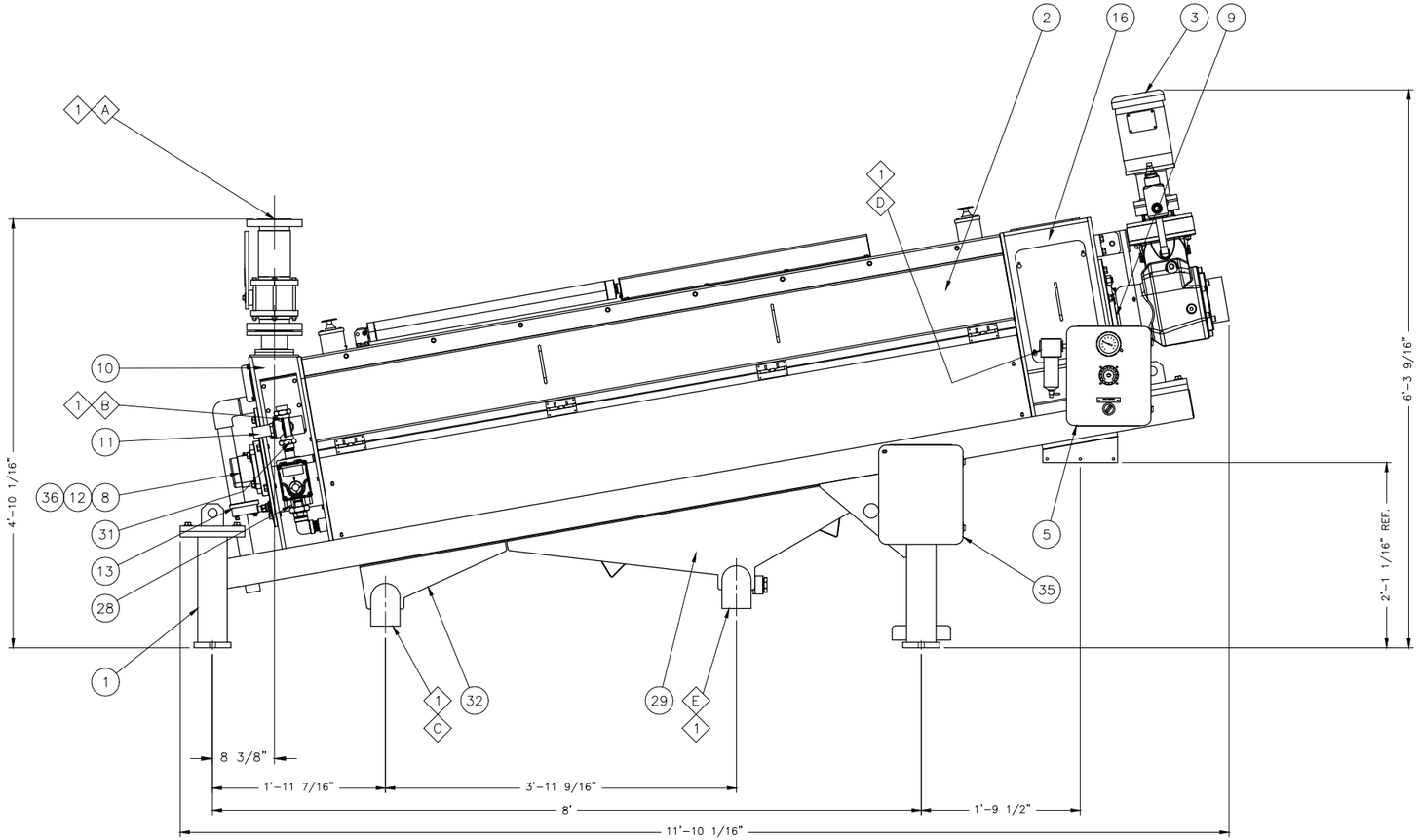
	Mounting Position											
	M1 [1]		M2 [1]		M3 [2]		M4		M5 [2]		M6 [2]	
Gear Unit	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters
RX57	0.16	0.6	0.21	0.8	0.34	1.3	0.34	1.3	0.24	0.9	0.24	0.9
RX67	0.21	0.8	0.21	0.8	0.45	1.7	0.50	1.9	0.29	1.1	0.29	1.1
RX77	0.29	1.1	0.40	1.5	0.69	2.6	0.71	2.7	0.42	1.6	0.42	1.6
RX87	0.45	1.7	0.66	2.5	1.27	4.8	1.27	4.8	0.77	2.9	0.77	2.9
RX97	0.55	2.1	0.90	3.4	1.96	7.4	1.85	7	1.27	4.8	1.27	4.8
RX107	1.03	3.9	1.48	5.6	3.06	11.6	3.14	11.9	2.03	7.7	2.03	7.7
RXF57	0.13	0.5	0.21	0.8	0.29	1.1	0.29	1.1	0.18	0.7	0.18	0.7
RXF67	0.18	0.7	0.21	0.8	0.40	1.5	0.45	1.7	0.26	1	0.26	1
RXF77	0.24	0.9	0.40	1.5	0.63	2.4	0.66	2.5	0.42	1.6	0.42	1.6
RXF87	0.42	1.6	0.66	2.5	1.29	4.9	1.24	4.7	0.77	2.9	0.77	2.9
RXF97	0.55	2.1	0.95	3.6	1.88	7.1	1.85	7	1.27	4.8	1.27	4.8
RXF107	0.82	3.1	1.56	5.9	2.96	11.2	2.77	10.5	1.90	7.2	1.90	7.2
R17/R17F	0.07	0.25	0.16	0.6	0.09	0.35	0.16	0.6	0.09	0.35	0.09	0.35
R27/R27F	0.07 (0.11)	0.25 (0.4)	0.18	0.7	0.11	0.4	0.18	0.7	0.11	0.4	0.11	0.4
R37/R37F	0.08 (0.26)	0.3 (1)	0.24	0.9	6.26	1	0.29	1.1	0.21	0.8	0.26	1
R47/R47F	0.18 (0.40)	0.7 (1.5)	0.42	1.6	0.40	1.5	0.45	1.7	0.40	1.5	0.40	1.5
R57/R57F	0.21 (0.45)	0.8 (1.7)	0.50	1.9	0.45	1.7	0.55	2.1	0.45	1.7	0.45	1.7
R67/R67F	0.29 (0.61)	1.1 (2.3)	0.69 (0.92)	2.6 (3.5)	0.74	2.8	0.85	3.2	0.48	1.8	0.53	2
R77/R77F	0.32 (0.79)	1.2 (3)	1.00 (1.14)	3.8 (4.3)	0.95	3.6	1.14	4.3	0.66	2.5	0.90	3.4
R87/R87F	0.61 (1.59)	2.3 (6)	1.77 (2.22)	6.7 (8.4)	1.90	7.2	2.03	7.7	1.66	6.3	1.72	6.5
R97	1.22 (2.59)	4.6 (9.8)	3.09 (3.70)	11.7 (14)	3.09	11.7	3.54	13.4	2.99	11.3	3.09	11.7
R107	1.59 (3.62)	6 (13.7)	4.31	16.3	4.46	16.9	5.07	19.2	3.49	13.2	4.20	15.9
R137	2.64 (6.61)	10 (25)	7.40	28	7.79	29.5	8.32	31.5	6.61	25	6.61	25
R147	4.07 (10.57)	15.4 (40)	12.29	46.5	12.68	48	13.74	52	10.44	39.5	10.83	41
R167	7.13 (18.49)	27 (70)	21.66	82	20.61	78	23.25	88	17.44	66	18.23	69
RF17	0.07	0.25	0.16	0.6	0.09	0.35	0.16	0.6	0.09	0.35	0.09	0.35
RF27	0.07 (0.11)	0.25 (0.4)	0.18	0.7	0.11	0.4	0.18	0.7	0.11	0.4	0.11	0.4
RF37	0.11 (0.26)	0.4 (1)	0.24	0.9	0.26	1	0.29	1.1	0.21	0.8	0.26	1
RF47	0.18 (0.40)	0.7 (1.5)	0.42	1.6	0.40	1.5	0.45	1.7	0.40	1.5	0.40	1.5
RF/RM57	0.21 (0.45)	0.8 (1.7)	0.48	1.8	0.45	1.7	0.53	2	0.45	1.7	0.45	1.7
RF/RM67	0.32 (0.66)	1.2 (2.5)	0.71 (0.95)	2.7 (3.6)	0.71	2.7	0.82	3.1	0.50	1.9	0.55	2.1
RF/RM77	0.32 (0.69)	1.2 (2.6)	1.00 (1.08)	3.8 (4.1)	0.87	3.3	1.08	4.1	0.63	2.4	0.79	3
RF/RM87	0.63 (1.59)	2.4 (6)	1.8 (2.09)	6.8 (7.9)	1.88	7.1	2.03	7.7	1.66	6.3	1.69	6.4
RF/RM97	1.35 (2.69)	5.1 (10.2)	3.14 (3.70)	11.9 (14)	2.96	11.2	3.70	14	2.96	11.2	3.12	11.8
RF/RM107	1.66 (3.94)	6.3 (14.9)	4.20	15.9	4.49	17	5.07	19.2	3.46	13.1	4.20	15.9
RF/RM137	2.51 (6.61)	9.5 (25)	7.13	27	7.66	29	8.59	32.5	6.61	25	6.61	25
RF/RM147	4.33 (11.10)	16.4 (42)	12.42	47	12.68	48	13.74	52	11.10	42	11.10	42
RF/RM167	6.87 (18.49)	26 (70)	21.66	82	20.61	78	23.25	88	17.17	65	18.76	71

[1] On compound gear units the primary (larger) gear unit is provided with the oil quantity in parenthesis.

[2] On compound gear units having mounting positions M3, M5, or M6 the secondary (smaller) gear unit is provided with the oil filling of the M1 flanged mounting position.

For additional information on R-Series mounting positions, refer to the SEW Catalog or call the SEW FAXline, 1-800-601-6195, and request Document #2111.

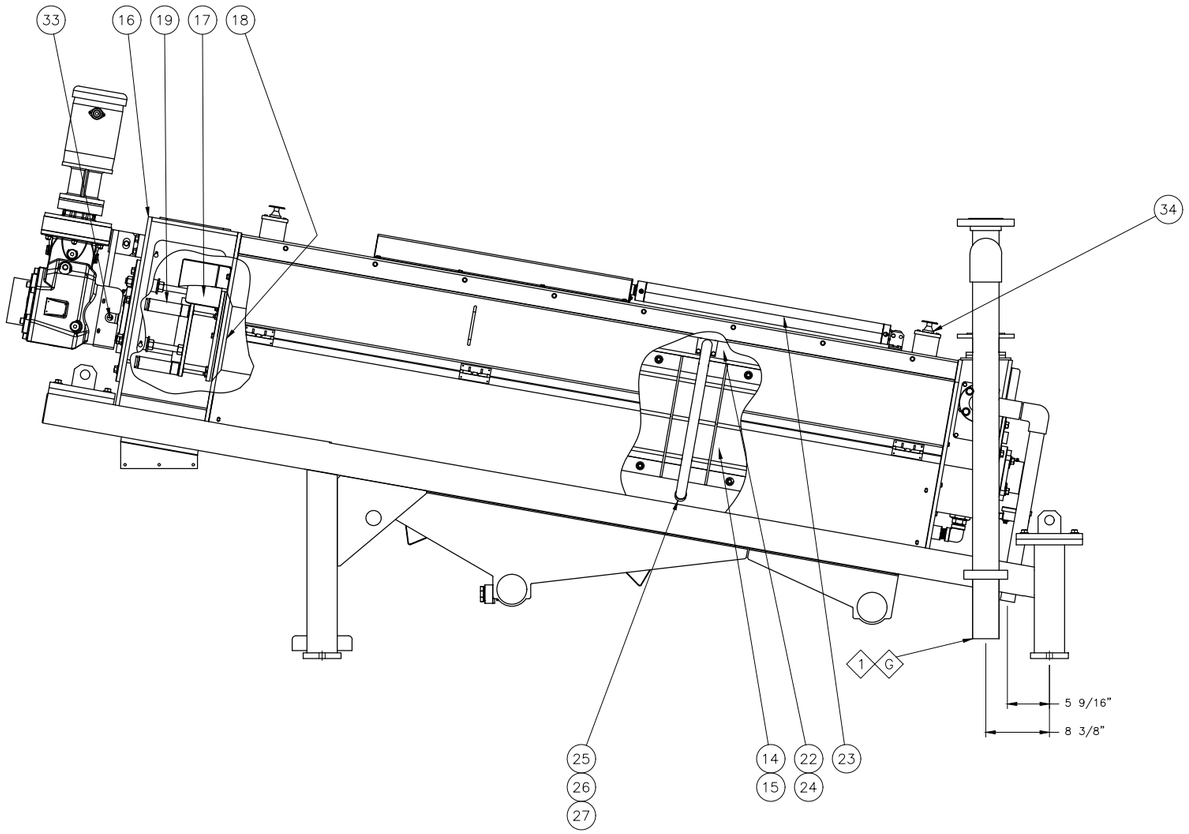


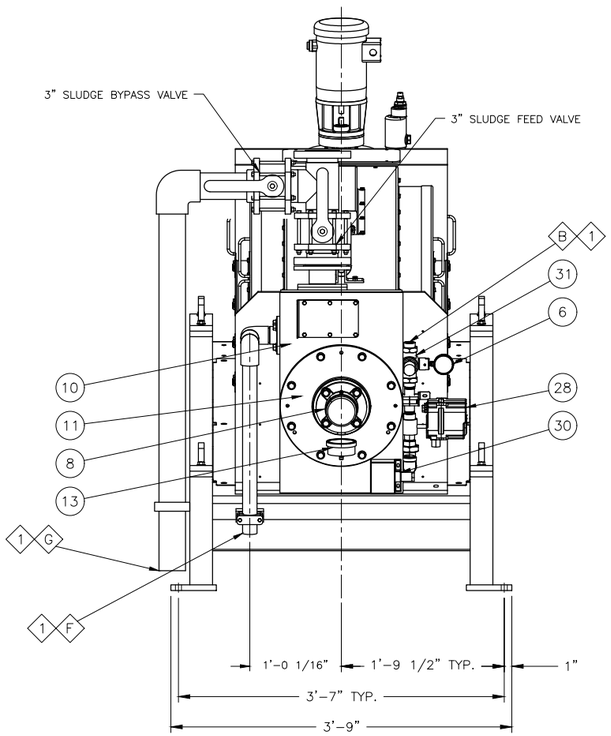


QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER:	MACHINE:	DWG TITLE
MIDDLEBURG, NY	DSP 12x8	GENERAL ARRANGEMENT MODEL DSP 12x8 SCREW PRESS
BDP JOB NO. 1581	**DWN BY:** MJG	**DATE:** 5/26/21
APP'D BY:	**SCALE:**	**SHT.** 1 **OF** 3
DWG NO. 1-1581-1		**REV.** 3

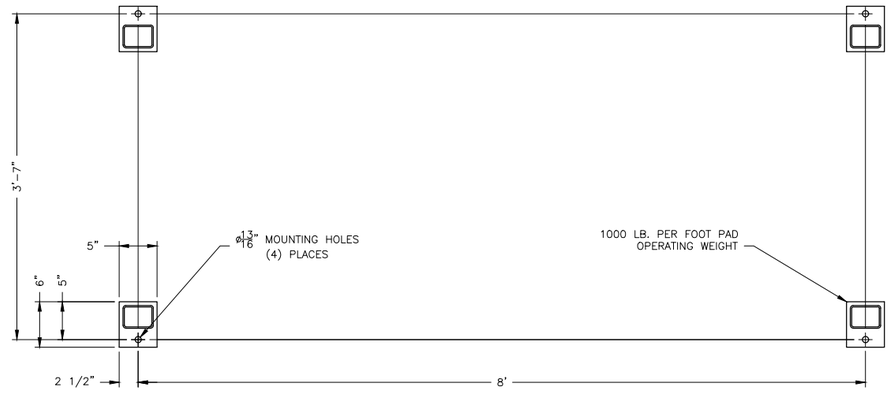




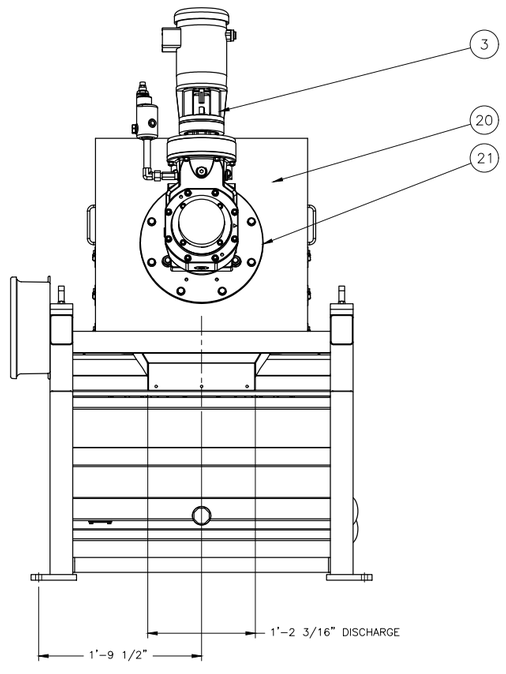
QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER: MIDDLEBURG, NY	MACHINE: DSP 12x8		DWG TITLE: GENERAL ARRANGEMENT MODEL DSP 12x8 SCREW PRESS
BDP JOB NO. 1581	DWN BY: MJG	DATE: 5/26/21	
APP'D BY:	SCALE:	SHT. 2 OF 3	DWG NO. 1-1581-1 REV. 3



FOOT PAD LAYOUT



CONNECTION LEGEND

- (A) 3"-150# ANSI FEED INLET FLANGE
- (B) 1" NPT WASHWATER INLET
- (C) 3" SCREW SUMP PAN DRAIN
- (D) 1/2" NPTF PNEUMATIC PANEL INLET
- (E) 3" UPPER PAN SECTION DRAIN
- (F) 1-1/2" OVER PRESSURE DRAIN
- (G) 3" INLET BYPASS DRAIN

NOTES:

(1) PIPING BEYOND THIS POINT INDEPENDENTLY SUPPORTED (NOT BY BDP).

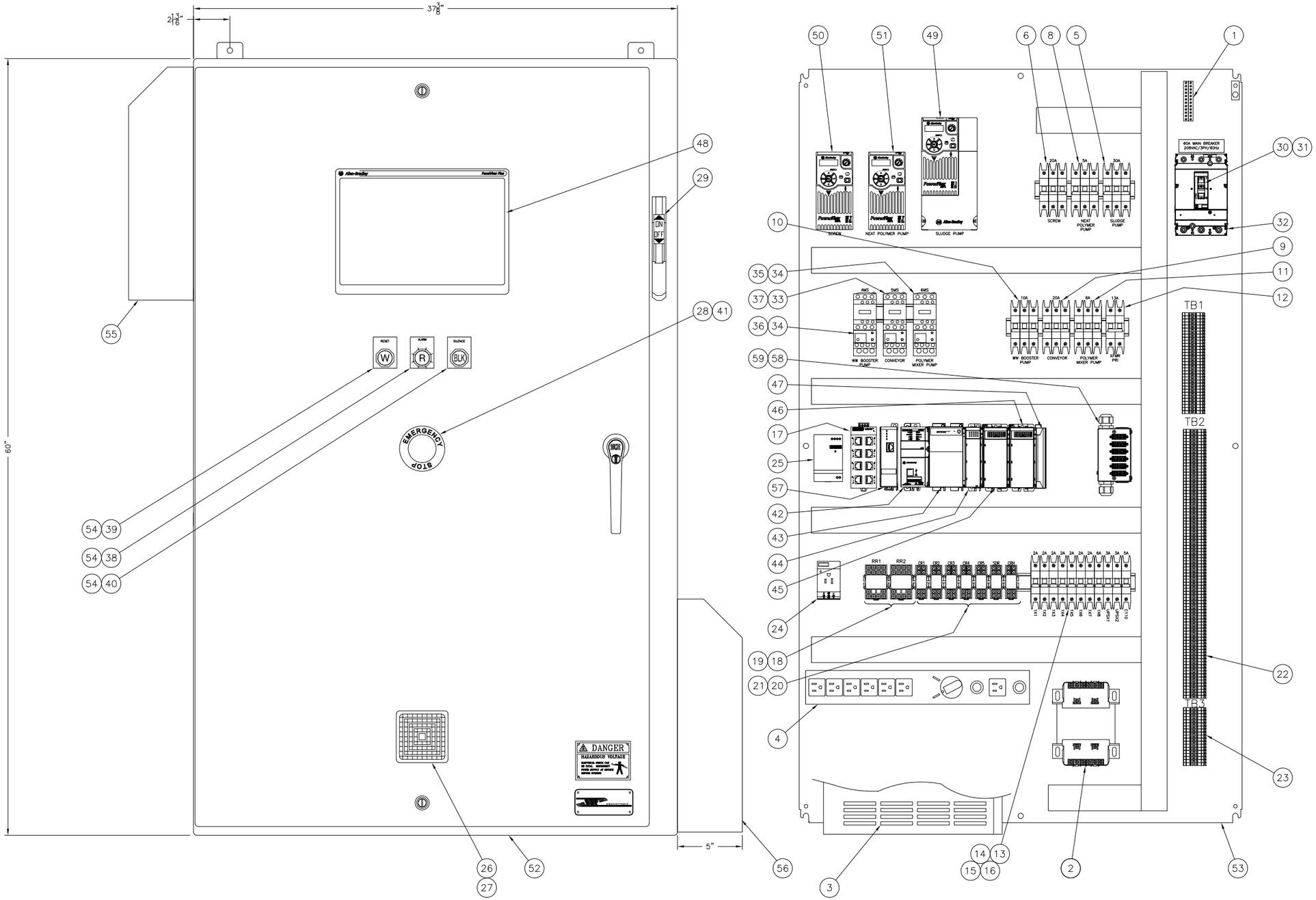
2. FRAME IS TUBULAR STEEL A554-MT304, SAND BLASTED CLEAN WITH TOP CLEAR COAT.
3. ALL STAINLESS STEEL SHEET AND PLATE IS TYPE 304 SS. FASTENERS AND HARDWARE ARE TYPE 304 SS.
4. ITEMS NOT OTHERWISE PROTECTED ARE COATED WITH NAPA URETHANE ENAMEL PER BDP SPECIFICATION QA94-006.
5. APPROXIMATE WEIGHTS: 3,200 LBS. DRY
   4,000 LBS. OPERATING
6. ELECTRICAL CONDUIT IS PVC.
7. SUMITOMO GEARMOTOR, LHYJS-5B14DB-Y2-501-145TC, 501:1, SHAFT MOUNT, Y2 MOUNT, 65mm SHRINK DISC. BALDOR MOTOR CEM3558T, 2HP, 1800 RPM, 460V, TEFC.

