

CONTRACT PROVISIONS AND PLANS

FOR THE CONSTRUCTION OF:

Salmon Creek Treatment Plant Dewatering Equipment Replacement

VOLUME IV – PRE-SELECTED FKC DEWATERING EQUIPMENT
QUOTE AND SUBMITTALS (PROVIDED AS PART OF
ADDENDUM 01, DATED 04MAR26)

Discovery Clean Water Alliance Project No. 93-2021-0058

A Discovery Clean Water Alliance Capital Project with Clark Regional Wastewater
District as Administrative Lead



CLARK REGIONAL WASTEWATER DISTRICT
8000 N.E. 52nd COURT
VANCOUVER, WASHINGTON 98665
(360) 750-5876
FAX (360) 750-7570
crwwd.com

March 2026



To: ALL BIDDERS

Date: March 4, 2026

Re: District Project 93-2021-0058

SCTP Dewatering Equipment Replacement

FOR REFERENCE

VOLUME IV – FKC CO, Ltc. - CONTRACT PACKAGE

In an effort to expedite the overall project construction schedule, the Clark Regional Wastewater District has procured the following and included same as a supplemental reference package to assist contractors in preparation of bid proposal and eventual generation of a contract with FKC Co. The District has only procured the pricing and submittal information to be used by and included in the Contractor's bid package as part of their scope of work in order to deliver the project.

INCLUDED:

- 1) **SCOPE OF SUPPLY** as defined by Section 41 12 13.16 (Shaftless Screw Conveyor) / 46 71 01 (Temporary Sludge Dewatering Facilities – partial) / 46 76 27 (Screw Press Dewatering Systems (46 76 27) of the bid documents (11 pp).
- 2) **QUOTE** as referenced in the scope of supply and to be carried by the Contractor's bid on in line Item #3 of the bid form.
- 3) **SUBMITTAL PACKAGE ONLY** has been pre-purchased by the District and attached for reference. This effort was made to save on schedule so once contract is negotiated with FKC Co. Ltd., the Contractor could release the equipment for fabrication. The submittal information includes the following:
 - a) Submittal 467627-001.2: Process mechanical package (screw presses, flocculation tanks, screw conveyor, and slide gate) [129pp]
 - b) Submittal 467101-001.0: Temporary dewatering package including temporary conveyor used to move dewatered sludge into biosolids bunker #3. [37 pp]
 - c) Electrical & controls package submittal is still in the approval process and will be shared with the low and responsive bidder after the award of the contract.
- 4) All other submittal requirements in the specifications regarding the dewatering equipment system, as required by sections 41 12 13.16, 46 71 01 and 46 76 27 will be the responsibility of the Contractor to obtain, review, submit, and procure approval. These items include, but are not limited to:
 - i) Certificate of unit responsibility
 - ii) Stamped & signed anchorage calculations
 - iii) O&M manuals
 - iv) Equipment warranties
 - v) Factory acceptance testing procedures & forms

- vi) Factory testing and inspection results
- vii) Site storage requirements
- viii) Field testing plan and submittals
- ix) Field testing results
- x) Any as-built conditions packages

Bob Sanguinetti / *Construction Program Manager*
Clark Regional Wastewater District

FKC CO., LTD.

2708 West 18th Street
Port Angeles, WA 98363



(360) 452-9472
FAX (360) 452-6880

November 5, 2025

Quinn Behnke, P.E.>

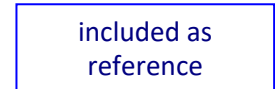
Brown and Caldwell
Portland, OR

Email: qbehnke@brwncald.com

Re: FKC Co., Ltd. BHX-1350x7500L
Salmon Creek WWTP / Clark Regional Wastewater District



via email



Attached is a proposal for FKC's BHX 1350x7500L, which has a capacity of 11.0 BDST/D or 916 Dry Lbs. / Hr. of sludge. In summary the following equipment is included:

- (2) BHX-1350x7500L screw press
- (2) 540GL flocculation tank
- (2) Standard Control Panel
- (2) Headbox level transmitter
- (2) Hi-Hi Level Flocc Tank Probe
- (1) 14" Shaftless Screw Conveyor, 40' Long
- (1) 12" Shaftless Screw Conveyor, 37' Long – Temp Install

Additional ancillary equipment necessary for a complete dewatering system such as pumps, polymer systems, valves, disposal bin, etc. are not included. We can quote these if desired.

Along with this pricing you will find information on other miscellaneous information such as delivery, payment terms, warranty, and performance guarantees.

We hope this information is helpful. Please contact this office if you have questions or require any further information.

Thank you,

Paul Kohl

Paul Kohl
FKC Co., Ltd.

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A. Proposed Equipment

1. Screw Press

| Quantity | Description |
|----------|---|
| 2 | FKC Screw Press Model BHX 1350x7500L |
| | Material to process: Anaerobic |
| | Inlet Consistency: 2.0% Total Solids |
| | Average Flow: 91 gpm @ 2.0 % Total Solids (polymer excluded) |
| | Average Solids Thru put: 916 dry pounds per hour 11.0 BDST/D |
| | Outlet Consistency: 15% or greater w/ polymer use |
| | Solids Capture: 92% minimum |
| | Typical Operation: 24 hours per Day |

A. Proposed Equipment

2. Flocculation Tank

| Quantity | Description |
|----------|-------------|
|----------|-------------|

2 FKC Flocculation Tank
Model 540GL

Material to flocculate: Anaerobic

Inlet Consistency: 2.0 % Total Solids

Average Flow: 91 gpm @ 2.0% Total Solids (polymer excluded)

Ave Detention Time: 5.9 minutes @ 2.0% Total Solids

Materials of Construction:

| | |
|--|---------