QTY.	DESCRIPTION	MAT.	ITEM	REMARKS
1	SECONDARY INLET SHAFT SEAL	PALMETTO	36	9155-0095-981P
1	ELECTRICAL JUNCTION BOX	FRP	35	
2	EMERGENCY STOP BUTTON	ALLEN-BRADLEY	34	800H-FRXJT6A1
1	ZERO SPEED SWITCH	ALLEN BRADLEY	33	871TM-BH8N18-H2
1	LOWER SCREW FILTRATE PAN	304 SS	32	
1	PRESSURE REDUCING VALVE	MCMASTER	31	45805K68
1	LOW WASHWATER SWITCH	SOR	30	6NN-K3-N4-F1A
1	UPPER SCREW FILTRATE PAN	304 SS	29	
1	1" ELECTRIC BALL VALVE	TRIAC	28	22-TX-100/WEA1-XX
24	SCREW SHOWER FLOODJET NOZZLE	SPRAYING SYSTEMS	27	1/8K-2
24	SCREW SHOWER VEEJET NOZZLE	SPRAYING SYSTEMS	26	H1/8VV-8004
6	SCREW SHOWER MANIFOLD	304 SS	25	
4	SHOWER CARRIAGE WHEEL	NYLON	24	3-810-297
1	SCREW SHOWER AIR CYLINDER	BIMBA	23	SS-5030-DXPWEE0.625
1	SCREW SHOWER CARRIAGE	304 SS	22	
1	SCREW OUTLET BEARING PLATE	304 SS	21	
1	SCREW OUTLET HOUSING	304 SS	20	
3	CONE PNEUMATIC CYLINDER	BIMBA	19	SS-173-DW
1	BACKPRESSURE CONE	UHMW	18	2-810-143 P3
1	SCREW BACKPRESSURE ASSEMBLY	304 SS	17	
1	SCREW OUTLET HOUSING	304 SS	16	
4	SCREW FILTER SCREEN ASSEMBLY	304 SS	15	
1	DEWATERING SCREW ASSEMBLY	304 SS	14	
1	SCREW PRESSURE SENSOR	IFM	13	PG2797
1	PRIMARY INLET SHAFT SEAL	HARWALL	12	2.438x3.25x.375 HHP1
1	SCREW INLET BEARING PLATE	304 SS	11	
1	SCREW INLET HOUSING	304 SS	10	
1	2-15/16" FLANGED BEARING	LINKBELT	9	FC-B22447E7E7
1	1-15/16" FLANGED BEARING	LINKBELT	8	F-B22431E7E7CSS
			7	
1	PRESSURE GAUGE		6	
1	PNEUMATIC CONTROL PANEL	FRP	5	
			4	
1	SCREW PRESS DRIVE	SUMITOMO	3	NOTE 7
1	SCREW PRESS ENCLOSURE	304 SS	2	
1	TUBULAR STEEL FRAME		1	A554-MT304

REV.	DESCRIPTION	DATE	BY
3	SHOW UPGRADED INLET PLUMBING	8/16/22	MJG
2	SHOW UPGRADED SPLIT SUMP PANS	11/15/21	SKD

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER:	MACHINE:	DWG TITLE
MIDDLEBURG, NY	DSP 12x8	GENERAL ARRANGEMENT MODEL DSP 12x8 SCREW PRESS
BDP JOB NO. 1581	**DWN BY:** MJG	**DATE:** 5/26/21
APP'D BY:	**SCALE:**	**SHT.** 3 **OF** 3
DWG NO. 1-1581-1		**REV.** 3



INCOMING POWER
208VAC, 3ϕ, 60Hz

1	LC/LC FIBER PATCH CABLE, 2 METER LONG	DINS, SNAP	59	039696002M
1	FIBER OPTIC PATCH PANEL, DIN RAIL MOUNT, LC CONNECTORS	DINS, SNAP	58	SNAP-12LC-MM
1	EMBEDDED SWITCH, ETHERNET/IP TAP 1 COP, 2 FIB	A.B.	57	1783-ETAP2F
1	NEMA 4X FILTER HOOD	KOOLTRONIC	56	KNPA60FLV
1	NEMA 4X FILTER FAN, 115V	KOOLTRONIC	55	KNP40FLV
3	LEG-1 STANDARD LEGENDS PER PRINT	BDP	54	LEG-1
1	BACK PANEL	SAGINAW	53	SCE-60P36
1	NEMA 4X ENCLOSURE, 304 STAINLESS STEEL	SAGINAW	52	SCE-60XEL3712SSLP
1	POWERFLEX 525, 1 HP, 240V, NEMA 1	A.B.	51	25B-B5P0N104
1	POWERFLEX 525, 2 HP, 240V, NEMA 1	A.B.	50	25B-B8P0N104
1	POWERFLEX 525, 7.5 HP, 240V, NEMA 1	A.B.	49	25B-B024N104
1	PANELVIEW PLUS 7, 12" STANDARD TERMINAL	A.B.	48	2711P-T12W21D8S
1	RIGHT END CAP/TERMINATOR	A.B.	47	1769-ECR
1	4CH ANALOG INPUT CARD	A.B.	46	1769-IF4
1	16 PT OUTPUT CARD	A.B.	45	1769-OA16
1	16 PT INPUT CARD	A.B.	44	1769-IA16
1	COMPACTLOGIX POWER SUPPLY	A.B.	43	1769-PA2
1	COMPACTLOGIX PROCESSOR	A.B.	42	1769-L30ER
1	MUSHROOM HEAD E-STOP BUTTON	A.B.	41	800H-FRXJT6A1
1	BLACK PUSH BUTTON	A.B.	40	800H-BR2A
1	WHITE PUSH BUTTON, 2 NORMALLY OPEN CONTACT BLOCK	A.B.	39	800H-BR5MXXX
1	RED PILOT LIGHT, LED STYLE	A.B.	38	800H-QRH2R
1	OVERLOAD UNIT, 7 TO 10 AMPS	SQUARE D	37	LRD14
1	OVERLOAD UNIT, 4 TO 6 AMPS	SQUARE D	36	LRD10
1	OVERLOAD UNIT, 2.5 TO 4 AMPS	SQUARE D	35	LRD08
2	CONTACTOR, NON-REV, 9 AMP, 120 VOLT COIL	SQUARE D	34	LC1D09G7
1	CONTACTOR, NON-REV, 12 AMP, 120 VOLT COIL	SQUARE D	33	LC1D12G7
1	POWER DISTRIBUTION LUG KIT	SQUARE D	32	PDC6HD6
1	CIRCUIT BREAKER, 3 POLE, 60 AMP	SQUARE D	31	HDL36060
1	VARIABLE DEPTH OPERATING MECHANISM	SQUARE D	30	9422RQ1
1	OPERATING HANDLE, NEMA 4X	SQUARE D	29	9422A2
1	EMERGENCY STOP CIRCULAR LEGEND	SQUARE D	28	9001KN8330
1	HORN MOUNTING KIT	FEDERAL	27	K8435666A
1	WEATHER PROOF HORN	FEDERAL	26	350-120-30
1	24 VOLT DC POWER SUPPLY, 90 WATT	PHOENIX	25	2902994
1	SIMPLEX PLUG SOCKET, 120V	PHOENIX	24	804155
25	TERMINAL BLOCK - BLUE	PHOENIX	23	3044115
100	TERMINAL BLOCK - GRAY	PHOENIX	22	3044102
7	RELAY BASE	IDEC	21	SH2B-05
7	2 POLE RELAY	IDEC	20	RH2B-UL-120VAC
2	RELAY BASE	IDEC	19	SH4B-05
2	4 POLE RELAY	IDEC	18	RH4B-UL-120VAC
1	8 PORT ETHERNET SWITCH	PHOENIX	17	2891929
7	CIRCUIT BREAKER, 1 POLE, 2 AMP, C CURVE	EATON	16	FAZ-C2/1-NA-L
2	CIRCUIT BREAKER, 1 POLE, 3 AMP, C CURVE	EATON	15	FAZ-C3/1-NA-L
1	CIRCUIT BREAKER, 1 POLE, 5 AMP, C CURVE	EATON	14	FAZ-C5/1-NA-L
1	CIRCUIT BREAKER, 1 POLE, 6 AMP, C CURVE	EATON	13	FAZ-C6/1-NA-L
1	UL 489 BREAKER, 2 POLE, 13 AMP, D TRIP CURVE	EATON	12	FAZ-D13/2-NA-L
1	UL 489 BREAKER, 3 POLE, 6 AMP, D TRIP CURVE	EATON	11	FAZ-D6/3-NA-L
1	UL 489 BREAKER, 3 POLE, 10 AMP, D TRIP CURVE	EATON	10	FAZ-D10/3-NA-L
1	UL 489 BREAKER, 3 POLE, 20 AMP, D TRIP CURVE	EATON	9	FAZ-D20/3-NA-L
1	UL 489 BREAKER, 3 POLE, 5 AMP, C TRIP CURVE	EATON	8	FAZ-C5/3-NA-L
			7	
1	UL 489 BREAKER, 3 POLE, 20 AMP, C TRIP CURVE	EATON	6	FAZ-C20/3-NA-L
1	UL 489 BREAKER, 3 POLE, 30 AMP, C TRIP CURVE	EATON	5	FAZ-C30/3-NA-L
1	HOT SWAP MAINTENANCE BYPASS	EATON	4	EHBPL1500R-PDUIU
1	TOWER STYLE UPS 700VA, 120V	EATON	3	9SX700
1	1500VA CONTROL TRANSFORMER	HAMMOND	2	PH1500MQMJ
2	UL LISTED GROUND BAR	MORRIS	1	91140
QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

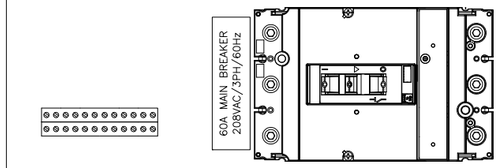
BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

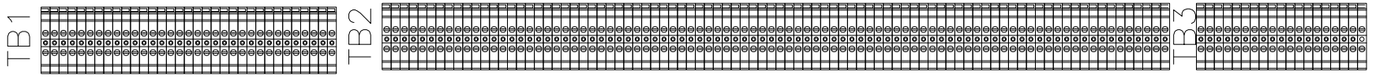
CUSTOMER: MIDDLEBURGH, NY	MACHINE: 12X8 DSP	DWG TITLE: GENERAL ARRANGEMENT ELECTRICAL CONTROL PANEL	
BDP JOB NO. 1581	DWN BY: MJG	DATE: 7/13/21	
APP'D BY:	SCALE:	SHT. 1 OF 3	REV. 3
		DWG NO. 1–1581–4	

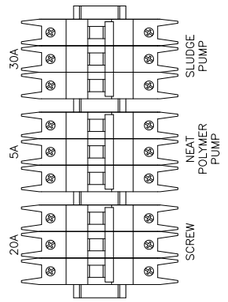
QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

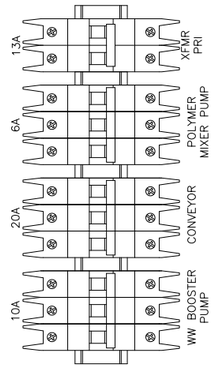
BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

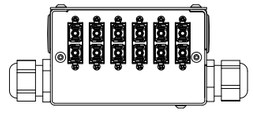
CUSTOMER: MIDDLEBURGH, NY	MACHINE: 12X8 DSP	DWG TITLE: GENERAL ARRANGEMENT ELECTRICAL CONTROL PANEL	
BDP JOB NO. 1581	DWN BY: MJG	DATE: 7/13/21	
APP'D BY:	SCALE:	SHT. 2 OF 3	REV. 3
		DWG NO. 1–1581–4	

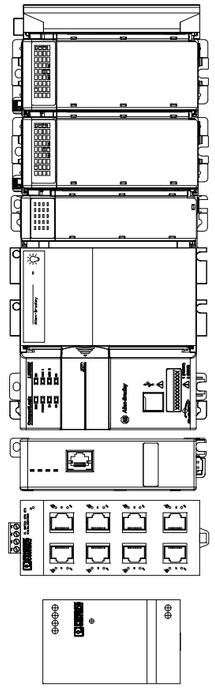


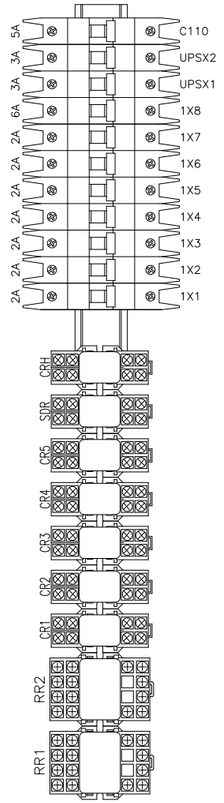


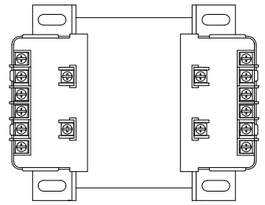


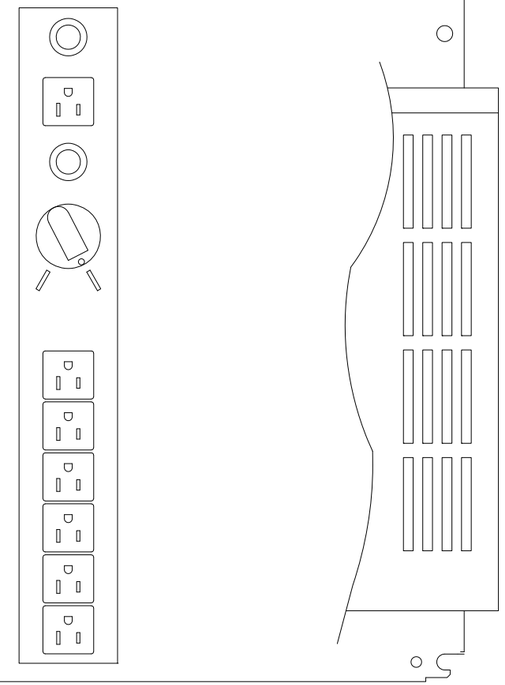


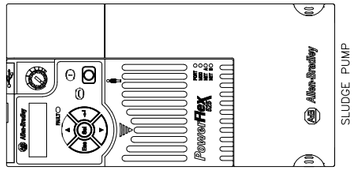


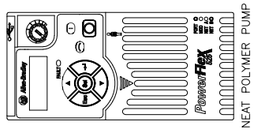


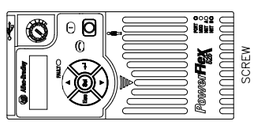


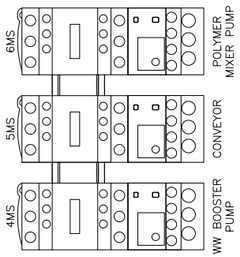












NOTES:

1. THIS DRAWING TO BE USED WITH DRAWINGS 1–1581–5 & 1–1581–6.
2. WEIGHT DRY – 300 LBS
3. ALL DOOR MOUNTED OPERATOR DEVICES ARE ALLEN–BRADLEY AND ARE NEMA 4X RATED.
4. REFER TO VENDOR DATA SECTION OF SUBMITTAL FOR CATALOG CUTS AND ADDITIONAL INFORMATION.
5. SYMBOL ⟨#⟩ INDICATES A REVISION WHERE THE # IS THE REVISION NUMBER.

REV.	DESCRIPTION	DATE	BY
3	AS BUILT	7/7/22	DH
2	ADD ITS. 57–59	9/15/21	MJG
1	INITIAL RELEASE	7/13/21	MJG

QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER: MIDDLEBURGH, NY	MACHINE: 12X8 DSP	DWG TITLE: GENERAL ARRANGEMENT ELECTRICAL CONTROL PANEL
BDP JOB NO.: 1581	DWN BY: MJG	DATE: 7/13/21
APP'D BY:	SCALE:	SHT. 3 OF 3
DWG NO. 1–1581–4		REV. 3

208V, 3PH, 60Hz

L1 L2 L3

MAIN BREAKER
60 AMP

RUNG 160

13A

H1 H2

1500VA XFMR
208 PRIMARY VOLTS
120 SECONDARY VOLTS
60Hz

X1 CO

2A 1X1 — ENCLOSURE FAN — CO

2A 1X2 — SCREW WW VALVE 120V POWER; RUNGS 72,81

2A 1X3 — CR2 (9, 5) — C174 — SCREW SHOWER AIR SOLENOID

2A 1X4 — CR3 (9, 5) — C175 — SCREW PRESSURE CONE AIR SOLENOID

2A 1X5 — FLOWMETER POWER

2A 1X6 — IFM WATER FLOW SENSOR (1, 2, 4, 5) — C8 — I:1/5 — RUNG 65

2A 1X7 — DILUTION WATER VALVE 120V POWER RUNGS 74,84

6A 1X8

700VA
120V UPS

UPS MAINTENANCE BYPASS

COUPS

C110UPS

3A UPSX1

DC POWER SUPPLY +24VDC (L, GRD, +, N, -)

C200 C201

OIT (+, RJ45, GRD, -)

ETHERNET SWITCH (+, -, RJ45 ports)

E1 TO SCREW VFD; 164

E2 TO NEAT POLY PUMP VFD; 169

E6 E4 E5 TO SLUDGE PUMP VFD; 174

TO FIBER OPTIC PATCH PANEL — 1783-ETAP2F

COMPACTLOGIX PLC RACK

CPU	POWER SUPPLY	SLOT 1	SLOT 2	SLOT 3	
1769-L30ER	1769-PA2	1769-IA16 BEGINS RUNG 60	1769-OA16 BEGINS RUNG 79	1769-IF4 BEGINS RUNG 100	1769-ECR
	GRD L1 L2				

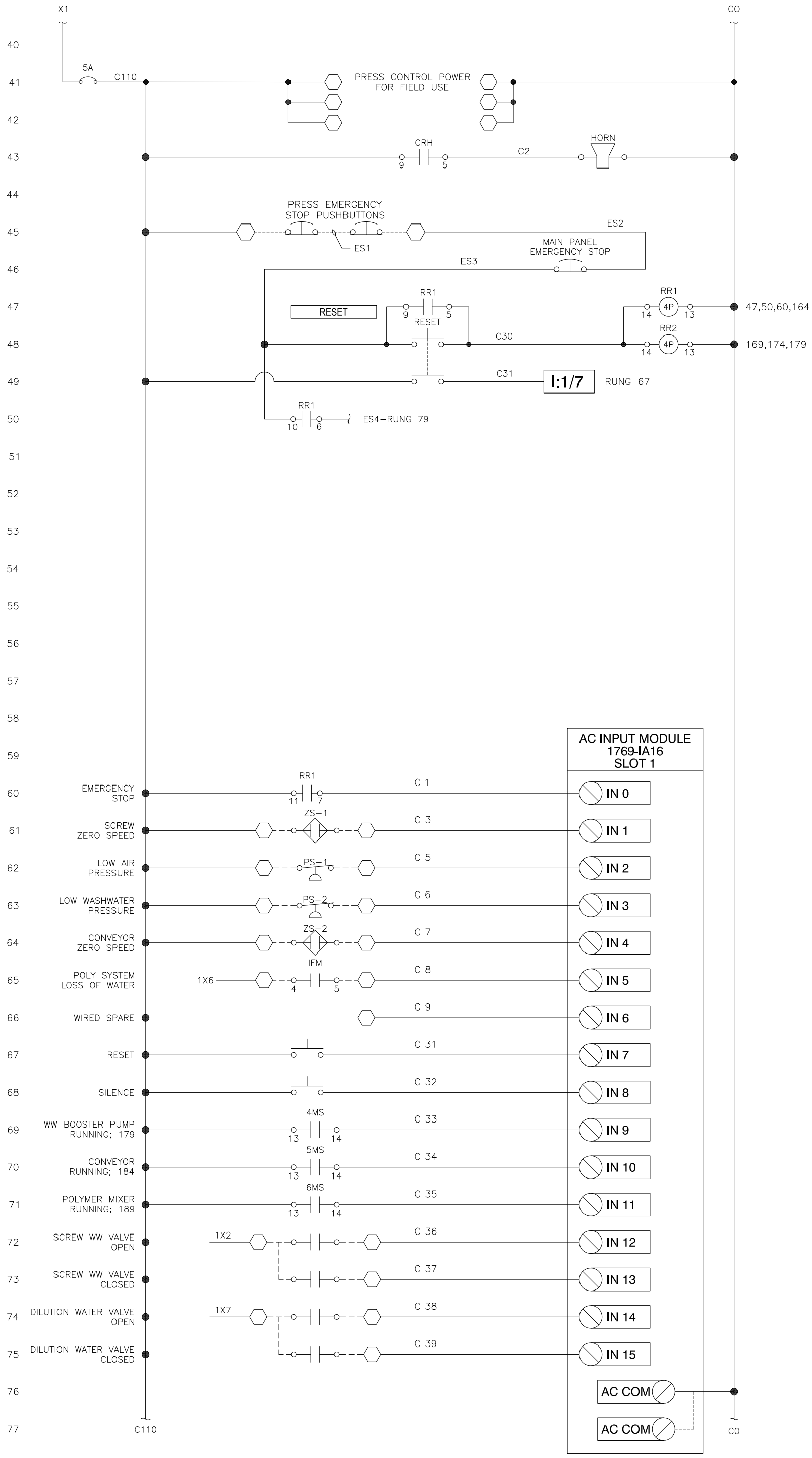
3A UPSX2

X1 C0

QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

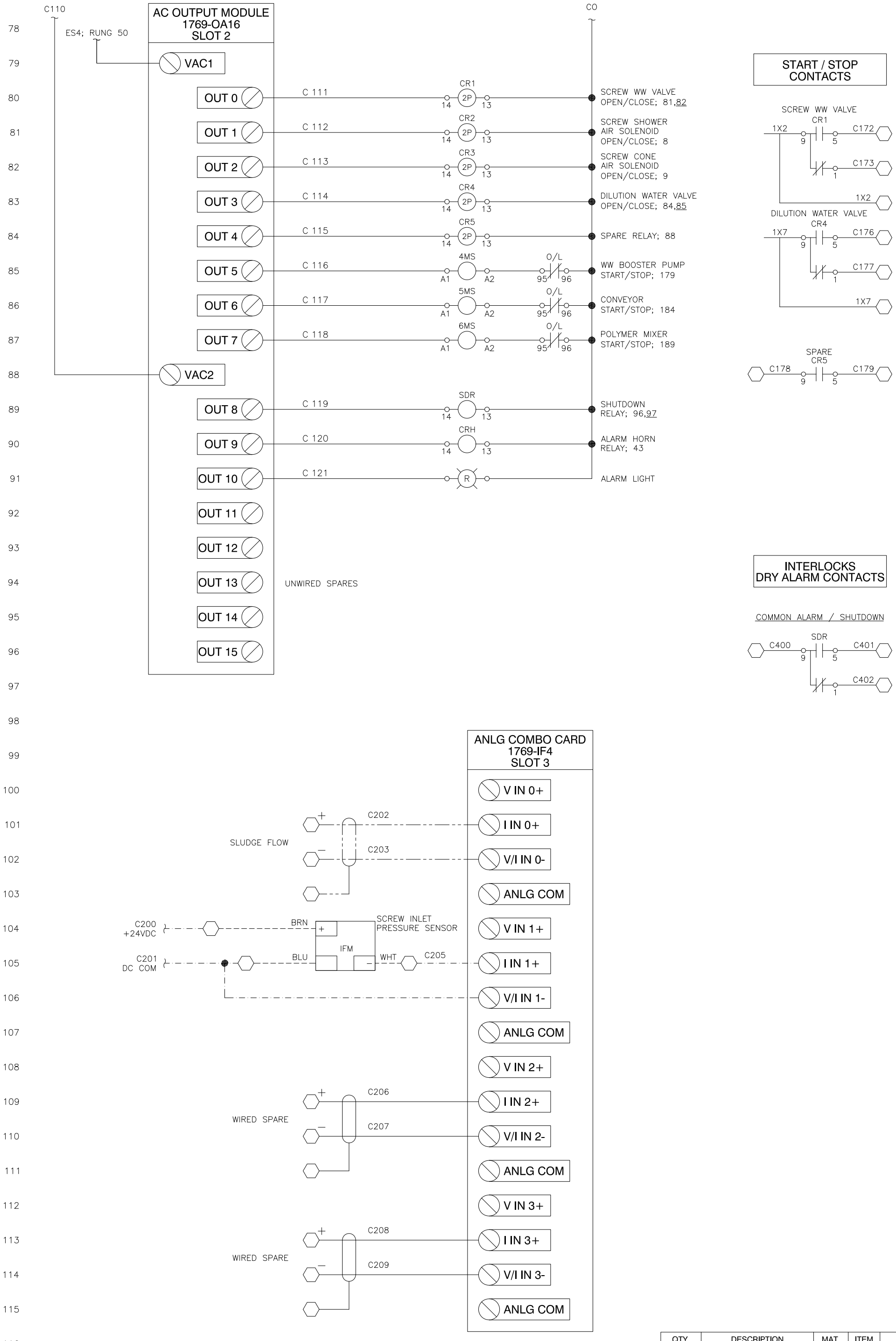
CUSTOMER: MIDDLEBURGH, NY	MACHINE: 12x8 DSP	DWG TITLE: SCHEMATIC POWER AND CONTROL
BDP JOB NO. 1581	DWN BY: MJG	DATE: 7/9/21
APP'D BY:	SCALE:	SHT. 1 OF 4
DWG NO. 1-1581-5		REV. 3



QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

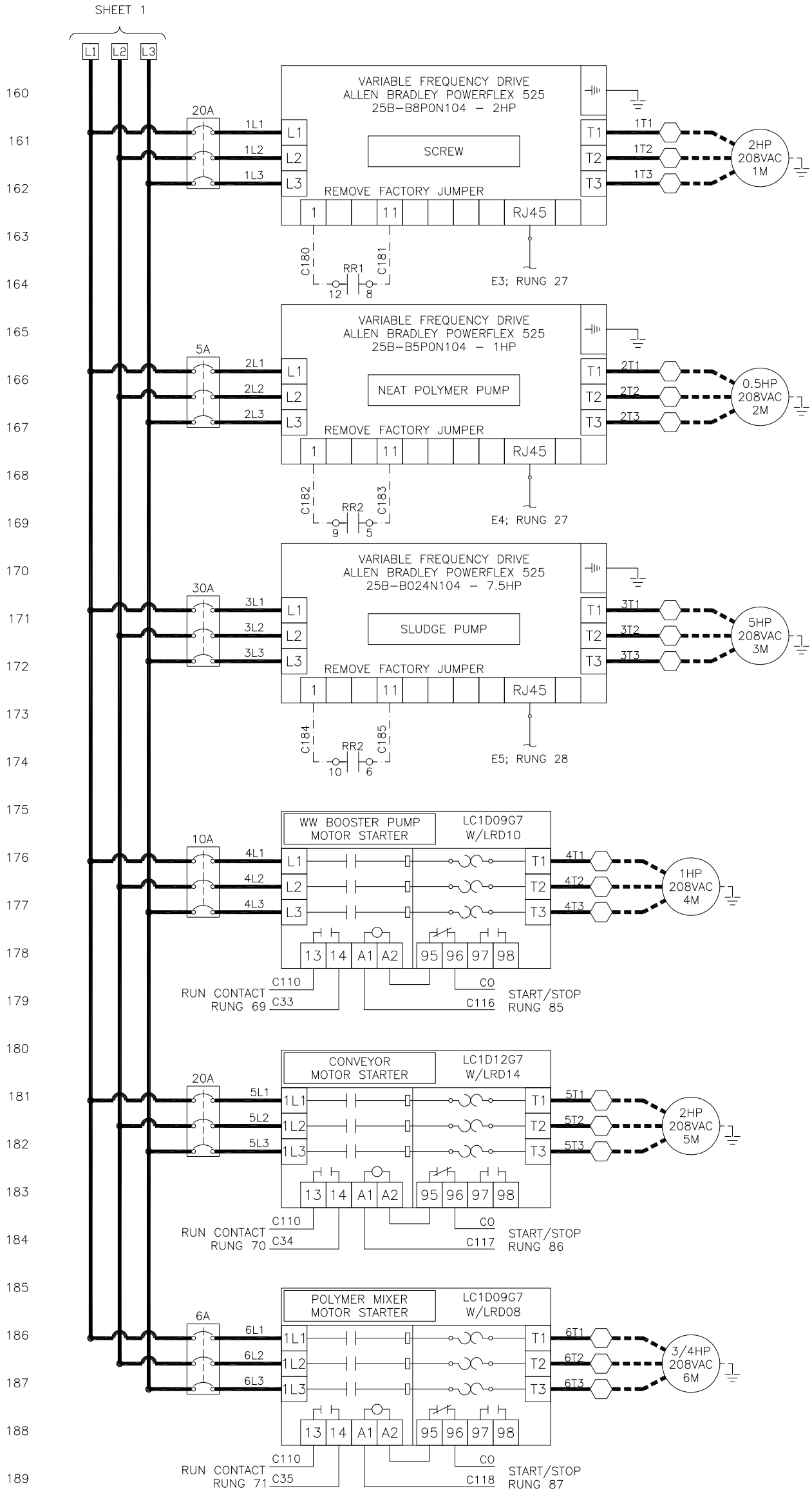
CUSTOMER: MIDDLEBURGH, NY	MACHINE: 12x8 DSP	DWG TITLE: SCHEMATIC POWER AND CONTROL	
BDP JOB NO. 1581	DWN BY: MJG	DATE: 7/9/21	
APP'D BY:	SCALE:	SHT. 2 OF 4	REV. 3
		DWG NO. 1–1581–5	



QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER: MIDDLEBURGH, NY	MACHINE: 12x8 DSP	DWG TITLE: SCHEMATIC POWER AND CONTROL	
BDP JOB NO. 1581	DWN BY: MJG	DATE: 7/9/21	
APP'D BY:	SCALE:	SHT. 3 OF 4	REV. 3
		DWG NO. 1-1581-5	



PowerFlex 525 Common Drive Parameters

- Set Accel [P041] to 5 sec
- Set Decel [P042] to 5 sec
- Set Min Freq [P043] to 10 Hz
- Set Stop Mode [P045] to 1 (Coast)
- Set Start Src [P046] to 5 (Ethernet/IP)
- Set Speed Ref [P047] to 15 (Ethernet/IP)
- Set EN Data Out 1 [C157] to 3
- Set Max Voltage [A534] to 480
- Set Auto Restrt Tries [A541] to 3
- Set Auto Restrt Delay [A542] to 2.0 sec

LEGEND

- – NORMALLY OPEN RELAY CONTACT
- – NORMALLY CLOSED RELAY CONTACT
- – CIRCUIT BREAKER
- – TERMINAL BLOCK
- – PUSH–TO–TEST PILOT LIGHT
- – PILOT LIGHT
- – LIMIT SWITCH
- – PUSHBUTTON
- – RELAY COIL
- – HORN
- – PRESSURE SWITCH
- – FLOAT SWITCH
- – ZERO SPEED SWITCH
- – REVISION
- – CUSTOMER SUPPLIED CONTACT
- – WIRING EXTERNAL TO PANEL (BY CONTRACTOR)
- – 120VAC CONTROL WIRING
- – VDC WIRING
- – ETHERNET CABLE
- – SHIELDED 4–20mA CABLE
- – HIGH VOLTAGE WIRING (208/240/460/575V)

NOTES:

1. THIS DRAWING TO BE USED WITH DRAWINGS 1–1581–4 & 1–1581–6.
2. POWER WIRING TO BE SIZED FOR LOAD.
3. WIRING SHALL BE COLOR CODED:
   (A) BLACK – LOAD & CONTROL AT LINE VOLTAGE, AC OR DC
   (B) RED – AC CONTROL CIRCUITS
   (C) BLUE – DC CONTROL CIRCUITS
   (D) GREEN – EQUIPMENT GROUNDING CONDUCTOR(S)
   (E) WHITE – NEUTRAL
4. USE 16 GAUGE (MIN.) STRANDED MACHINE TOOL WIRE FOR CONTROL WIRING.
5. ALL WIRES MUST BE TAGGED AT BOTH ENDS, TERMINAL STRIP TERMINALS AND WIRE NUMBERS TO HAVE SAME LABEL.

REV.	DESCRIPTION	DATE	BY
3	AS BUILT	7/7/22	DH
2	ADD ETAP MODULE	9/15/21	MJG
1	INITIAL RELEASE	7/9/21	MJG

QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER: MIDDLEBURGH, NY	MACHINE: 12x8 DSP	DWG TITLE: SCHEMATIC POWER AND CONTROL	
BDP JOB NO. 1581	DWN BY: MJG	DATE: 7/9/21	
APP'D BY:	SCALE:	SHT. 4 OF 4	REV. 3
		DWG NO. 1–1581–5	

PRESS CONTROL PANEL

FIELD

* – SYMBOL SHOWN FOR BDP PRE–WIRED SKID MOUNTED COMPONENTS

– ALL OTHER FIELD WIRING BY OTHERS

TB–1

1T1	SCREW MOTOR	1T1	2HP 208VAC 1M
1T2		1T2	
1T3		1T3	
2T1	NEAT POLYMER PUMP MOTOR	2T1	0.5HP 208VAC 3M *
2T2		2T2	
2T3		2T3	
3T1	SLUDGE PUMP MOTOR	3T1	5HP 208VAC 4M
3T2		3T2	
3T3		3T3	
4T1	WW BOOSTER PUMP MOTOR	4T1	1HP 208VAC 5M *
4T2		4T2	
4T3		4T3	
5T1	CONVEYOR MOTOR	5T1	2HP 208VAC 6M
5T2		5T2	
5T3		5T3	
6T1	POLYMER MIXER MOTOR	6T1	3/4HP 208VAC 7M *
6T2		6T2	
6T3		6T3	

TB–2

C110	CONTROL POWER	C110
C110		C110
C110	CONTROL POWER	C110
C110		C110
C0	NEUTRAL	C0
C0		C0
C0	NEUTRAL	C0
C0		C0
ES2	E–STOP LOOP	ES2
C3	SCREW ZERO SPEED	C3
C5	LOW AIR PRESSURE SWITCH	C5
C6	LOW WASHWATER PRESSURE SWITCH	C6
C7	CONVEYOR ZERO SPEED	C7
C8	IFM WATER FLOW SENSOR	C8
C9	SPARE DIGITAL INPUT	C9
C36	SCREW WW VALVE OPEN	C36
C37	SCREW WW VALVE CLSD	C37
C38	DILUTIN WATER VALVE OPEN STATUS	C38
C39	DILUTION WATER VALVE CLOSED STATUS	C39
C172	SCREW WW VALVE OPEN/CLOSE CONTACT	C172
C173		C173
C174	SCREW SHOWER AIR SOLENOID	C174
C175	SCREW CONE AIR SOLENOID	C175
C176	DILUTION WATER VALVE OPEN/CLOSE CONTACT	C176
C177		C177
C178	SPARE RELAY	C178
C179		C179
C400	SHUTDOWN RELAY	C400
C401	SDR N.O.	C401
C402	SDR N.C.	C402
1X2	SCREW WW VALVE PWR	1X2
1X5	FLOWMETER 120V POWER	1X5
1X6	IFM FLOW SENSOR 120V POWER	1X6
1X7	DILUTION WATER VALVE 120V POWER	1X7

1X2 CR1 (C172, C173)

1X3 CR2 (C174)

1X4 CR3 (C175)

1X7 CR4 (C176, C177)

CR5 (C178, C179)

SDR (C401, C402)

120V JUNCTION BOX

- ITEMS PRE–WIRED TO JUNCTION BOX BY BDP
- PULL (18) MINIMUM 16GA. WIRES FROM PANEL TO JUNCTION BOX

C0	NEUTRAL	C0
C0		C0
C110	CONTROL POWER	C110
C110		C110
ES2	E–STOP LOOP	ES2
C3	SCREW ZERO SPEED	C3
C5	LOW AIR PRESSURE SWITCH	C5
C6	LOW WASHWATER PRESSURE SWITCH	C6
C172	SCREW WW VALVE OPEN/CLOSE CONTACT	C172
C173		C173
C36	SCREW WW VALVE OPEN	C36
C37	SCREW WW VALVE CLSD	C37
1X2	CONTROL POWER	1X2
C174	SCREW SHOWER AIR SOLENOID	C174
C175	SCREW CONE AIR SOLENOID	C175
GND	GROUND	GND

ES1, ZS1, PS–1, PS–2

8 12 7 4 3 2 M

ZS–2; CONVEYOR

NOT USED: 8 5SEC/, 7 12PPM

5 L2N, 4 L1, 3 NC, 2 COM, 1 NO

C7 – GND

POLYMER WATER FLOW SENSOR PRE–WIRED BY BDP

1X6 – 1 IFM, 2, 4, 5 – C8

DILUTION WATER VALVE; PRE–WIRED BY BDP

C176 – 12, C177 – 8, C38 – 7, C39 – 4, 1X7 – 3, 2 – M

QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER: MIDDLEBURGH, NY	MACHINE: 12x8 DSP	DWG TITLE: TERMINAL STRIP ARRANGEMENT	
BDP JOB NO.: 1581	DWN BY: MJG	DATE: 7/13/21	
APP'D BY:	SCALE:	SHT. 1 OF 2	REV. 2
		DWG NO. 1–1581–6	

PRESS CONTROL PANEL

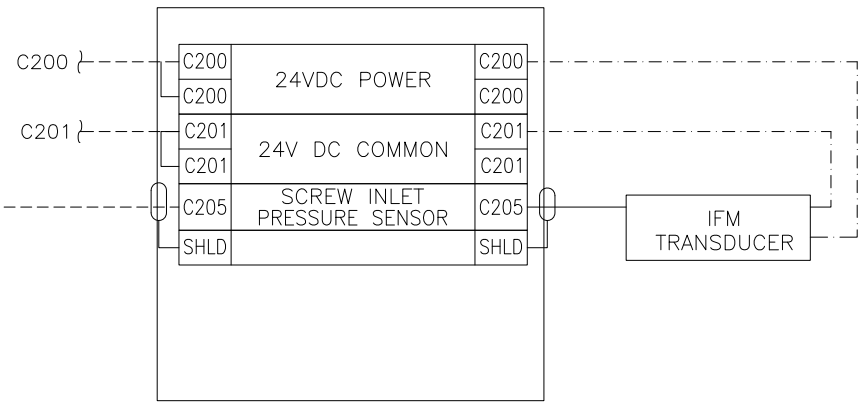
FIELD

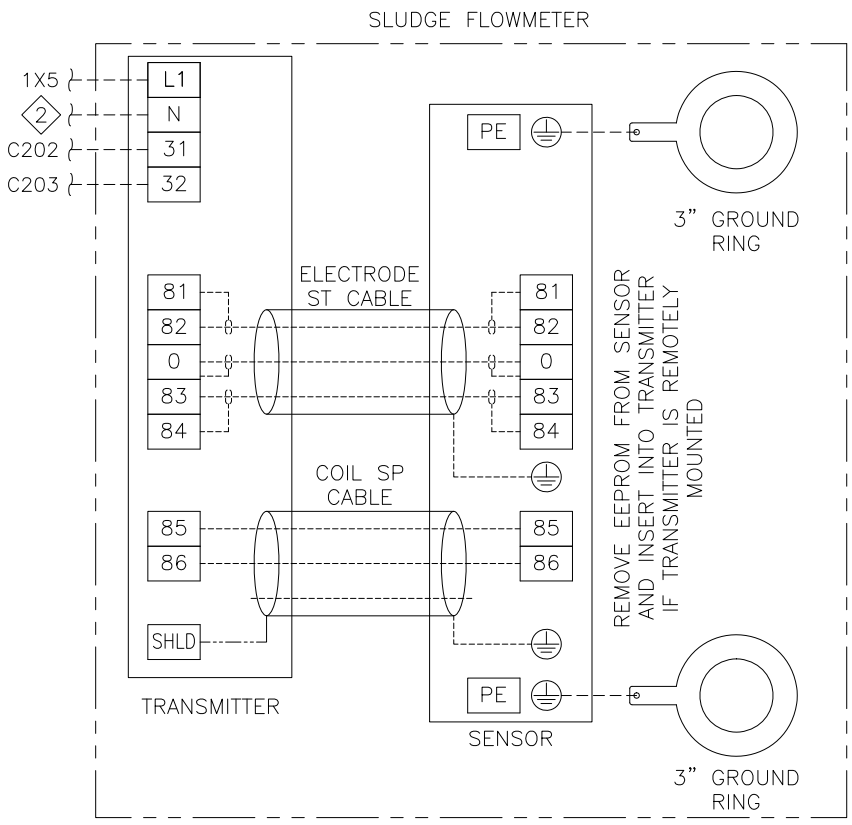
TB–3

C200	24V DC POWER	C200
C200		C200
C201	24V DC COMMON	C201
C201		C201
(+) C202	SLUDGE FLOW	C202 (+)
(–) C203		C203 (–)
SHLD		SHLD
(–) C205	SCREW INLET PRESSURE SENSOR	C205
SHLD		SHLD
(+) C206	SPARE ANALOG INPUT	C206
(–) C207		C207
SHLD		SHLD
(+) C208	SPARE ANALOG INPUT	C208
(–) C209		C209
SHLD		SHLD

PRESS JUNCTION BOX

- ITEMS PRE–WIRED TO JUNCTION BOX BY BDP
- PULL (2) MINIMUM 16GA. WIRES FROM PANEL TO JUNCTION BOX FOR DC CONTROL
- PULL (2) MINIMUM TWISTED PAIR 18GA SHIELDED CABLES





LEGEND

- – NORMALLY OPEN RELAY CONTACT
- – NORMALLY CLOSED RELAY CONTACT
- – CIRCUIT BREAKER
- – TERMINAL BLOCK
- – PUSH–TO–TEST PILOT LIGHT
- – PILOT LIGHT
- – LIMIT SWITCH
- – PUSHBUTTON
- – RELAY COIL
- – HORN
- – PRESSURE SWITCH
- – FLOAT SWITCH
- – ZERO SPEED SWITCH
- (#) – REVISION
- – CUSTOMER SUPPLIED CONTACT
- – – – – WIRING EXTERNAL TO PANEL
- ——— – 120VAC CONTROL WIRING
- — · — · — – VDC WIRING
- ——o—— – ETHERNET CABLE
- ——— – SHIELDED 4–20mA CABLE
- ═══ – HIGH VOLTAGE WIRING (208/240/460/575V)
- (1) – RUN WITH C110 FROM TOP OF TB–2
- (2) – RUN WITH CO FROM TOP OF TB–2

NOTES:

1. THIS DRAWING TO BE USED WITH DRAWINGS 1–1581–4 & 1–1581–5.

QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER: MIDDLEBURGH, NY	MACHINE: 12x8 DSP	DWG TITLE: TERMINAL STRIP ARRANGEMENT	
BDP JOB NO. 1581	DWN BY: MJG	DATE: 7/13/21	
APP'D BY:	SCALE:	SHT. 2 OF 2	REV. 2
DWG NO. 1–1581–6			

REV.	DESCRIPTION	DATE	BY
2	AS BUILT	7/7/22	DH
1	INITIAL RELEASE	7/13/21	MJG

INDUSTRIES INC.
354 State Route 29 • P.O. Box 118 • Greenwich, NY 12834 • Tel. (518) 695-6851 • Fax: (518) 695-5417

SCREW PRESS CONTROLS DESCRIPTION

The DSP Screw press will have a NEMA 4X 304 stainless steel control panel. The main panel will contain a touch screen, all VFDs, motor starters, and PLC wiring. The panel will have the necessary set point adjustments needed to control the speeds of the necessary equipment. The example control schematics 1-1534-4, 1-1534-5, and 1-1534-6 show the wiring between the panel and the auxiliary equipment. The following items are controlled and/or displayed from the front of the OIT:

1. Hand-Off-Auto selector button
2. Auto Start/Stop buttons
3. Washwater Booster Pump Start/Stop buttons and speed control
4. Screw Drive Start/Stop buttons and speed control
5. Sludge Pump Start/Stop buttons and speed control (via network with SCADA)
6. Polymer System Start/Stop buttons and speed control
7. Emergency Stop mushroom head pushbutton
8. Hour Run Display
9. Test/Reset pushbutton
10. Silence pushbutton
11. Speed Displays for all variable speed drives
12. Sludge Flow Display
13. Various Alarm Displays

Control of the equipment is accomplished through the OIT mounted on the front of the panel. The OIT communicates to the PLC through Ethernet. The PLC is an Allen Bradley CompactLogix and the OIT is an Allen Bradley 12” PanelView Plus 7. See drawing 1-1534-5 for all digital inputs needed for press operation. Starting and stopping the equipment is done through the digital output cards or via Ethernet to a VFD. Speed control is through the analog output card of the PLC or via Ethernet to a VFD. The setpoint is set through the OIT and the speed command is sent through the Ethernet link to the VFD. Speed feedbacks and all other displayed information will be communicated through Ethernet.

Auto Setup / Overview Screen

SCREW PRESS CONTROLS DESCRIPTION

This screen will be the start of every operation. The mode of operation can be selected from this screen. In the OFF position, none of the components will operate. In the HAND position, the operator will then go to the Hand Mode screen to operate the press with the individual buttons for each component. In the AUTO position, the AUTO START button will activate an automatic starting of the components in order but the operator will be responsible for adjusting the speeds, and the AUTO STOP button will then stop the components in the reverse order.

Auto Mode

When in Auto mode, the AUTO START button begins the startup sequence and the operator will be responsible for setting the component speeds. The PLC will begin to start the following components in order. The washwater booster pump will be called to start. The screw driveswill be called to start and will rotate at the speed adjustable by the setpoint on the OIT screen. The system will then enter a Pre-Wash Cycle and will highlight a display on the OIT screen. This cycle is usually 180 seconds long to allow pre wetting of the drum media and screw flights. The display on the OIT screen will indicate the press is in Pre-Wash and show a countdown of the time. After the pre wash cycle has completed, the Wash Cycle display will turn off, and the SCREW READY display will highlight. At this point, conditioned sludge will pass through the feed pipe, into the flocculation drum and down to the screw press. The dewatered cake will fall from the screw press into a cake pump for removal. When the cake pump is set to auto speed, the pump will automatically adjust speed control based on the signal from the load cell under the pump to keep a consistent level.

The screw shower is set up for intermittent cleaning. An adjustable time delay is programmed to open an air solenoid that moves the shower cage, and at the same time opens an electric valve to allow water to pass through the shower cage nozzles. The time adjustments for the screw shower can be made from the Misc Data screen. In Auto Mode, the transfer pump speed will automatically adjust based on the level sensor in the transfer hopper. The screw speed will automatically adjust based on the pressure sensed at the inlet of the screw.

When operation is complete, pressing the AUTO STOP button will automatically shut down the components in the reverse order that they started. First, the sludge pump and polymer system will be called to stop and the WASH CYCLE display will highlight again. The post wash cycle usually lasts 20 minutes to allow all sludge to be removed from the screw press and cake pump. This also allows sufficient time for operators to wash down the machine. After the wash cycle, the screw press drives and washwater booster pump will stop, and the washwater valves will close.

SCREW PRESS CONTROLS DESCRIPTION

Hand Mode Screen

From the Auto Setup / Overview screen Hand Mode should be selected and then switch to the Hand Mode Screen to operate. In Hand Mode the operator is responsible for starting and stopping the components individually. The components are arranged on the screen so that starting will commence from the top to the bottom. The order of operation should follow the same steps as described in the AUTO MODE above.

Misc. Setup Data Screen

This screen allows the operator to select pumps, and to change the various time delays and setpoints such as:

- Pre-wash cycle duration
- Post-wash cycle duration
- Screw shower cycle duration
- Screw shower cycle start interval
- Screw inlet pressure high/low setpoints
- Booster Pump VFD speed setpoints for drum shower and combined drum+screw shower
- Slide gate automatic open/close timers

Emergency Stop Pushbutton

The E-stop is a jumbo head red pushbutton on the panel door. When pressed, the button is maintained and can only be released by twisting the head. See ALARMS below for functionality.

SCREW PRESS CONTROLS DESCRIPTION

Alarms

Any of the following alarms will cause an Emergency shutdown:

- Emergency Stop pushbutton
- Emergency Stop buttons on press
- Screw Zero Speed

Any of the following alarms will cause a Programmed shutdown:

- Low Washwater Pressure
- Low Air Pressure
- Sludge Pump Failure
- Polymer System Failure

An emergency shutdown will immediately wash water booster pump, screw press drives, polymer system, sludge pump, and cake pump. The emergency shutdown interrupts all power to the equipment and activates the audible alarm horn. The SILENCE pushbutton will stop the alarm horn. Once the problem is corrected, the RESET button will clear the alarm. The equipment will not automatically restart on its own for safety reasons, the operator must restart the equipment again from the OIT.

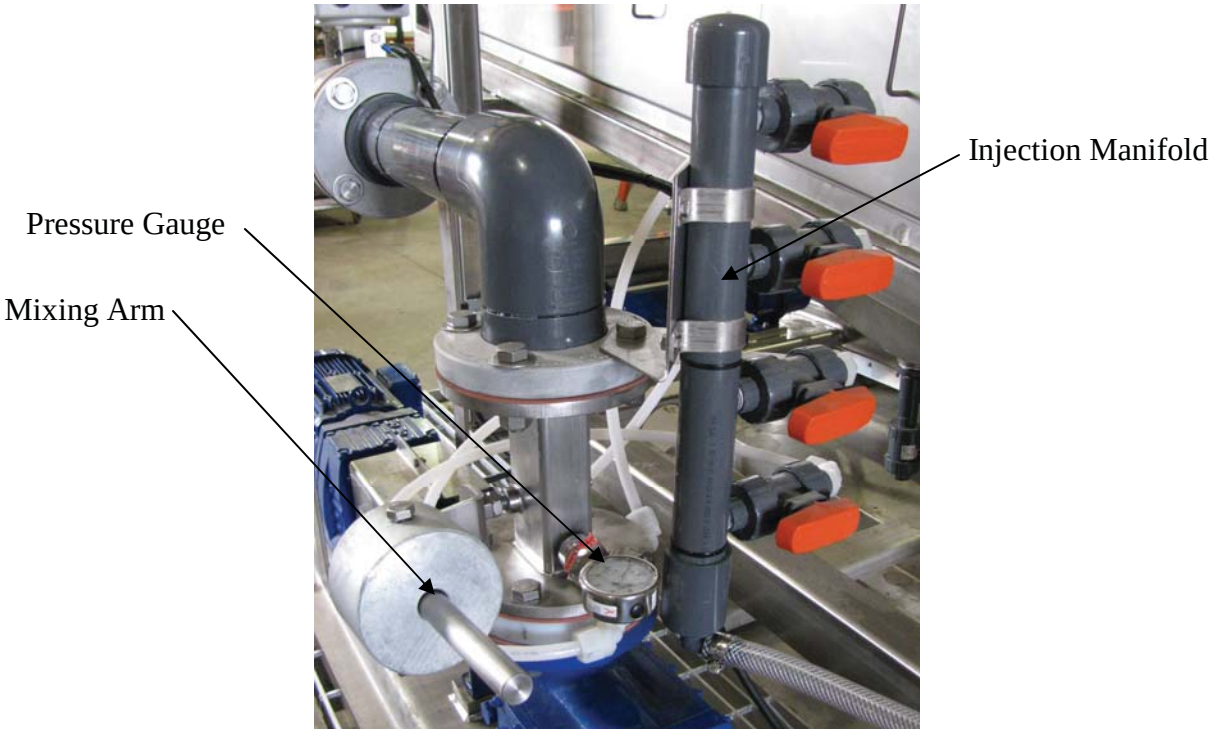
A programmed shutdown will immediately stop the sludge feed pump, and polymer system feeds. All press drives will continue to run for fifteen seconds to allow all sludge to empty from the drum, and then all press drives will stop.

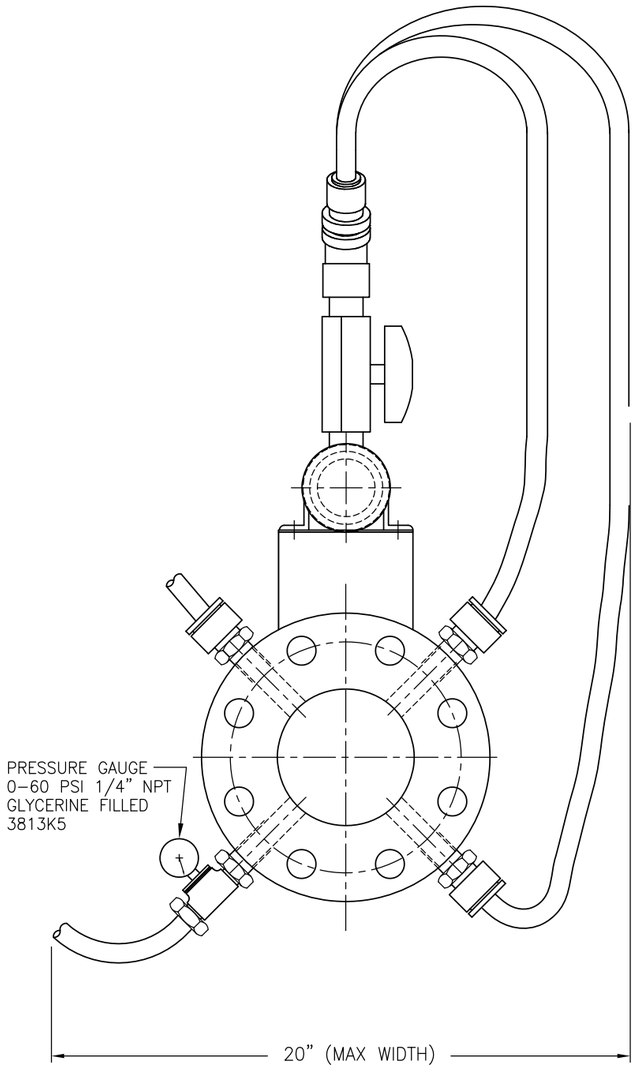
VENTURI MIXER

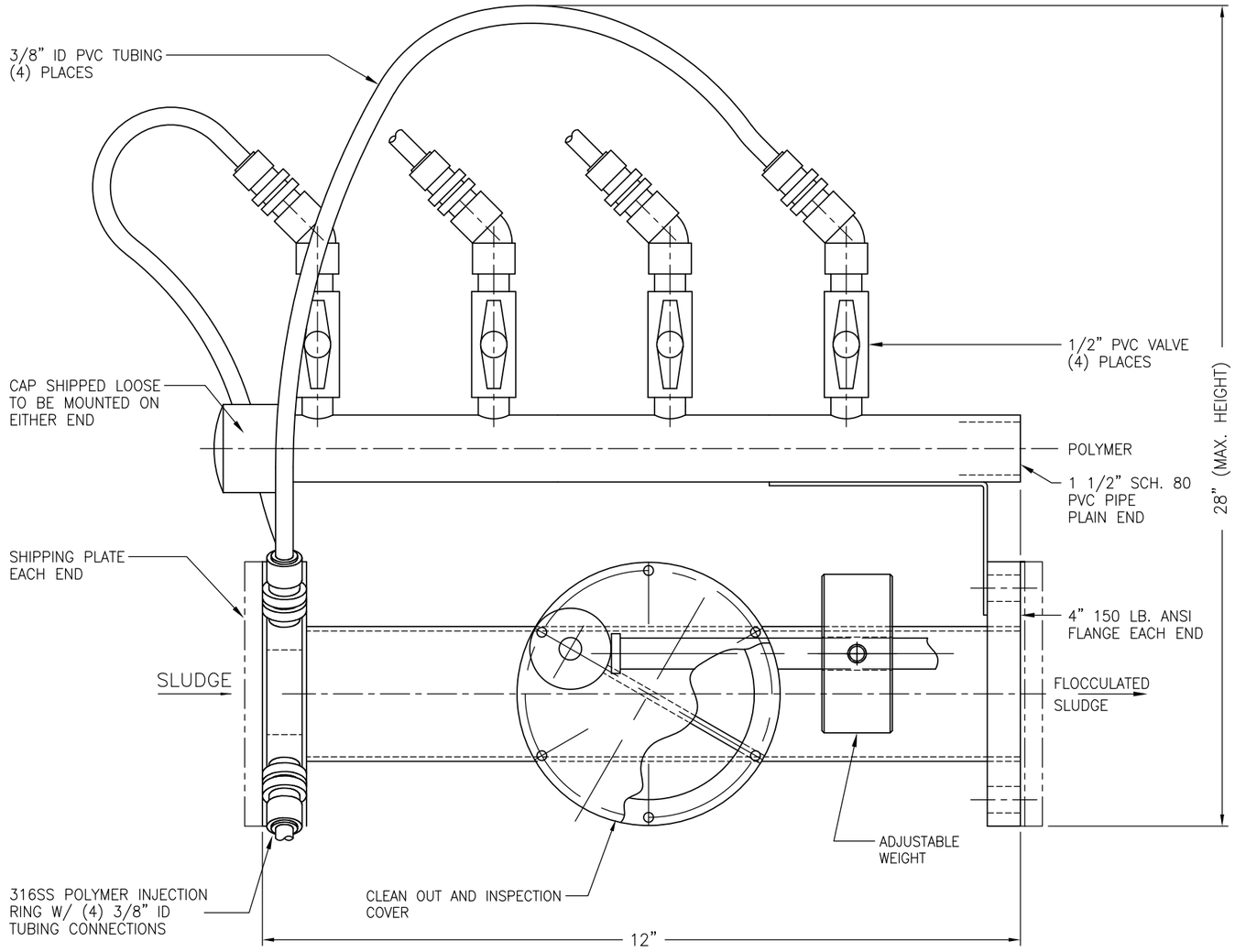
A. General

All venturi mixers are designed and fabricated by BDP Industries. The in-line venturi mixer is designed to mix the feed slurry with made down polymer solution in order to obtain flocculated feed slurry. "Made down" is defined as diluting the polymer from its original state to a desired percentage (e.g., 0.35%) solution mixture. Depending on the type of sludge and the molecular weight and charge of the polymer solution, the amount of mixing required in the venturi mixer will vary. The mixing intensity is varied by adding or removing weight on the mixing arm. The amount of mixing intensity is measured by the pressure gauge mounted to the injection polymer manifold.

The venturi mixer is supplied with a vortex polymer injection ring with four (4) tangentially mounted polymer injection ports. The injection manifold is supplied with PVC ball valves. The mixer is provided with an adjustable counter weight on the mixing arm which moves the wear plate inside the mixer. This controls the amount of mixing.







NOTE:

1. MAY BE MOUNTED HORIZONTAL OR VERTICAL.
2. VENTURI MIXER IS MANUFACTURED BY BDP.

REV.	DESCRIPTION	BY	DATE
3	ADDED 316 SS CONSTRUCTION NOTE	DCW	6/12/03
2	CHG'D PIPE BRACKET	KCE	2/22/01
1	ISSUED	KCE	1/18/01

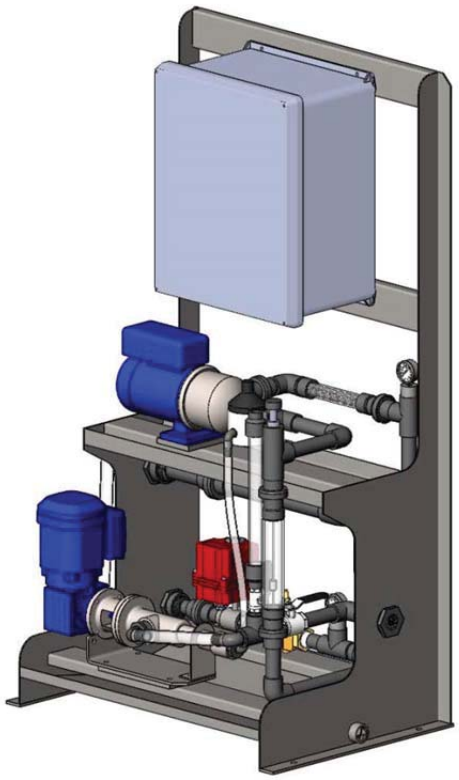
QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER: GENERAL	MACHINE:	DWG TITLE: 4" VENTURI MIXER 316 SS CONSTRUCTION	
BDP JOB NO.	DWN BY: SKD	DATE: 0118/01	
APP'D BY:	SCALE:	SHT. 1 OF 1	REV. 2
		DWG NO. 3–110–83	

BDP INDUSTRIES

SBM1200-5P-1



Stationary Boost Mixing Polymer Make Down System

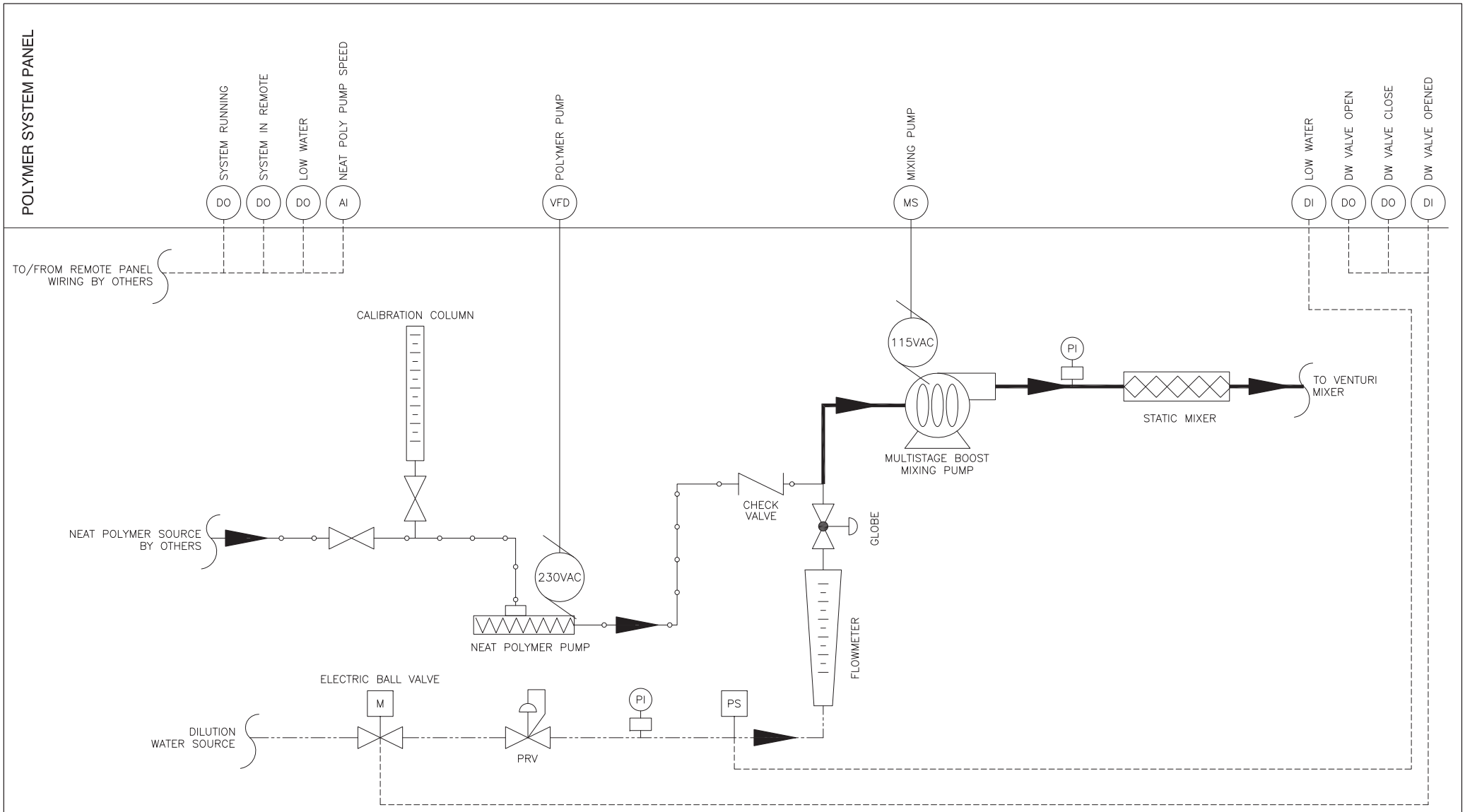
Dilution Water Capacity:	1200 gallons per hour
Neat Polymer Capacity:	5 gallons per hour neat polymer pump
Control System:	Level 1

SBM1200-5P-1

SECTION 1 – System Description

The boost mixing polymer system from BDP is designed to provide an instantaneously mixed polymer solution directly to the process stream. The desired solution concentration is achieved by electronically adjusting the speed of the neat polymer pump while manually adjusting the dilution water flow. Controls for the system are pre wired to a NEMA 4X control box on the skid. The following is a description of the system components and capacities:

Dilution Water:	1200 GPH (20 GPM) maximum capacity
Neat Polymer Pump:	Moyno progressive cavity pump, ¼ HP, 5 GPH (.08 GPM) maximum capacity
Boost Mixing Pump:	Goulds multistage pump, ¾ HP
Maximum Water Pressure:	100 psi
Minimum Water Pressure:	50 psi
Controls:	Level 1, 115VAC 1Ø 60Hz 20 amp, see section 3 for more details
System Frame:	304 SS
Approx. Operating Weight:	300 lbs



NOTES:

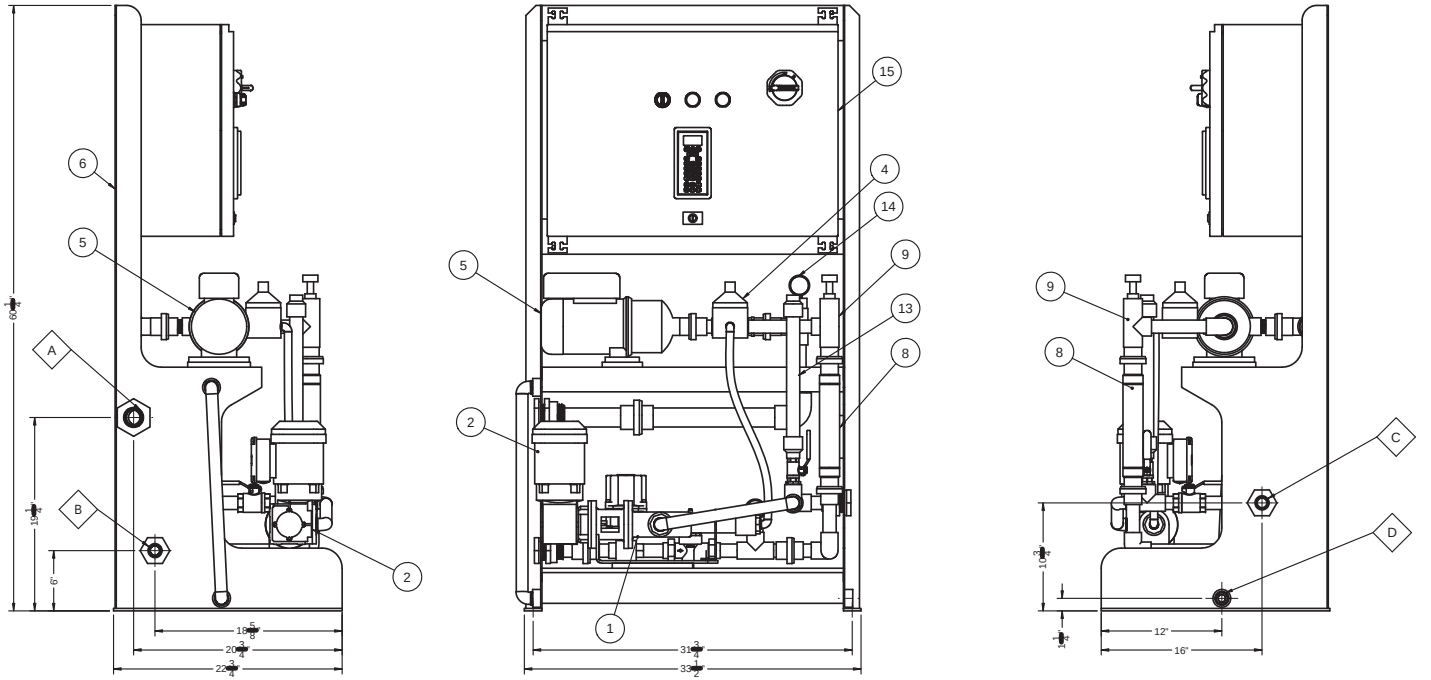
1. ALL INTERCONNECTING PIPING TO AND FROM SYSTEM SKID SUPPLIED BY OTHERS.
2. ALL WIRING FROM PANEL BOX TO DEVICES MOUNTED ON SKID BY BDP.
3. DRAWING IS FOR REFERENCE ONLY. NOT TO BE USED FOR CONSTRUCTION.

REV.	DESCRIPTION	DATE	BY

QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER:	MACHINE: SBMXXX–XP–1	DWG TITLE: SBMXXX–XP–1 LEVEL 1 CONTROLS P&ID	
BDP JOB NO.	DWN BY: MJG	DATE: 7/1/15	
APP'D BY:	SCALE: NONE	SHT. 1 OF 2	DWG NO. BM–1 PID REV. 1



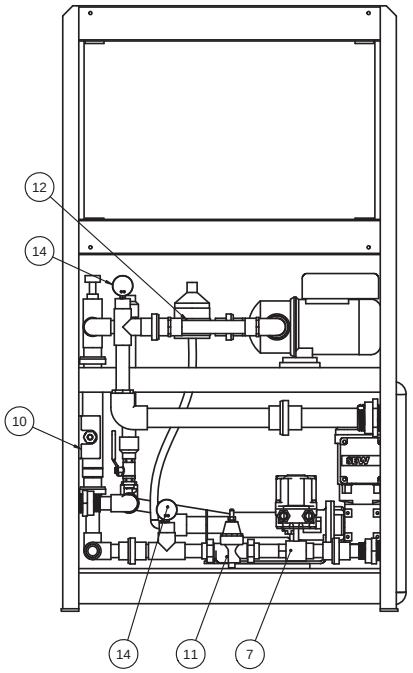
LOCATION	CONNECTION
A	1-1/2" FNPT SOLUTION OUTLET
B	1" FNPT DILUTION WATER INLET
C	1" FNPT NEAT POLYMER INLET
D	1" FNPT PAN DRAIN

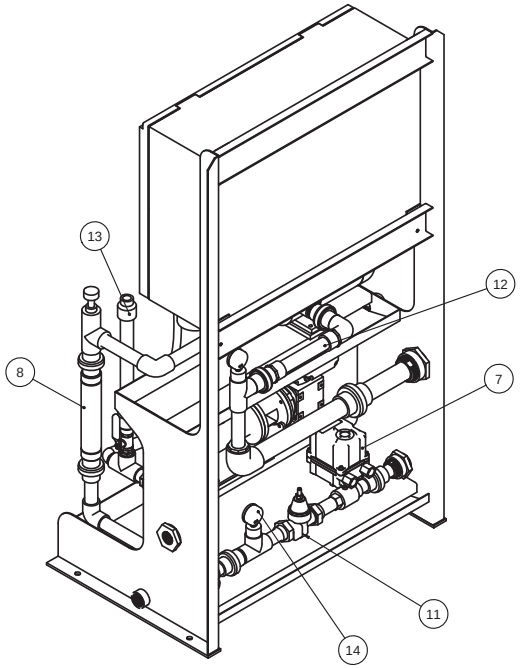
NOTES:
1. APPROX. WEIGHT; 275 LBS
2. MAX. WATER PRESSURE; 100 PSI

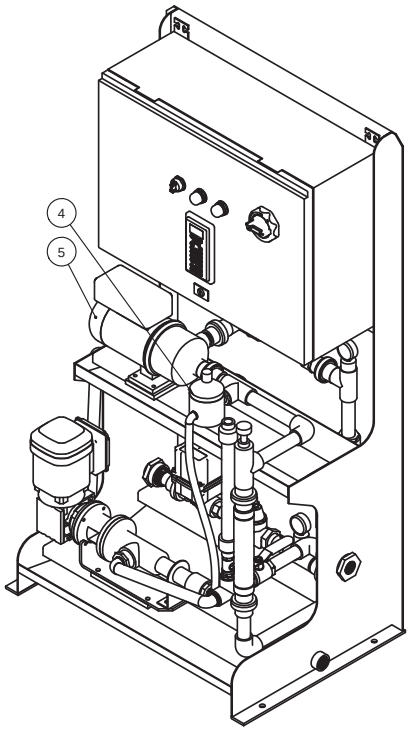
QTY.	DESCRIPTION	MAT.	ITEM	REMARKS
1	CONTROL BOX		15	
2	PRESSURE GAUGE, 0-100 PSI	TRERICE	14	D82LFB2502LA110
1	CALIBRATION COLUMN	MCMASTER	13	4446K72
1	STATIC MIXER, 1"	MCMASTER	12	35385K24
1	PRESSURE REDUCING VALVE	WATTS	11	LFN45BDU-M1
1	PRESSURE SWITCH	SOR	10	6NN-K3-N4-F1A
1	ANGLE GLOBE VALVE	HAYWARD	9	AV10100T
1	FLOWMETER	KING	8	7205-0181-31W
1	ELECTRIC BALL VALVE, 1"	TRIAC	7	22-TX-100/WEA1-XX
1	SYSTEM FRAME; 304SS		6	2-110-580
1	MIXING PUMP	GOULDS	5	3HM06N11T6PBQE
1	BACK PRESSURE VALVE	GRIFFCO	4	BPG050P
1	METERING PUMP BASE		3	3-110-897
1	PUMP DRIVE; .25 HP	SEW	2	WF20DRS71S4-IP65
1	PROGRESSIVE CAVITY NEAT PUMP	MOYNO	1	B4100 DSSF3 SAA

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER:	MACHINE: SBM	DWG TITLE: POLYMER MAKE DOWN SYSTEM SBM1200-5P-1	
BDP JOB NO.	DWN BY: MJG	DATE: 6/18/15	
APP'D BY:	SCALE:	SHT. 1 OF 2	DWG NO. 2-110-579 REV. 3







REV.	DESCRIPTION	DATE	APPROVED
3	REVISED FRAME FOR CONTROL BOX	2/11/16	MJG
2	WATTS PRV HAD CPVC UNIONS	10/12/15	MJG
REVISIONS			

QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER:	MACHINE: SBM	DWG TITLE: POLYMER MAKE DOWN SYSTEM SBM1200-5P-1	
BDP JOB NO.	DWN BY: MJG / DATE: 6/18/15		
APP'D BY:	SCALE:	SHT. 2 OF 2	DWG NO. 2-110-579 / REV. 3

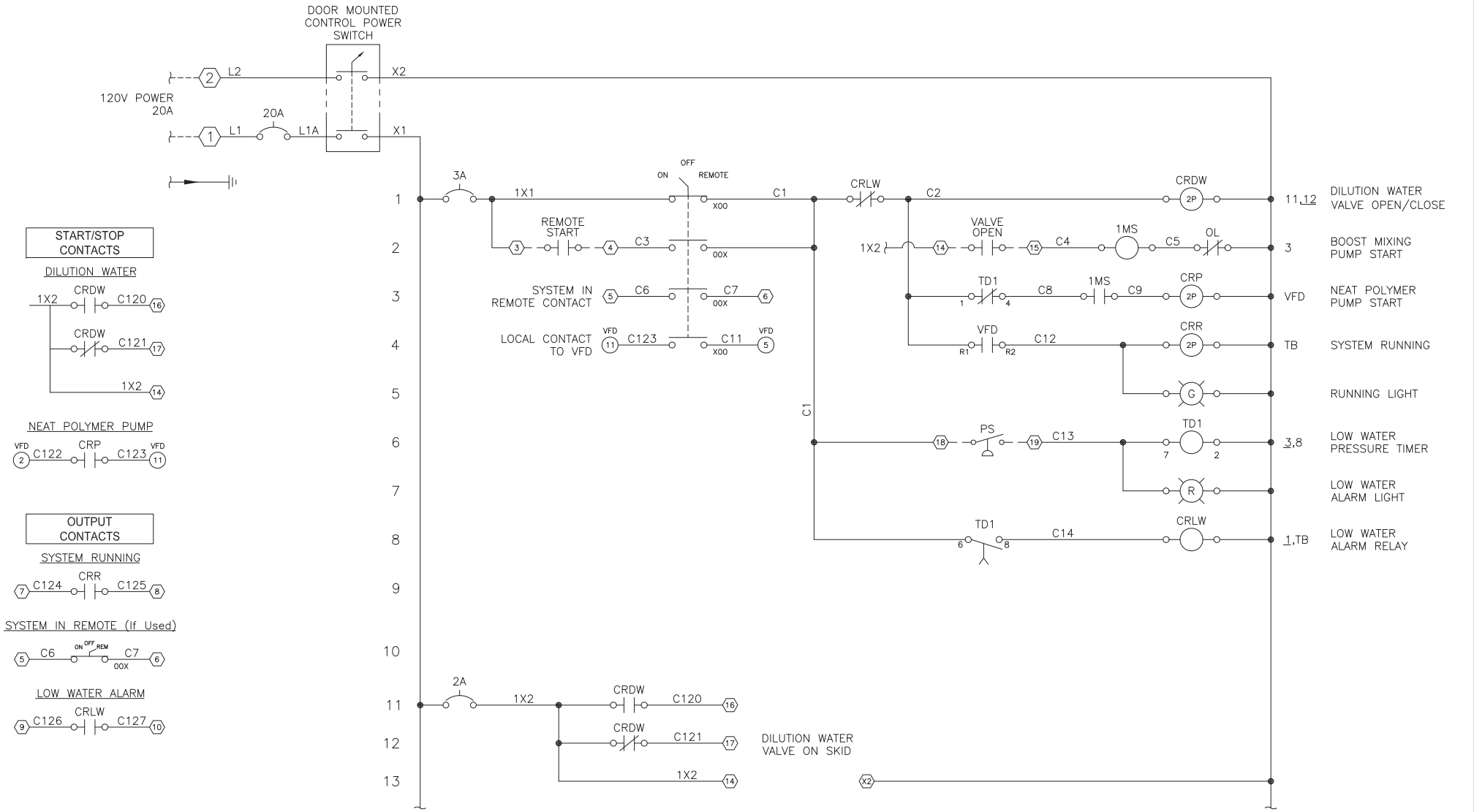
SBM1200-5P-1

SECTION 3 – Electrical

Level 1 Controls:	On-Off-Remote selector switch System Running Light Low Water Pressure Alarm Digital Speed Potentiometer for polymer pump FRP Nema 4X control enclosure
Power Feed:	115V, 1Ø, 60Hz, 20 amp
Available Outputs:	System Running Low Water Pressure System in Remote
Remote Inputs:	Remote Start/Stop 4-20mA pump speed signal

The system is designed for local or remote control. When the selector switch is in ON position, the electric dilution water ball valve will open. Once fully opened, the neat polymer pump and mixing pump will start. The neat polymer pump speed can be adjusted through the digital speed pot on the front of the panel. The dilution water is manually adjusted with the globe valve atop the water flowmeter. If low water pressure is detected, the switch will trigger a timer in the panel. The switch will instantly stop the neat polymer pump, but will continue to allow the flow of dilution water through the system. If sufficient pressure does not rebuild after 15 seconds, the system will shut down and annunciate the low water alarm.

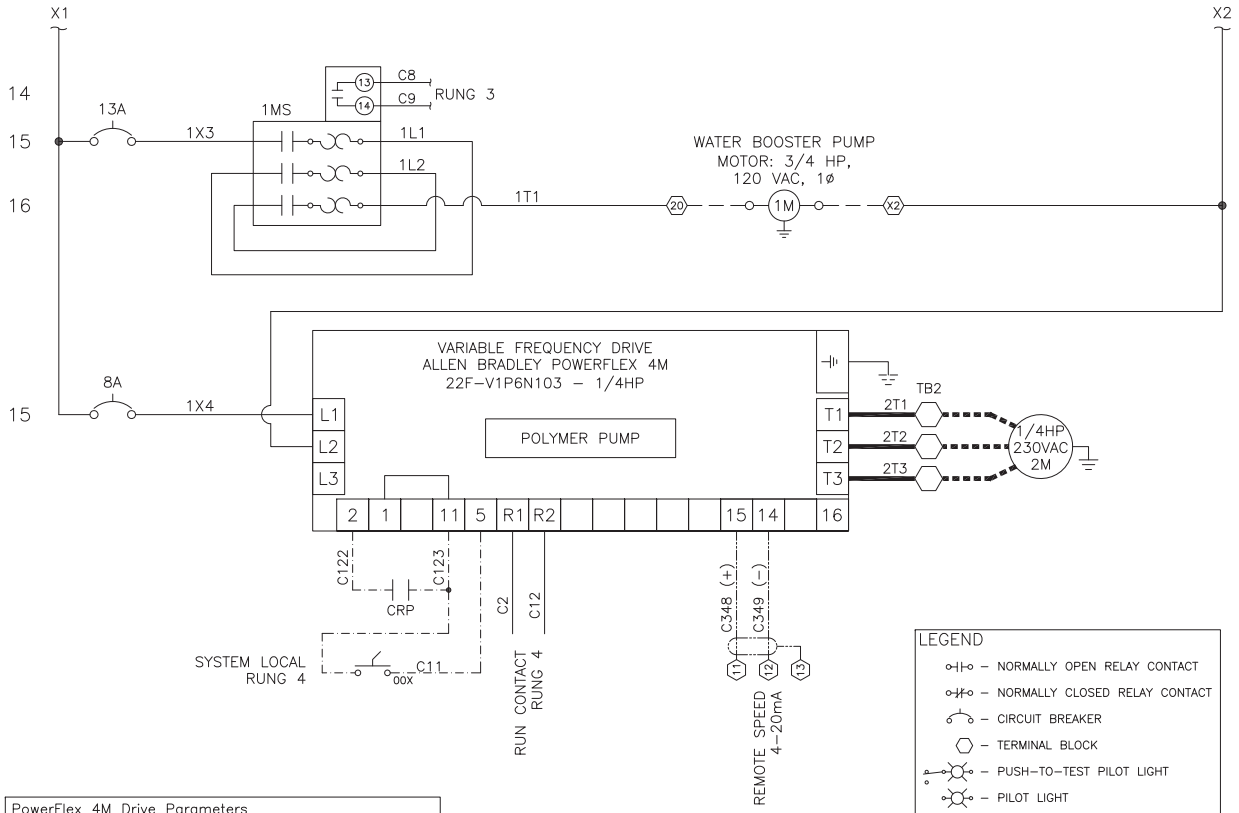
When the selector switch is in the REMOTE position, the remote panel can start and stop the system. When in the remote position, the speed of the neat polymer pump can be adjusted remotely through a 4-20mA signal.

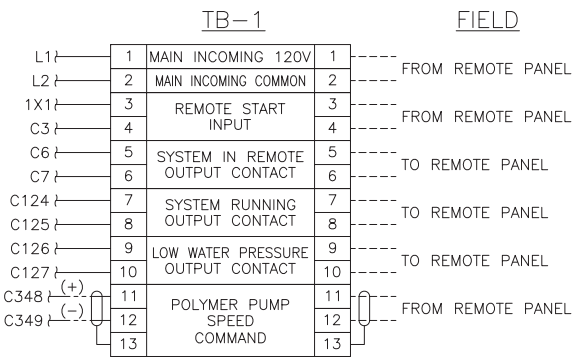


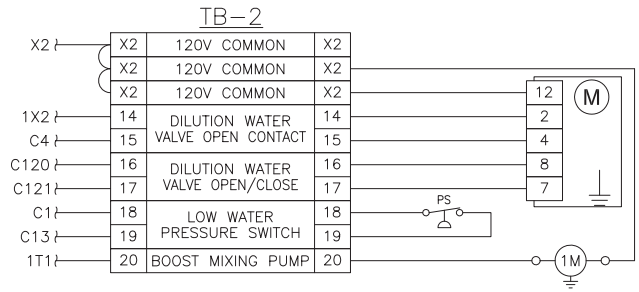
QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

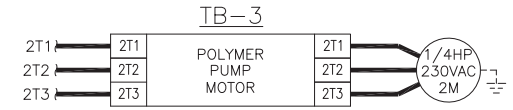
BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER:	MACHINE: SBMXXX–XP–1	DWG TITLE: SCHEMATIC DIAGRAM SBMXXX–XP–1	
BDP JOB NO.	DWN BY: MJG	DATE: 6/24/15	
APP'D BY:	SCALE:	SHT. 1 OF 3	DWG NO. BM–1 REV. 2









PowerFlex 4M Drive Parameters

- Set Min Freq [P104] to 10 Hz
- Set Start Src [P106] to 2 (2 wire)
- Set Stop Mode [P107] to 1 (Coast)
- Set Speed Ref [P108] to 2 (0–10V)
- Set Accel [P109] to 5 sec
- Set Decel [P110] to 5 sec
- Set Digital In 1 Sel [t201] to 14 (20mA in Control)
- Set Relay Out Sel [t221] to 2 Motor Run
- Set Auto Rstrt Tries [A451] to 3
- Set Auto Rstrt Delay [A452] to 2.0
- Set Max Voltage [A457] to 240V

LEGEND

- – NORMALLY OPEN RELAY CONTACT
- – NORMALLY CLOSED RELAY CONTACT
- – CIRCUIT BREAKER
- – TERMINAL BLOCK
- – PUSH–TO–TEST PILOT LIGHT
- – PILOT LIGHT
- – LIMIT SWITCH
- – PUSHBUTTON
- – RELAY COIL
- – HORN
- – PRESSURE SWITCH
- – FLOAT SWITCH
- – ZERO SPEED SWITCH
- – REVISION
- – CUSTOMER SUPPLIED CONTACT
- – WIRING BY CONTRACTOR
- – 120VAC CONTROL WIRING
- – VDC WIRING
- – ETHERNET CABLE
- – SHIELDED 4–20mA CABLE
- – HIGH VOLTAGE WIRING (208/240/460/575V)

NOTES:

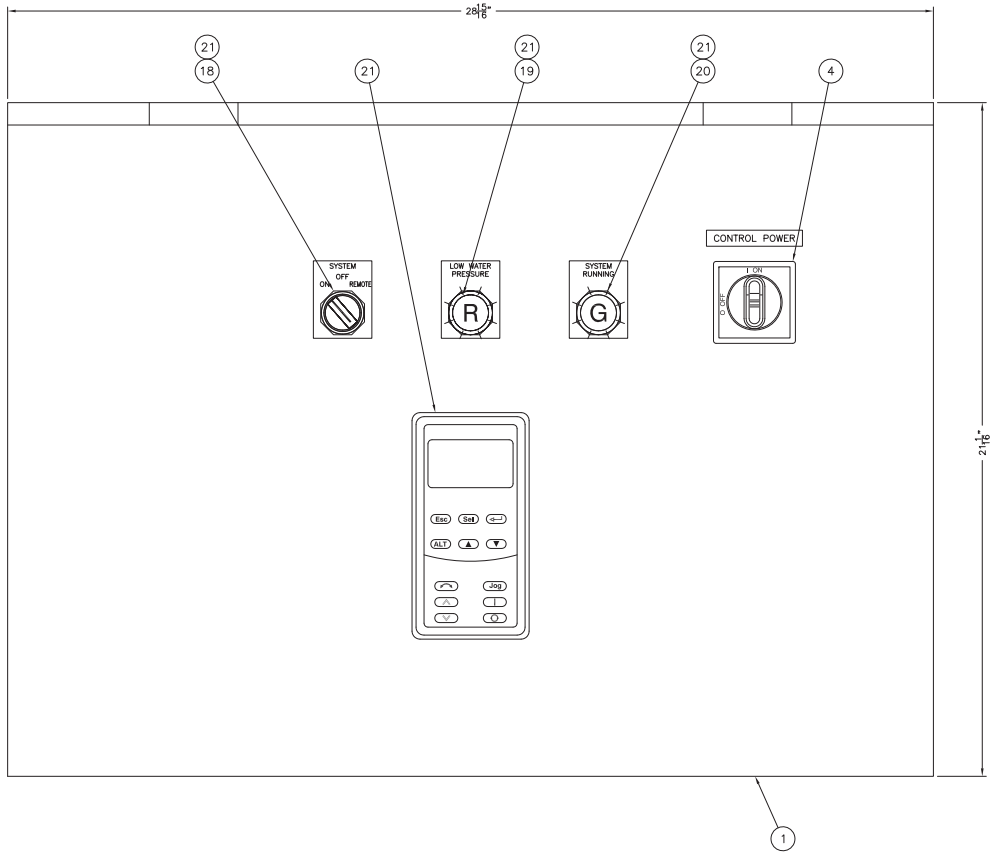
1. POWER WIRING TO BE SIZED FOR LOAD.
2. WIRING SHALL BE COLOR CODED:
   (A) BLACK – LOAD & CONTROL AT LINE VOLTAGE, AC OR DC
   (B) RED – AC CONTROL CIRCUITS
   (C) BLUE – DC CONTROL CIRCUITS
   (D) GREEN – EQUIPMENT GROUNDING CONDUCTOR(S)
   (E) WHITE – NEUTRAL
3. USE 16 GAUGE (MIN.) STRANDED MACHINE TOOL WIRE FOR CONTROL WIRING.
4. ALL WIRES MUST BE TAGGED AT BOTH ENDS.

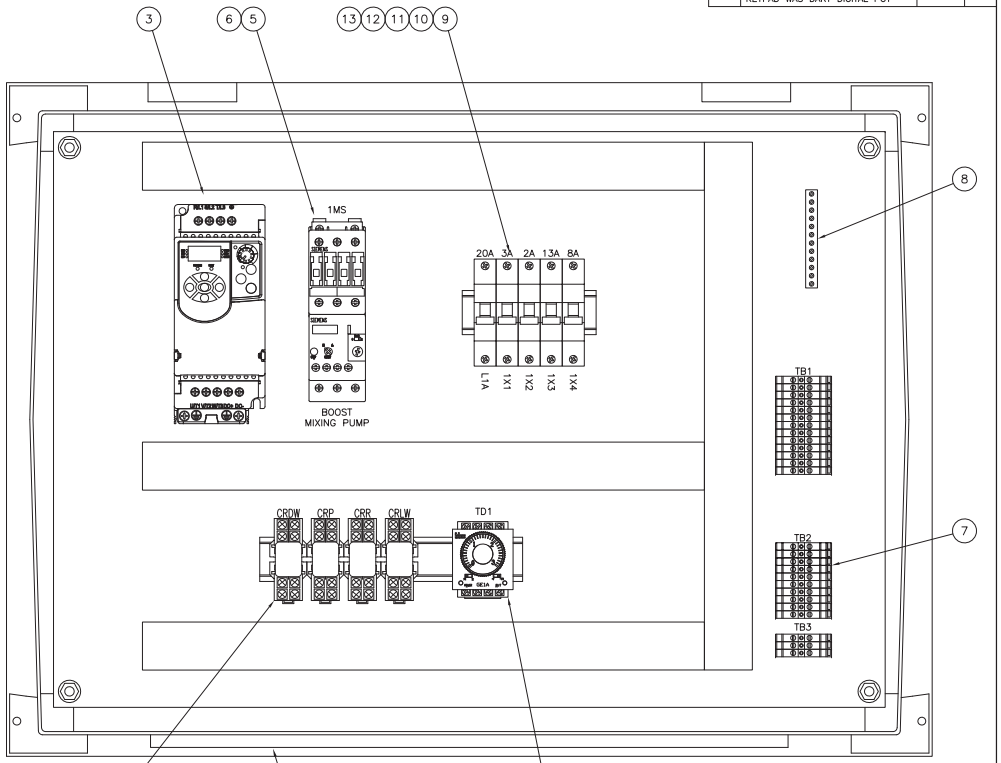
QTY.	DESCRIPTION	MAT.	ITEM	REMARKS

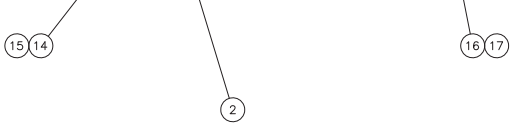
BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER:	MACHINE: SBMXXX–XP–1	DWG TITLE: SCHEMATIC DIAGRAM SBMXXX–XP–1	
BDP JOB NO.	DWN BY: MJG	DATE: 6/24/15	
APP'D BY:	SCALE:	SHT. 2 OF 3	REV. 2
		DWG NO. BM–1	

REV.	DESCRIPTION	DATE	BY
1	INITIAL RELEASE	6/24/15	MJG
2	REVISED ENCLOSURE SIZE KEYPAD WAS DART DIGITAL POT	2/8/16	MJG







INCOMING POWER
120VAC, 1ϕ, 60Hz

QTY.	DESCRIPTION	MAT.	ITEM	REMARKS
3	ENGRAVED LEGENDS	MIECO	21	LEG–1
1	GREEN PILOT LIGHT	ALLEN BRADLEY	20	800H–QRH2G
1	RED PILOT LIGHT	ALLEN BRADLEY	19	800H–QRH2R
1	3 POSITION SWITCH	ALLEN BRADLEY	18	800H–JR2A
1	8 PIN RELAY BASE	IDEC	17	SR2P–06
1	ON DELAY TIMER	IDEC	16	GE1A–B10HA110
4	2 POLE RELAY BASE	IDEC	15	SH2B–05
4	2 POLE RELAY	IDEC	14	RH2B–UL–120VAC
1	1P, C CURVE BREAKER; 2 AMP	SQUARE D	13	60103
1	1P, C CURVE BREAKER; 3 AMP	SQUARE D	12	60104
1	1P, C CURVE BREAKER; 8 AMP	SQUARE D	11	60109
1	1P, C CURVE BREAKER; 13 AMP	SQUARE D	10	60111
1	1P, C CURVE BREAKER; 20 AMP	SQUARE D	9	60113
2	GROUND BAR	C. H.	8	GBK10
25	TERMINAL BLOCKS – GRAY	ABB	7	011511607
1	CONTACTOR OVERLOAD	SIEMENS	6	3RU1126–1JB0
1	MOTOR CONTACTOR	SIEMENS	5	3RT1025–1AK60
1	PANEL DISCONNECT SWITCH	SQUARE D	4	VCDN20
1	POLYMER PUMP VFD; 1/4 HP	ALLEN BRADLEY	3	22F–V1P6N103
1	BACK PANEL	VYNCKIER	2	MP2016S
1	ENCLOSURE; FRP NEMA 4X	VYNCKIER	1	VJ2016HWPL2

BDP INDUSTRIES, INC.
GREENWICH, N.Y. 12834

CUSTOMER:	MACHINE: SBMXXX–XP–1	DWG TITLE: SCHEMATIC DIAGRAM SBMXXX–XP–1	
BDP JOB NO.	DWN BY: MJG	DATE: 6/24/15	
APP'D BY:	SCALE:	SHT. 3 OF 3	REV. 2
		DWG NO. BM–1	

Overview

The SITRANS F M MAGFLO MAG 5100 W is an electromagnetic flow sensor designed to meet ground water, drinking water, waste water, sewage or sludge applications.

Benefits

- DN 25 to DN 1200 (1" to 48")
- Connection flanges EN 1092-1 (DIN 2501), ANSI, AWWA and AS.
- NBR Hard Rubber liner for all water applications
- Drinking water EPDM liner with approvals
- Hastelloy integrated grounding and measuring electrodes
- Increased low flow accuracy for water leak detection, due to coned liner design.
- Drinking water approvals
- Suitable for direct burial and constant flooding
- Build-in length according to ISO 13359
- Easy commissioning, SENSORPROM unit automatically uploads calibration values and settings.
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprint.

Application

The main applications of the SITRANS F M MAGFLO electromagnetic flow sensors can be found in the following fields:

- Water abstraction
- Water treatment
- Water distribution network (leak detection management)
- Custody transfer water meters
- Irrigation
- Waste water treatment
- Filtration plant (e.g. reverse osmosis and ultra filtration)
- Industrial water applications

Mode of operation

The flow measuring principle is based on Faradays law of electromagnetic induction were the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Function

- Highly resistant to a wide range of chemicals
  - Pattern approval OIML R49 (Denmark, Germany)
  - conforms to ISO 4064 and EN 14154
  - MI-001 Custody Transfer approval for billing (EU)
- Meets EEC directives: PED, 97/23/EC pressure directive for EN1092-1 flanges
- Simple onsite or factory upgrade to IP68/NEMA 6P of a standard sensor.

Integration

The complete flowmeter consists of a flow sensor and an associated transmitter SITRANS F M MAGFLO MAG 5000, MAG 6000 or MAG 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems, e.g. HART, PROFIBUS DP & PA, MODBUS RTU/RS485.

MAGFLO MAG 5100 W

Technical specifications

Design	Full bore sensor	Coned bore sensor	Full bore sensor
Nominal size	DN 25 ... 40 (1" ... 1½")	DN 50 ... 300 (2" ... 12")	DN 350 ... 1200 (14" ... 48")
Measuring principle	Electromagnetic induction		
Excitation frequency	12.5 Hz	• 50 ... 65 mm (2" ... 2½"): 12.5 Hz • 80 ... 150 mm (3" ... 6"): 6.25 Hz • 200 ... 300 mm (8" ... 12"): 3.125 Hz	DN 350 ... 450 (14" ... 18"): 3.125 Hz DN 500 ... 1200 (20" ... 48"): 1.5625 Hz
Process connection			
Flanges		Flat face flanges	
• EN 1092-1	PN 40 (580 psi)	• 50 ... 300 mm: PN 16 (2" ... 12": 230 psi) • 200 ... 300 mm: PN 10 (8" ... 12": 145 psi)	• PN 10 (145 psi) • PN 16 (230 psi)
• ANSI B16.5	Class 150 lb	Class 150 lb ~20 bar (290 psi)	--
• AWWA C-207	--	--	28" ... 48": Class D
• AS4087	PN 16 (230 psi) DN 50 ... 1200 (2" ... 48"), 14 bar (232 psi)		
Rated Operation conditions			
Ambient temperature			
• Sensor	-40 ... +70 °C (-40 ... +158 °F)		
• With compact transmitter MAG 5000/6000	-20 ... +50 °C (-4 ... +122 °F)		
• With compact transmitter MAG 6000 I	-20 ... +60 °C (-4 ... +140 °F)		
Operating pressure	0.01 ... 40 bar (0.15 ... 580 psi)	0.03 ... 20 bar (0.44 ... 290 psi)	0.01 ... 16 bar (0.15 ... 232 psi)
Enclosure rating			
• Standard	IP67 to EN 60529 / NEMA 4X/6 (1 mH_2O for 30 minutes)		
• Option	IP68 to EN 60529 / NEMA 6P (10 mH_2O continuously)		
Pressure drop at 3 m/s (10 ft/s)	As straight pipe	Max. 25 mbar (0.36 psi)	As straight pipe
Medium conditions			
Temperature of medium			
• NBR	-10 ... +70 °C (14 ... +158 °F)		
• EPDM	-10 ... +70 °C (14 ... +158 °F)		
EMC	89/336 EEC		
Design			
Weight	See dimensional drawings		
Material			
• Housing and flanges	Carbon steel, St 37.2		
• Terminal box	Standard Fibre glass reinforced polyamide		
• Measuring pipe	AISI 304 (1.4301)		
• Liner	NBR Hard Rubber (hydro carbon resistent) EPDM		
• Electrodes	Hastelloy C276		
• Grounding electrodes standard	Hastelloy C276		
Certificates and approvals			
Custody Transfer (only together with MAG 5000/6000 CT), order as special	OIML R 49 pattern approval cold water (Denmark and Germany): DN 50 ... 300 (2" ... 12") MI 001 cold water (EU): DN 50 ... 300 (2" ... 12")		
Approvals	FM Class 1, Div 2		
Drinking water approvals			
• EPDM	NSF61 (Cold water, US) WRAS (WRc, BS6920 cold water, GB) ACS listed (F), DVGW W270 (D) Belaqua (B)		
• NBR	NSF61 (Cold water, US)		
Approvals	PED – 97/23 EC[1)], CRN		

[1)] For sizes larger than 600 mm (24") in PN 16 PED conformity is available as a cost added option. The basic unit will carry the LVD (Low Voltage Directive) and EMC approval.

Selection and Ordering data		Order No.
SITRANS F M Flowsensor MAGFLO MAG 5100 W	F)	7ME6520 -
Hastelloy electrodes, carbon steel flanges		■■■1■ - 2■■■
Diameter		
DN 25 (1“)	▶	2D
DN 40 (1½“)	▶	2R
DN 50 (2“)	▶	2Y
DN 65 (2½“)	▶	3F
DN 80 (3“)	▶	3M
DN 100 (4“)	▶	3T
DN 125 (5“)	▶	4B
DN 150 (6“)	▶	4H
DN 200 (8“)	▶	4P
DN 250 (10“)	▶	4V
DN 300 (12“)	▶	5D
DN 350 (14“)	▶	5K
DN 400 (16“)	▶	5R
DN 450 (18“)	▶	5Y
DN 500 (20“)	▶	6F
DN 600 (24“)	▶	6P
DN 700 (28“)	▶	6Y
DN 750 (30“)	▶	7D
DN 800 (32“)	▶	7H
DN 900 (36“)	▶	7M
DN 1000 (40“)	▶	7R
42“	▶	7U
44“	▶	7V
DN 1200 (48“)	▶	8B
Flange norm and pressure rating		
to EN 1092-1		
PN 10 (DN 200 ... 1200/8“ ... 48“)	▶	B
PN 16 (DN 50 ... 1200/2“ ... 48“)	▶	C
PN 16, non PED (DN 700 ... 1200/28“ ... 48“)		D
PN 40 (DN 25 ... 40/1“ ... 1½“)	▶	F
to ANSI B16.5		
class 150 (1“ ... 24“)	▶	J
to AWWA C-207		
Class D (28“ ... 48“)		L
to AS 4087		
PN 16		N
Liner material		
EPDM		2
NBR Hard Rubber		3
Transmitter		
Sensor for remote transmitter (Order transmitter separately)		A
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC		C
MAG 6000, Polyamid, 11 ... 30 V DC/11 ... 24V AC		H
MAG 6000, Polyamid, 115/230 V AC		J
MAG 5000, Polyamid, 11 ... 30 V DC/11 ... 24V AC		K
MAG 5000, Polyamid, 115/230 V AC		L
Communication		
None	▶	A
HART		B
PROFIBUS PA Profile 3 (only MAG6000/MAG6000 I)		F
PROFIBUS DP Profile 3 (only MAG6000/MAG6000 I)		G
MODBUS RTU/RS 485 (only MAG6000/MAG6000 I)		E

Selection and Ordering data		Order No.
SITRANS F M Flowsensor MAGFLO MAG 5100 W	F)	7ME6520 -
Hastelloy electrodes, carbon steel flanges		■■■1■ - 2■■■
Cable glands/terminal box		
Metric		1
½" NPT		2

▶ Available ex stock.

Selection and Ordering data	Order code
Additional information	
Please add **“-Z“** to Order No. and specify Order code(s) and plain text.	
Customer specific converter setup	**Y20**
Tag name plate, stainless steel fixed with SS wire (add plain text)	**Y17**
Tag name plate, plastic (self adhesive)	**Y18**
Factory certificate according to EN 10204-2.1	**C15**
Factory certificate according to EN 10204-2.2	**C14**
Sensor cables wired (specify cable order no.)	**Y40**
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable order no.)	**Y41**
Other postproduction requirements (add desired text)	**Y99**

Description		Order No.	Symbol
Potting kit for terminal box of MAGFLO sensors for IP68/NEMA 6P (Not ATEX)	F)	**FDK-085U0220**	

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I transmitters and sensors are delivered compact mounted from factory.
Communication module will be pre-mounted in the transmitter.

Please use online Product selector to get latest updates.

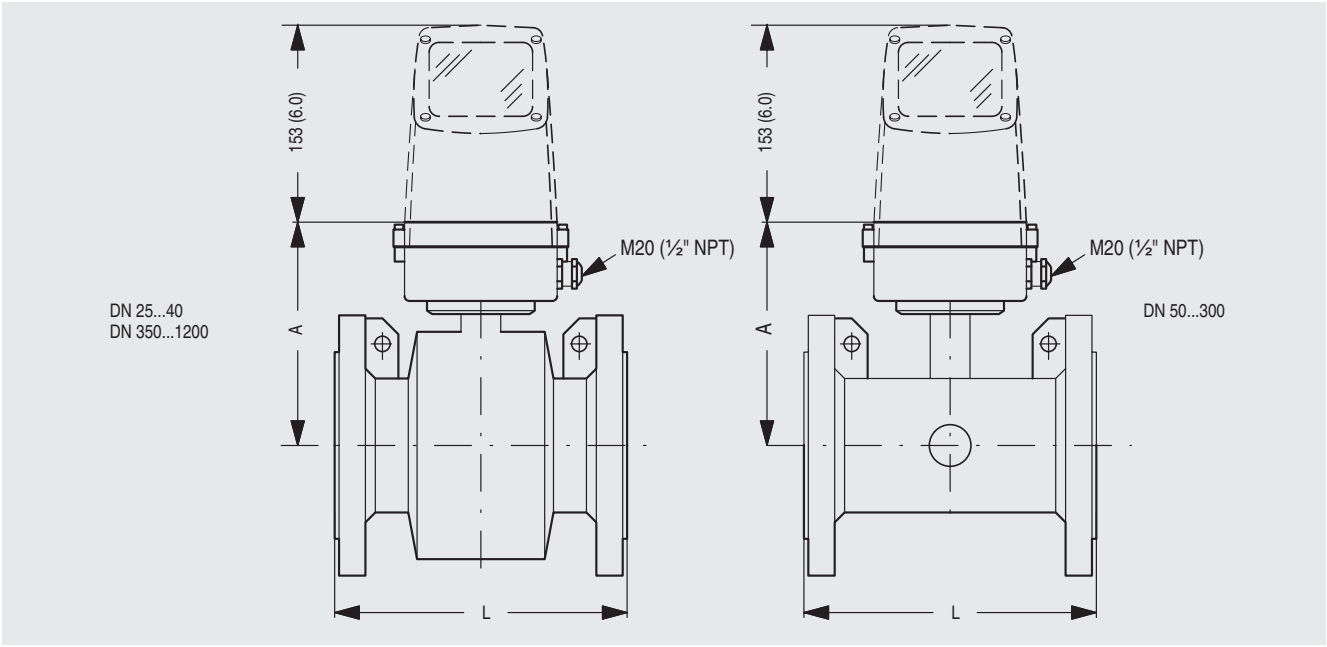
Product selector link:
www.pia-selector.automation.siemens.com

Please also see www.siemens.com/SITRANSFordering for practical examples of ordering

F) Subject to export regulations AL: 9I999, ECCN: N.

MAGFLO MAG 5100 W

Dimensional drawings



Nominal size		A		L									
				PN 10		PN 16		PN 40		Class 150 / AWWA		AS	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
25	1	187	7.4	-	-	-	-	200	7.9	200	7.9	200	7.87
40	1½	197	7.8	-	-	-	-	200	7.9	200	7.9	200	7.87
50	2	188	7.4	-	-	200	7.9	-	-	200	7.9	200	7.87
65	2½	194	7.6	-	-	200	7.9	-	-	200	7.9	200	7.87
80	3	200	7.9	-	-	200	7.9	-	-	200	7.9	200	7.87
100	4	207	8.1	-	-	250	9.8	-	-	250	9.8	250	9.84
125	5	217	8.5	-	-	250	9.8	-	-	250	9.8	250	9.84
150	6	232	9.1	-	-	300	11.8	-	-	300	11.8	300	11.81
200	8	257	10.1	350	13.8	350	13.8	-	-	350	13.8	350	13.78
250	10	284	11.2	450	17.7	450	17.7	-	-	450	17.7	450	17.72
300	12	310	12.2	500	19.7	500	19.7	-	-	500	19.7	500	19.69
350	14	382	15.0	550	21.7	550	21.7	-	-	550	21.7	550	21.65
400	16	407	16.0	600	23.6	600	23.6	-	-	600	23.6	600	23.62
450	18	438	17.2	600	23.6	600	23.6	-	-	600	23.6	600	23.62
500	20	463	18.2	600	23.6	600	23.6	-	-	600	23.6	600	23.6
600	24	514	20.2	600	23.6	600	23.6	-	-	600	23.6	600	23.6
700	28	564	22.2	700	27.6	700	27.6	-	-	700	27.6	700	27.6
750	30	591	23.3	-	-	-	-	-	-	750	29.5	750	-
800	32	616	24.3	800	31.5	800	31.5	-	-	800	31.5	800	31.5
900	36	663	26.1	900	35.4	900	35.4	-	-	900	35.4	900	35.4
1000	40	714	28.1	1000	39.4	1000	39.4	-	-	1000	39.4	1000	39.4
	42	714	28.1	-	-	-	-	-	-	1000	39.4	-	-
	44	765	30.1	-	-	-	-	-	-	1100	43.3	-	-
1200	48	820	32.3	1200	47.2	1200	47.2	-	-	1200	47.2	1200	47.2

- not available

MAGFLO MAG 5100 W

Weight

Nominal size		PN 10		PN 16		PN 40		Class 150/AWWA		AS	
[mm]	[inch]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]	[kg]	[lbs]
25	1	-	-	-	-	4	9	4	9	4	9
40	1½	-	-	-	-	7	15	6	13	7	15
50	2	-	-	9	20	-	-	8	20	9	20
65	2½	-	-	10.7	24	-	-	11	24	10.7	24
80	3	-	-	11.6	26	-	-	13	28	11.6	26
100	4	-	-	15.2	33	-	-	19	41	15.2	33
125	5	-	-	20.4	45	-	-	24	52	20.4	45
150	6	-	-	26	57	-	-	29	64	26	57
200	8	48	106	48	106	-	-	56	124	48	106
250	10	64	141	69	152	-	-	79	174	69	152
300	12	76	167	86	189	-	-	110	243	86	189
350	14	104	229	125	274	-	-	139	307	115	254
400	16	119	263	143	314	-	-	159	351	125	277
450	18	136	299	173	381	-	-	182	400	141	311
500	20	163	359	223	491	-	-	225	495	189	418
600	24	236	519	338	744	-	-	320	704	301	664
700	28	270	595	314	692	-	-	273	602	320	704
750	30	-	-	-	-	-	-	329	725	-	-
800	32	346	763	396	873	-	-	365	804	428	944
900	36	432	951	474	1043	-	-	495	1089	619	1362
1000	40	513	1130	600	1321	-	-	583	1282	636	1399
	42	-	-	-	-	-	-	687	1512	-	-
	44	-	-	-	-	-	-	763	1680	-	-
1200	48	643	1415	885	1948	-	-	861	1896	813	1789

- not available

With transmitter MAG 5000 and MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lbs), with MAG 6000 I, weight is increased by 5.5 kg (12.1 lb).

Transmitter MAGFLO MAG 5000/6000

Overview

Transmitter MAG 5000/6000 compact version (left) and 19“ insert version (right)

The MAG 5000 and 6000 are microprocessor-based transmitters engineered for high performance, easy installation, commissioning and maintenance. The transmitters evaluate the signals from the SITRANS F M MAGFLO sensors type MAG 1100, MAG 1100 F, MAG 3100 and MAG 5100 W.

Transmitter types:

- MAG 5000: Max. measuring error 0.5% of rate (incl. sensor)
- MAG 6000: Max. measuring error 0.25% of rate (incl. sensor, see also sensor specifications) and with additional features such as: Plug & Play insert bus modules; integrated batch functions.

Benefits

- Superior signal resolution for optimum turn down ratio
- Digital signal processing with many possibilities
- Automatic reading of SENSORPROM data for easy commissioning
- User configurable operation menu with password protection.
- 3 lines, 20 characters display in 11 languages.
- Flow rate in various units
- Totalizer for forward, reverse and net flow as well as additional information available
- Multiple functional outputs for process control, minimum configuration with analogue, pulse/frequency and relay output (status, flow direction, limits)
- Comprehensive self-diagnostic for error indication and error logging (see under SITRANS F M MAGFLO diagnostics)
- Batch control
- Custody transfer approval: PTB, OIML R75, R117, OIML R 49 and MI-001,
- MAG 6000 with add-on bus modules for HART, MODBUS RTU/RS485, PROFIBUS PA and DP

Application

The MAG flowmeters are suitable for measuring the flow of almost all electrically conductive liquids, pastes and slurries. The main applications can be found in:

- Water and waste water
- Chemical and pharmaceutical industries
- Food & beverage industries
- Power generation and utility

Design

The transmitter is designed as either IP67 NEMA 4X enclosure for compact or wall mounting or 19" version as a 19” insert as a base to be used in:

- 19" rack systems
- Panel mounting IP65/NEMA 4
- Back of panel mounting IP20/NEMA 2
- Wall mounting IP66/NEMA 4

Several options on 19” versions are available such as:

- Transmitters mounted in safe area for Ex ATEX approved flow sensors (incl. barriers)
- Transmitters with electrode cleaning unit

Function

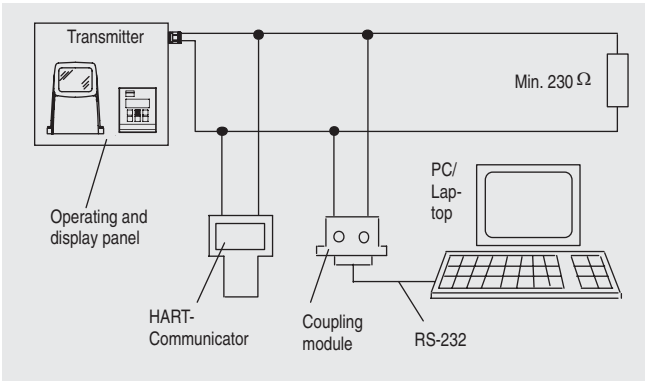
The MAG 5000/6000 are microprocessor-based transmitters with a build-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

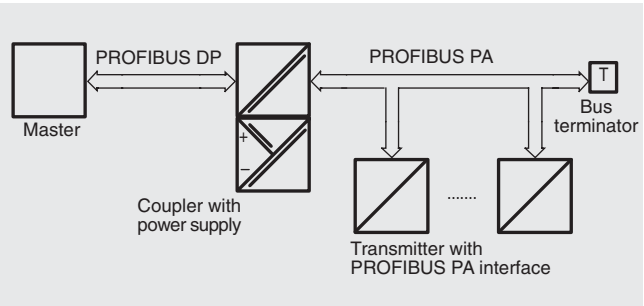
Displays and controls

Operation of the transmitter can be carried out using:

- Control and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS or MODBUS communication



HART communication



PROFIBUS PA communication

Technical specifications

Mode of operation and design	
Measuring principle	Electromagnetic with pulsed constant field
Empty pipe	Detection of empty pipe (special cable required in remote mounted installation)
Excitation frequency	Depend on sensor size
Electrode input impedance	> 1 x 10^{14} Ω
Input	
Digital input	11 ... 30 V DC, R_i = 4. 4 KΩ
• Activation time	50 ms
• Current	$I_{DC\ 11\ V}$ = 2.5 mA, $I_{DC\ 30\ V}$ = 7 mA
Output	
Current output	
• Signal range	0 ... 20 mA or 4 ... 20 mA
• Load	< 800 Ω
• Time constant	0.1 … 30 s, adjustable
Digital output	
Frequency	0 ... 10 kHz, 50% duty cycle (uni/bidirectional)
Pulse (active)	DC 24 V, 30 mA, 1 KΩ ≤ R_i ≤ 10 KΩ, short-circuit-protected (power supplied from flowmeter)
Pulse (passive)	DC 3 … 30 V, max. 110 mA, 200 Ω ≤ R_i ≤ 10 KΩ (powered from connected equipment)
Time constant	0.1 … 30 s, adjustable
Relay output	
Time constant	Changeover relay, same as current output
Load	42 V AC/2 A, 24 V DC/1 A
Low flow cut off	0 ... 9.9% of maximum flow
Galvanic isolation	All inputs and outputs are galvanically isolated
Max. measuring error (incl. sensor and zero point)	
MAG 5000	0.5% of rate
MAG 6000	0.25% of rate
Rated operation conditions	
Ambient temperature	
• Operation	• Display version: -20 ... +50 °C (-4 ... +122 °F) • Blind version: -20 ... +60 °C (-4 ... +140 °F)
• Storage	-40 ... +70 °C (-40 ... +158 °F)
Mechanical load	
Compact version	18 ... 1000 Hz, 3,17 G rms, sinusoidal in all directions to IEC 68-2-36
19“ insert	1 ... 800 Hz, 1 G, sinusoidal in all directions to IEC 68-2-36

Degree of protection	
Compact version	IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH_2O 30 min.)
19“ insert	IP20/NEMA 2 to IEC 529 and DIN 40050
EMC performance	
Emitted interference	To EN 50081-1 (Light industry)
Noise immunity	To EN 50082-1 (Industry)
Display and keypad	
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults; Reverse flow indicated by negative sign
Time constant	Time constant as current output time constant
Design	
Enclosure material	
• Compact version	Fiber glass reinforced polyamide; optional (IP67 only): AISI 316 stainless steel
• 19“-insert	Standard 19“ insert of aluminium/steel (DIN 41494), width: 21 TE, height: 3 HE
• Back of panel	IP20/NEMA 2; Aluminium
• Panel mounting	IP65/NEMA 4; ABS plastic
• Wall mounting	IP66/NEMA 4; ABS plastic
Dimensional drawings	
Compact version	See dimensional drawings
19“ insert	See dimensional drawings
Weight	
Compact version	0.75 kg (2 lb)
19“ insert	See dimensional drawings
Power supply	• 115 ... 230 V AC +10% -15%, 50 ... 60 Hz, 17 VA • 11 ... 30 V DC or 11 ... 24 V AC
Power consumption	• 230 V AC: 17 VA • 24 V AC : 9 W, I_N = 380 mA, I_{ST} = 8 A (30 ms) • 12 V DC : 11 W, I_N = 920 mA, I_{ST} = 4 A (250 ms)
Certificates and approvals	CE, ULc general purpose, C-tick; FM Class 1, div 2
Custody transfer approval (MAG 5000/6000 CT)	• PTB OIML R49 (cold water pattern approval); MI-001 • PTB and DANAK OIML R75 (hot water pattern approval) (MAG 6000 CT) • PTB and DANAK OIML R117 (cold water/milk, beer etc. pattern approval) (MAG 6000 CT)
Communication	
Standard	
• MAG 5000	Without serial communication or HART as option
• MAG 6000	Prepared for client mounted add-on modules
Optional (MAG 6000 only)	HART, MODBUS RTU/RS485, PROFIBUS PA, PROFIBUS DP as add-on modules
• MAG 5000/6000 CT	no communication moduls approved

Transmitter MAGFLO MAG 5000/6000

Selection and Ordering Data

Transmitter MAG 5000

Description	Order No.[F)]	Symbol
Transmitter MAG 5000 Blind for compact and wall mounting; IP67/NEMA 4X, fibre-glass reinforced polyamide		
• 11 ... 30 V DC / 11 ... 24 V AC	**7ME6910-1AA30-0AA0**	
• 115/230 V AC, 50/60 Hz	**7ME6910-1AA10-0AA0**	
Transmitter MAG 5000 Display for compact and wall mounting; IP67/NEMA 4X, fibre-glass reinforced polyamide		
► • 11 ... 30 V DC / 11 ... 24 V AC	► **7ME6910-1AA30-1AA0**	
► • 115/230 V AC, 50/60 Hz	► **7ME6910-1AA10-1AA0**	
• 115/230 V AC, 50/60 Hz, with HART	**7ME6910-1AA10-1BA0**	
Transmitter MAG 5000 CT for compact and wall mounting, approved for custody transfer; IP67/NEMA 4X, fibre-glass reinforced polyamide		
• 11 ... 30 V DC / 11 ... 24 V AC	**7ME6910-1AA30-1AB0**	
• 115/230 V AC, 50/60 Hz	**7ME6910-1AA10-1AB0**	
Transmitter MAG 5000 for 19" rack and wall mounting		
• 11 ... 30 V DC / 11 ... 24 V AC	**7ME6910-2CA30-1AA0**	
• 115/230 V AC, 50/60 Hz	**7ME6910-2CA10-1AA0**	

Transmitter MAG 6000

Description	Order No.[F)]	Symbol
Transmitter MAG 6000 Blind for compact and wall mounting; IP67/NEMA 4X, fibre-glass reinforced polyamide		
• 11 ... 30 V DC / 11 ... 24 V AC	**7ME6920-1AA30-0AA0**	
• 115/230 V AC, 50/60 Hz	**7ME6920-1AA10-0AA0**	
Transmitter MAG 6000 for compact and wall mounting; IP67/NEMA 4X, fibre-glass reinforced polyamide		
► • 11 ... 30 V DC / 11 ... 24 V AC	► **7ME6920-1AA30-1AA0**	
► • 115/230 V AC, 50/60 Hz	► **7ME6920-1AA10-1AA0**	
IP67/NEMA 4X, AISI 316 stainless steel (only for sensor with SS terminal box)		Picture is still missing
• 11 ... 30 V DC / 11 ... 24 V AC	**7ME6920-1QA30-1AA0**	
• 115/230 V AC, 50/60 Hz	**7ME6920-1QA10-1AA0**	

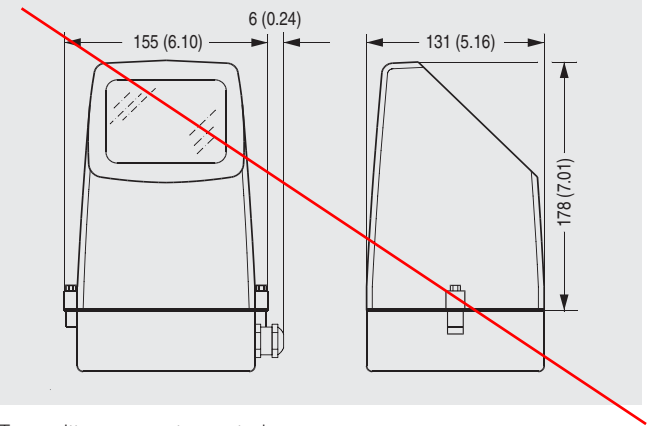
► Available ex stock

Description	Order No.[F)]	Symbol
Transmitter MAG 6000 CT for compact and wall mounting, approved for custody transfer (no communication moduls possible); IP67/NEMA 4X, fibre-glass reinforced polyamide		
• 11 ... 30 V DC / 11 ... 24 V AC	**7ME6920-1AA30-1AB0**	
• 115/230 V AC, 50/60 Hz	**7ME6920-1AA10-1AB0**	
Transmitter MAG 6000 SV for compact and wall mounting; special excitation 44 Hz settings for Batch application DN ≤ 25/1" IP67/NEMA 4X, fibre-glass reinforced polyamide		
11 ... 30 V DC / 11 ... 24 V AC	**7ME6920-1AB30-1AA0**	
115/230 V AC, 50/60 Hz	**7ME6920-1AB10-1AA0**	
Transmitter MAG 6000 for 19" rack and wall mounting		
• 11 ... 30 V DC / 11 ... 24 V AC	**7ME6920-2CA30-1AA0**	
• 115/230 V AC, 50/60 Hz	**7ME6920-2CA10-1AA0**	
Transmitter MAG 6000 SV for 19" rack and wall mounting; special excitation 44 Hz settings for Batch application DN ≤ 25/1"		
• 11 ... 30 V DC / 11 ... 24 V AC	**7ME6920-2CB30-1AA0**	
• 115/230 V AC, 50/60 Hz	**7ME6920-2CB10-1AA0**	
MAG 6000 with IP66/NEMA 4X enclosure; 115/230 V AC, 50/60 Hz	**7ME6920-2EA10-1AA0**	
MAG 6000 with electrode cleaning unit, complete mounted with IP66/NEMA 4X mounting enclosure		
• 11 ... 30 V DC / 11 ... 24 V AC	**7ME6920-2PA30-1AA0**	
• 115/230 V AC, 50/60 Hz	**7ME6920-2PA10-1AA0**	
MAG 6000 with safety barrier for ATEX 2G D approved sensors, complete mounted with IP66/NEMA 4X wall mounting enclosure, ATEX, 115/230 V AC, 50/60 Hz		
• For ATEX 2G D sensors	**7ME6920-2MA11-1AA0**	
MAG 6000 SV, 19" insert, in IP66/NEMA 4X , ABS plastic enclosure, excitation frequency 44 Hz for Batch application DN ≤ 25/1", 11 … 30 V DC, 11 … 24 V AC, 50/60 Hz	**7ME6920-2EB30-1AA0**	

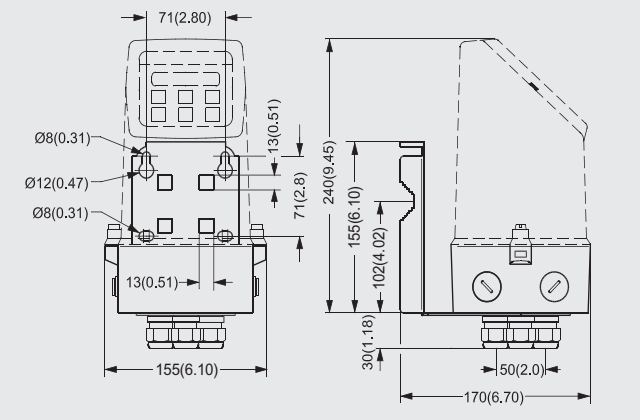
F) All products on this page subject to export regulations AL: 9I999, ECCN: N.

Dimensional drawings

Transmitter IP67/NEMA 4X compact polyamide

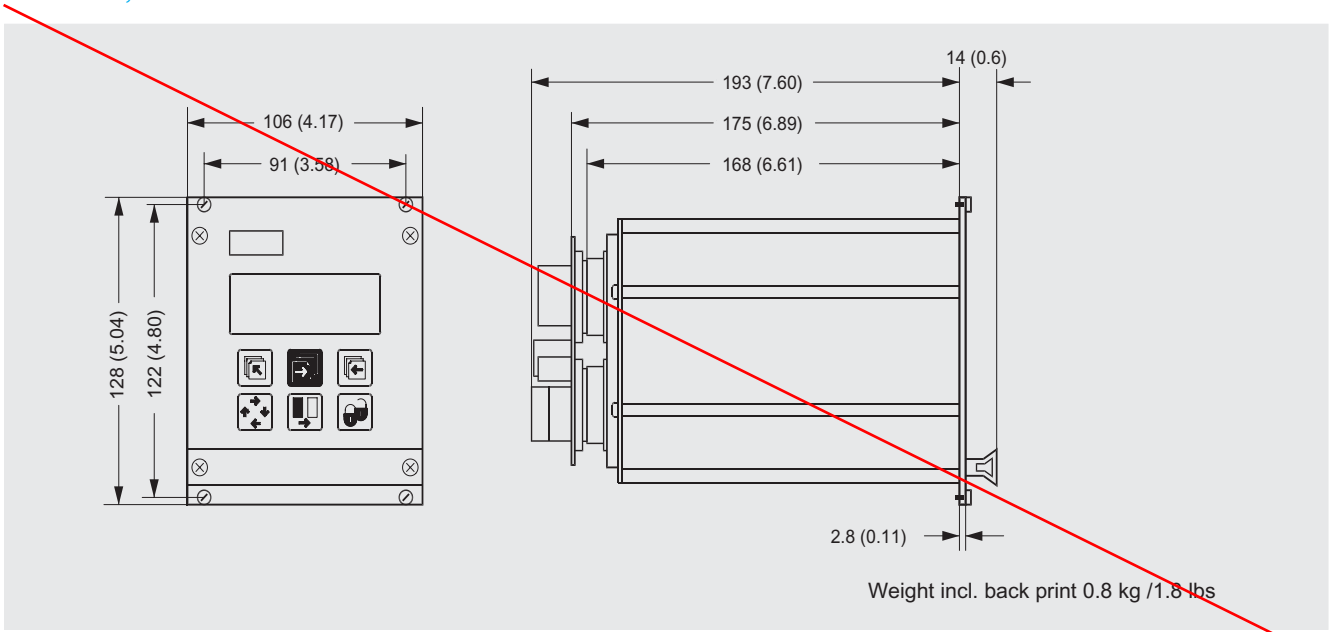


Transmitter compact mounted



Transmitter wall mounted

Transmitter, 19" IP20/ NEMA 2 standard unit



Weight incl. back print 0.8 kg /1.8 lbs

Schematics

Electrical connection

Grounding

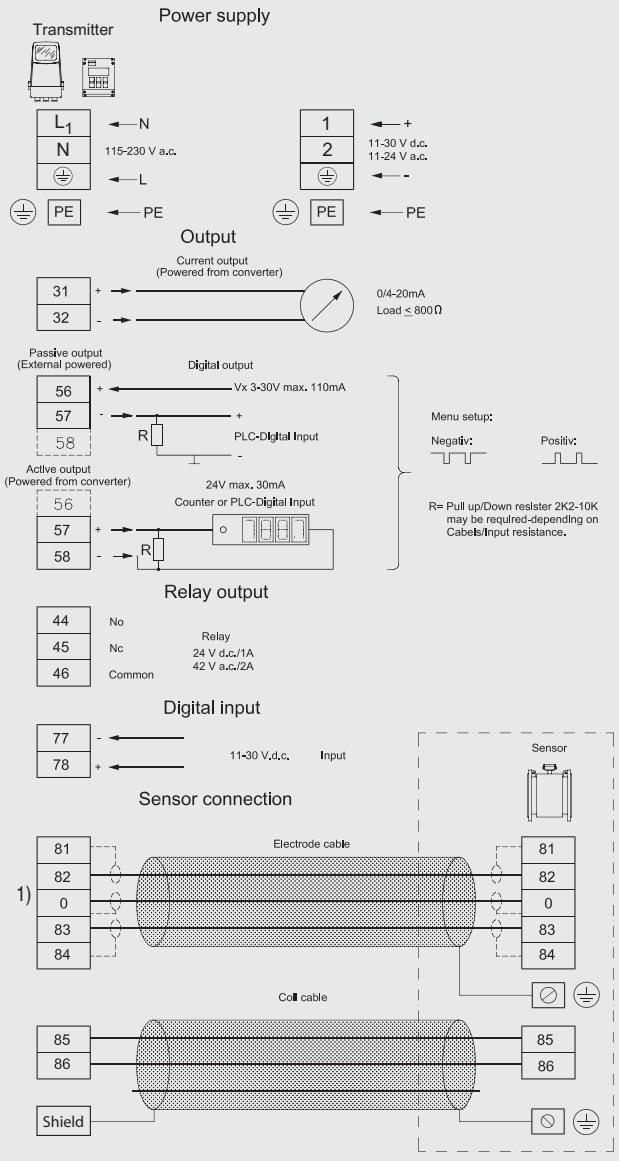
PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 µF capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

Output cables

If the output cable length is long in noisy environment, we recommend to use screened cable.



1) Note
Special cable with individual wire shields (shown as dotted lines) are only required when using empty pipe function or long cables

SECTION 11350

SCREW PRESS DEWATERING SYSTEM

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. The screw press equipment specified in this section shall be provided by a single supplier to ensure coordination and compatibility of equipment.

B. The screw press manufacturer is advised to familiarize themselves with the overall plant process in order to evaluate the compatibility of their equipment to dewater the particular sludge generated.

C. The manufacturer shall provide one (1) complete Screw Press dewatering system as specified herein. The system shall include the following: screw press unit, polymer dosing system, and control panel. The screw press dewatering system must be complete and integrated such that it can operate in a fully interlocked manner while achieving the performance requirements as specified in this document.

D. The dewatering system shall be designed to concentrate and dewater wastewater sludge by means of a screw press. The connected ancillary equipment as stated within this specification shall be supplied by the Screw Press Manufacturer to ensure system compatibility and system responsibility.

1.2 DESCRIPTION OF SYSTEM AND PERFORMANCE CRITERIA

A. Screw Press Operational Requirements: The Screw Press (referred to as "screw press" or "press" in the remainder of this document) shall meet the following operating parameters when processing the sludge specified.

1. The screw press unit shall be capable of meeting the performance criteria as set forth below:

a. Performance:

PARAMETER	REQUIREMENT
Sludge Type	Secondary Waste Activated Sludge
Sludge Feed Solids (% wt)	0.5 – 0.8
Solids Throughput (dry lb/hr)	123
Sludge Flow Rate (gpm)	31 to 49
Maximum Polymer Dosage (act. lb/dry ton)	60
Minimum Discharge Cake Solids (% wt)	14
Minimum Solids Capture (%)	95

B. Process Performance Test and Guarantee: Once a representative sludge has been established, the manufacturer shall operate the press at or above the required flow rate and solids loading for a minimum period of 6 hours with samples of feed, discharge cake, and filtrate collected hourly. Samples will be analyzed per ASTM standards for total suspended solids (TSS) and total solids (TS), and the results averaged. The average cake solids and polymer dosage must be better than the above requirements in order to demonstrate compliance. Should the screw press fail to meet the minimum standards specified, the following shall occur:

1. Plant operating procedures shall be reviewed to determine that the sludge is in fact representative of normal operation and within the design specifications.
2. If it is determined that the sludge is representative and within these specifications, the manufacturer shall make any modifications necessary to accomplish the specified performance levels.
3. If the sludge can be demonstrated as representative and within specified parameters and if the manufacturer cannot meet the performance, the owner may elect to have the manufacturer remove the unit and refund any monies paid.

1.3 QUALIFICATIONS

A. The screw press equipment shall be furnished by a single supplier who has a minimum of twenty years' experience in the manufacture of sludge dewatering equipment. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods, and shall be equal to Basis of Design.

B. The equipment manufacturer must meet all of the following criteria:

1. Equipment manufacturer shall be a certified UL508 panel shop for the last 10 years.
2. All buy-out items on the screw press shall be standard off-the-shelf mounts. The screw press manufacturer must also supply all of the original part numbers for all original equipment manufacturers' buy-out items as well as a list of local suppliers located near the installed location.

C. These specifications describe equipment of a certain level of quality and process capability. There are specific areas affecting process functions, operation and maintenance, and reliability under which no exceptions shall be allowed. These are as follows:

1. High Strength Tubular Stainless-Steel Frame Construction with Machined Bearing Pads.
2. 304 Stainless Steel Construction.

D. The balance of this specification shall determine the quality level under which equipment shall be reviewed.

E. The owner and engineer reserve the right to reject any bid that does not meet all of the machine requirements as detailed in this specification.

PART 2 - MATERIALS AND EQUIPMENT

2.1 GENERAL

A. The equipment covered by these specifications is intended to be screw press dewatering equipment of proven ability as manufactured by reputable concerns having long experience in the production of such equipment. The equipment furnished shall be designed and constructed in accordance with the best practice and methods.

B. All components of the sludge dewatering equipment shall be engineered for long continuous and uninterrupted service. Provisions shall be made for easy lubrication, adjustment, or replacement of all parts. Corresponding parts of multiple units shall be interchangeable. Except as otherwise specified, steel plates and shapes shall have a minimum thickness of 1/4" and bolts shall have a minimum diameter of 1/2".

C. All welding shall be in accordance with the latest acceptable codes of the American Welding Society ANSI/AWS D1.6.

D. All material used in the construction of the sludge dewatering equipment shall be of the best quality and entirely suitable in every respect for the service required. All structural steel shall conform to the ASTM standard specification for structural stainless steel, designation A554-MT304. All iron casting shall conform to the ASTM standard specification for gray iron casting, designation A48-76, and shall be of a class suitable for the purpose intended. Other materials shall conform to ASTM specifications where such specifications exist; the use of such material shall be based on continuous and successful use under the similar conditions of service.

E. Unless otherwise specified herein, all metal parts in contact with polyelectrolyte or sludge shall be type 304L stainless steel. All fasteners, pins, and anchor bolts shall be type 304L stainless steel.

F. All fiberglass-reinforced plastics (FRP) shall be manufactured in conformance with NBS standards PS15-69.

2.2 SURFACE PROTECTION

A. The main frame and other misc metals, excluding drives, shall be stainless steel per ASTM A554-MT304 specification. Buyout items will be covered with the following paint system:

1. First coat of Tnemec #66 epoxy of contrasting color to a minimum of four (4) dry mils thickness.
2. Apply a second coat of Urethane topcoat, finished color, minimum of four (4) mils thickness. Total thickness of the two (2) coats will be a minimum of eight (8) mils dry.
3. Flame sprayed galvanizing is not acceptable.

B. All pre-painted purchased equipment such as electrical motors, gear boxes, etc., are to be painted with a final coat of the above system.

C. The control panel enclosure shall be Nema 4 X constructed of type 304 stainless steel. Inside of the box shall be white.

2.3 MECHANICAL DETAILS

A. Main Structural Frame

1. The frame shall be fabricated from stainless steel structural members designed to adequately support all components and accessories. Steel shall meet the requirements of ASTM A554-MT304; all welding shall be performed in accordance with ANSI/AWS D1.6. Where frame components are bolted, stainless steel fasteners shall be used.
2. The fabricated steel frame shall be designed to withstand the maximum stresses imposed on the individual members with a safety factor of 5. Specifically, the maximum actual stress on any member, connection, plate, etc., shall not exceed 1/5 of the yield strength of the frame material used. The deflection ratio of any structural member shall not exceed L/600 where L is the member span.
3. Drip pans shall be fabricated of a minimum 14-gauge type 304L stainless steel and shall collect filtrate.
4. The framework shall be constructed in such a manner that it will insure absolute plane parallelism of all rotating elements by machined bearing pads.
5. The framework shall be of welded and/or bolted construction. No disassembled component shall weigh more than 5,000 lbs. Lifting lugs shall be provided as necessary to afford convenient access to maintenance points throughout the screw filter.

B. Flocculation/Conditioning System - To achieve rapid contact between sludge particles and a solution of dilute polyelectrolyte, provide:

1. One (1) 316L stainless steel, venturi mixer. The mixer shall be equipped with a Vortex polymer injection ring with four (4) tangentially mounted polymer injectors. The mixer shall be located upstream of the screw presses. The screw press manufacturer shall recommend the proper layout of the system.

C. Pressure Zone

With 1 Exception

1. The screw press shall be supplied with a tapered shaft design with a smaller diameter at the inlet and a large diameter at the discharge.
2. Designs that utilize a variable pitch with constant shaft diameter, or designs with two-stage shaft diameters are not allowed.
3. The basket assembly around the screw must be constructed of stainless steel with slotted openings to allow for maximum porosity and avoidance of small diameter holes that tend to plug.
4. Designs that utilize basket assemblies constructed of wedge wire or moving rings will not be allowed.
5. The design of the screw auger shall be a tapered shaft to reduce the volume and therefore provide an increasing pressure profile on the solids. The tapered shaft of the screw is designed to force the sludge closer to the slotted screen, thus reducing the path length for liquid to be expressed from the cake. The tapered shaft reduces the potential of plug formation, where the cake turns with the screw and is not conveyed to the discharge point.

6. The high-pressure section shall consist of a variable pressure cone shaped plate on the discharge opening of the screw press. The cone shall be pneumatically adjustable for automatic operation that avoids binding.
7. Units that do not include a pressure cone will not be considered.
8. The cone shall be actuated pneumatically in both directions.
9. Minimum effective filtration area of the pressure zone of the screw press shall be 56 sq. ft.

12" DSP has an area of 25 sq ft

D. Shower Wash System

1. A wash station shall wash the screw press. The wash system shall use high-pressure water spray nozzles. The spray assembly shall be housed in an enclosure in a manner that contains the spray pattern and mist within the housing assembly. The housing and nozzle assembly shall be readily removable. The housing shall be fabricated from type 304 stainless steel.
2. The screw shower shall be pneumatically actuated with an adjustable timer setting on the OIT.
3. The screw system shower bar shall have nozzles placed to wash both the basket and the inside of the enclosure for simplified operation.
4. Wash water required shall not exceed an average of 4 GPM per unit at 80 psi.
5. The shower system shall include a dual basket strainer.
6. Each screw press shall be provided with a 3 HP wash water booster pump that will be installed as shown on the contract drawings. The wash water booster pump shall be a Goulds model eSV or approved equal.
7. Each shower header shall include a motorized ball valve for remote control of the shower as well as for pre-set timed intervals to wash the equipment.

E. Drives

12" DSP has a 2.0 HP drive

With 2 exceptions

1. The screw press drive shall be a 3.0 HP variable speed with a variable frequency AC drive unit. Multiple belt drives shall not be acceptable.
2. The nominal input horsepower rating of each gear or speed reducer shall be at least equal to the nameplate horsepower of the drive motor. Each drive unit shall be designed for 24-hour continuous service.
3. Each gear reducer shall be totally enclosed, water spray proof, oil lubricated with anti-friction bearings throughout. All motors shall be TEFC.
4. The screw auger drive shall be a 3.0 HP, shaft-mounted motor and gear reducer assembly. The drive must be on the discharged end of the screw shaft to reduce wear on the screen and flights due to deflection of the screw shaft.

2.0 HP Drive

5. The drives shall be furnished with provisions for use on 480-volt, 60 hertz, 3-phase power supply.

F. Safety Guards -All equipment having exposed moving parts such as fans, V-belts, gears, couplings, chains, and including the pressure roll section, shall be provided with safety guards as required by OSHA standards.

G. Bearings

1. The shafts shall be equipped with heavy-duty greaseable type, self-aligning ball or roller bearings in sealed, splash proof housings. The housing shall be sealed to provide adequate protection from moisture and grime.
2. All bearings shall have a minimum B-10 bearing life of 500,000 hours based on ANSI-B13.6-1972. The B-10 bearing life of 500,000 hours shall be based on the maximum summation of all forces applied to the bearing.
3. Bearings and housings shall be US manufactured and shall be manufactured by FMC Corporation, Link-Belt Division, Indianapolis, Indiana; Reliance Electric Industrial Company, Dodge Division, Greenville, South Carolina, or approved equal.

H. Drainage Pans - Drainage pans shall be supplied as necessary to contain all filtrate and wash water within the unit and to reduce rewetting of downstream cake. Filtrate and wash water pans shall be constructed of minimum 14-gauge type 304 stainless steel. All drainage piping shall be furnished adequately sized for the intended service and rigidly attached to the press frame.

2.4 POLYMER FEED SYSTEM

A. General Requirements

1. The press manufacturer shall provide as a part of the total dewatering equipment package, One (1) polymer feed system capable of automatically metering, diluting, activating and feeding a liquid polymer with water.

B. Polymer Dosing Unit

1. Polymer and water shall be mixed in a chamber designed to create sufficient mixing energy. This design shall include a progressive cavity metering pump, solenoid valve and pressure regulator.
2. The pumps shall have an adjustable speed with a variable frequency drive. The pumps shall be supplied with a 1/2 hp, 120 volt AC motor.
3. A motor driven impeller mixer shall be provided that will mix the polymer and water into solution.

C. Polymer Feed Pump

1. The polymer system shall be equipped with progressive cavity pump each capable of pumping up to 5 GPH.
2. The pump shall be designed with a high viscosity wet end pump capable of pumping neat polymer solution to the mixing chamber.
3. The pump shall be a Seepex, Netzsch, or approved equal.
4. The drive motor shall be a variable speed, 1/2 horsepower, complete with an SCR control unit. The SCR control unit shall have local speed adjustment, ON-OFF switch and

running indication. The control unit shall provide adjustments of feed rate over a range of 20 to 1.

D. Dilution Capability

1. The primary dilution shall feed into the motorized mixing chamber and shall be capable of 1200 GPH.
2. The dilution capability shall be adjustable with a clear rotameter with a stainless steel float.
3. Furnish a solenoid valve or ON-OFF control of dilution water supply

E. Emulsion Unit Control Panel

1. Each polymer system shall be supplied with a NEMA 4X control panel that provides an automated mixing system. The controls for the polymer make-down system shall be supplied in the screw press control panel.
2. The control panel shall include all timers and relay for a complete manual and auto system. The polymer mixer chamber and metering pump shall turn on and the water solenoid valve shall open.
3. The polymer feed pump shall include start/stop indicating lights, potentiometer and local remote control.
4. The polymer mixer and polymer metering pump shall be provided with start/stop pushbuttons, indicating lights and motor starters.
5. Single phase, 120 volt, 60 Hertz power shall be supplied to the main control panel.
6. All devices within the panels shall be permanently identified. Nameplates shall be made of laminated phenolic materials with a black face and white core.

2.5 ELECTRICAL REQUIREMENTS

A. General Requirements

1. Provide one (1) control panel constructed of 304 stainless steel, NEMA 4X construction.
2. The panel shall be a full operating panel complete with all motor control and supervisory devices for press-mounted and ancillary equipment. All electrical work shall be performed in accordance with applicable local and national electric codes. The control panel shall include an Allen Bradley Compact Logix PLC and a 12” color OIT Panel View Plus 7 touch screen. An Ethernet connection shall be provided for communication with plant control system. Allen Bradley AC Power Flex 525 Variable Frequency Drives shall be used for each of the following individual components in the local control panels: Screw Press drive, and the Filtrate Recycle Pump drive.
3. The ancillary equipment to be controlled by this panel includes the sludge feed pumps, polymer blending unit, washwater booster pump, discharge conveyor system. The washwater booster pump will have a motor starter in the control panel. All motor starters and VFDs will be protected by in-line dedicated circuit breakers. The PLC will include logic for all necessary system interlocks and will control process and emergency shutdowns.

4. The controls shall be such that selection of the desired ancillary equipment is easily accomplished at the OIT touchscreen for the Screw Press.
5. Three phase, 460 volt, 60-Hertz power shall be supplied to the control panels. A control transformer will be provided for 120-volt, single phase power source for motor starter coils, lights, relays, timers, controllers, and other related items.
6. The control panel shall be provided with terminal blocks for power wiring to and from the panel. The incoming terminal blocks shall be provided with a single magnetic circuit breaker disconnect switch. Circuit breaker protected motor starters with thermal overloads shall be supplied for each motor furnished with the unit.
7. All electrical equipment controls located on each screw press shall have NEMA 4X enclosures and wired, through PVC conduit, to a single common NEMA 4X terminal box.
8. All devices within the panel shall be permanently identified. Nameplates shall be provided on the face of the panel or on the individual device as required. Nameplates shall be made of laminated phenolic materials with a white face and a black core.
9. The panel shall be designed for manual starting and stopping of all drives. A master manual / auto system switch shall be supplied to override the alarm system and allow operation of any drive through a momentary contact pushbutton. The control panel shall contain start/stop pushbuttons, run lights, and alarm indications for all ancillary equipment.
10. The operator interface terminal (OIT) touchscreen shall be equipped with a start/stop switch and run light for each adjustable piece of equipment. The screw drive, and polymer solution pumps as hereafter specified, shall also incorporate speed control and speed indication. The control panel shall include start/ stop pushbutton, run lights, speed control and 4 to 20 mA signal generators for the polymer solution and sludge pumps controls.
11. Alarm lights, sensors, and related circuitry shall be provided for the following functions: zero speed, emergency stop push button on each side of the press, low water pressure, and low air pressure. In the event of any of the above malfunctions, the machine will shut down and an alarm sound. The alarm system shall include an audible horn rated at 90 DBA at 10'. The system shall include silencing provisions, but the function alarm indicating light shall remain lit until the alarm condition is satisfied. A separate set of alarm contacts shall be provided for remote alarm indication.
12. Arrange control panel to allow either manual or automatic control of screw press equipment. When “MANUAL” operation is selected, all equipment associated with the screw press shall be controlled by “START/STOP” pushbuttons. When “AUTOMATIC” operation is selected, control of equipment shall be “AUTOMATIC/START” and “AUTOMATIC/STOP” pushbuttons, and programmable controller:
    a. Local screw press control panel shall include OIT touchscreens with the following:
        1) One control mode selector switch marked “AUTOMATIC/ MANUAL.” When “MANUAL” operation is selected, all equipment associated

with screw press shall be controlled by "START/STOP" pushbuttons. Provide one "START" and one "STOP" pushbutton for each of the following:

a) Screw Press Drive.

b) Sludge Pump

c) Polymer Pump

d) Discharge Conveyor.

2) One speed potentiometer for manual adjustment of each drive speed.

3) Digital indicators for sludge feed flow rate. Indicators shall accept 4 to 20 mA DC field input and shall be calibrated in gpm.

4) Green indicating lights for "RUNNING" status for each unit operated from panel, including wash water solenoid valve energized indication.

5) Red indicating lights for "OFF" status for each unit operated from panel, including wash water solenoid valve de-energized indication.

6) One each "AUTOMATIC/START" and one "AUTOMATIC/STOP" momentary pushbuttons, for automatically starting and stopping each screw press system. Sludge cake conveyor shall be manually controlled when screw press control mode selector switch is in the "MANUAL" position.

7) One "EMERGENCY STOP" red mushroom pushbutton.

13. Automatic Controls and Sequencing:

a. General:

1) Program the PLC for automatic control of screw press, system sequencing, and interlock functions as specified.

2) Configuration and programming of PLC system shall be the responsibility of screw press manufacturer. System documentation including memory loading, I/O configuration and programming shall be provided.

3) Provide and install auxiliary relays and wiring for equipment and devices specified in this Section required for implementing functional requirements specified.

b. "AUTOMATIC START/AUTOMATIC STOP" Cycle (typical for all screw presses):

1) Automatic start cycle request to PLC shall be initiated by "AUTOMATIC/START" pushbutton.

2) Control logic for an "AUTOMATIC/START" cycle shall start screw press in the following order after "AUTOMATIC/START" command has been initiated and interlocks are complete.

a) Wash water motorized ball valve.

b) Screw Shower "Pre-Wash"

c) Discharge conveyors.

d) Screw press drive.

e) Polymer solution pump drive.

f) Sludge feed pump drive.

3) Each drive shall not start until previous drive is running and necessary time delay has elapsed. The screw press manufacturer shall determine where time delays are required and shall program settings to provide smooth start-up of equipment.

4) Once all drives are confirmed running by motor run contacts from their respective starters, PLC shall cause the run indicating light to illuminate. Loss of run status contact for a drive once cycle logic is complete shall shut down screw press and associated equipment.

5) Upon "AUTOMATIC /STOP" command, system shall shut down in order that is reverse of specified start-up order with necessary time delays.

c. Interlocks: The following interlocks shall be satisfied when control mode selector switch is in either "AUTOMATIC" or "MANUAL" position. Failure of any one signal during start cycle or after cycle is complete shall shut down all associated screw press equipment.

1) Sludge cake conveyors servicing the screw press shall be operating and confirmed by conveyor zero speed switches.

2) Washwater must be on and sufficient washwater pressure must be sensed at a specified level.

3) Air pressure must be sensed at a specified level.

4) Polymer activation tank level must be at specified level.

5) Control mode selector switch shall be in "AUTOMATIC" position.

6) "EMERGENCY STOP" pushbutton shall be in operating position.

14. Annunciation and Alarms:

a. Provide audible alarm and detailed alarm history in screw press control panel for alarming of the following:

1) Screw drive failure.

2) Local emergency stop initiated at either screw press control panel, screw press frame-mounted buttons or conveyor pull cord switches.

3) Pump/VFD fail at sludge feed pump.

4) Low wetwell level for sludge feed.

5) Low washwater pressure.

6) Low air pressure.

7) Discharge conveyors zero speed switches.

8) Polymer pump failure.

9) Sludge pump failure.

10) Polymer activation tank low level alarm.

b. Wire all alarms to PLC system for relaying to remote location.

15. Additional stations shall be included as hereinafter specified for other ancillary drives or systems.

B. Electric Motors furnished with this equipment shall meet the following requirements:

1. Rated for continuous duty at 40^{o}C ambient and insulated with a minimum of Class F insulation, with Class B temperature rise. All motors shall be totally enclosed, fan cooled or non-ventilated. All motors supplied shall be rated at 150% nameplate horsepower of the required horsepower maximum service condition.

2.6 AIR COMPRESSOR

A. A complete pneumatic system shall be provided and shall include an air compressor and air drier. This package shall include pump, motor, valves, air tank, all controls and piping as necessary to provide a complete and operating system. The unit shall include a low-pressure switch, system pressure gauge, and pressure relief.

B. The air compressor shall be an Ingersoll Rand T30 2 stage compressor with a 5 HP TEFC motor.

C. The air drier shall be an Ingersoll Rand D31EC.

D. The air compressor unit will be floor mounted away from the press to eliminate wash down spray.

E. The installation contractor shall supply air tubing from the air compressor unit to the press. The contractor shall include quick disconnects for air hose connections.

2.7 FLOW METER

A. The screw press manufacturer shall supply a totalizing flow meter for the screw press, as supplied by Siemens or approved equal. Each flow meter shall include a 3” ANSI flange connection, a digital display, and 30 feet of display cord.

B. The electromagnetic induction flow meter shall generate a voltage linearly proportional to flow for full-scale velocity setting from 2 to 33 feet per second. Standard accuracy of plus output shall be +/- 0.5% of rate for all meters.

C. The meter shall incorporate a high impedance amplifier of 1012 ohms or greater, eliminating the need for electrode cleaning systems the meter shall utilize bipolar pulsed DC coil excitation with auto-integrated zeroing each half-cycle. Manual zero adjustments shall not be required – even at start-up. Power consumption shall be no more than 15 VA, independent of meter size. Input power required will be from 85 to 260 VAC, 46-65 Hz, with DC input option available.

D. The magnetic flow meter shall be microprocessor based with integral electronics. The electronics shall be interchangeable for all sizes from 1/12” to 78”. The housing is to be powder coated cast aluminum with a NEMA 4X rating.

E. The meter's analog and pulse outputs shall be independently selected by push buttons. The analog output shall be an isolated 4-20mA DC into 700 ohms load. The pulse output shall be an open collector output with a maximum frequency of 1,000 Hz with configurable pulse width (0.5 to 2 sec). An open collector status output shall indicate either system or process error or flow direction. An auxiliary input shall be available to positive zero return. A low flow cutoff will be standard which can be turned on or off by pushbuttons.

F. A 2-line, 16-digit LCD backlit display shall indicate flow rate and/or total flow. The totalizer value is protected by EEPROM during power outages, and utilizes an overflow counter. The display shall also be capable of indicating error messages such as empty pipe condition, error condition and low flow cutoff.

PART 3 - INSTALLATION

3.1 INSTALLATION SUPERVISION

A. The manufacturer shall provide the services of a qualified factory representative to advise the installing contractor on proper installation, setting, piping, and wiring procedures. The installing contractor is responsible for all interconnections between the supplied equipment and plant utilities, including but not limited to, all piping, valves, wiring, conduits, foundation work, building and concrete work. The manufacturer shall provide two (2) days onsite over one (1) trip for installation supervision.

3.2 OPERATION & MAINTENANCE MANUALS

A. Two (2) paper copies and an electronic copy (in .pdf format) of operation and maintenance manuals shall be furnished. The manuals shall be prepared specifically for this installation and shall include detailed operating and maintenance instructions and specifications relative to the assembly, alignment, checking, lubrication, placing in operation, adjustment, and maintenance of each unit of equipment and auxiliaries furnished under this contract, together with complete parts lists, copies of dimension drawings, electrical drawings, and a copy of the manufacturer's start-up report.

3.3 START-UP SERVICES

A. Before the equipment is started up, the manufacturer shall make a thorough inspection of the installation to make sure the press has been installed properly and that all equipment relating to it has been installed according to the needs of the press. The equipment manufacturer shall provide two (2) days onsite over one (1) trip for mechanical check-out and pre-startup inspection.

B. The manufacturer shall provide three (3) days over one (1) trip of onsite services of a qualified factory representative to place the units in operation and conduct performance testing. The owner shall assist the manufacturer by starting up and operating all support systems such as water, sludge feed pumping, polymer mixing, electrical power and instrumentation, and other ancillary equipment as needed. The services provided by the manufacturer shall be as detailed in the O&M manuals and shall include at least the following:

1. Check equipment alignment and assure that there are no unusual internal stresses.
2. Calibrate all instrumentation.

3. Check systems to insure proper operation.
4. Check lubrication in all drives.
5. Check Motor rotations, etc.
6. Adjust spray wash angles and discharge cone pressure system.
7. Start the drives and assure they are operating properly with no binding and with correct rotation.
8. Ensure that all ancillary systems have been properly adjusted, including polymer and sludge feed.

3.4 TRAINING SUPERVISION

A. During the start-up procedures, the equipment manufacturer shall provide training to the owner's employees for proper operation and maintenance of the sludge dewatering equipment.

B. At a minimum, the manufacturer shall make an additional two (2) follow-up training and inspection trips after the equipment has been in operation at least 90 days at the owner's request.

PART 4 - MISCELLANEOUS

4.1 SPARE PARTS

A. The screw press manufacturer shall provide the following spare parts to the Owner.
   1. Ten (10) spare spray nozzles.
   2. Two (2) relays of each type and size.
   3. One (1) full set of screw wipers.

END OF SECTION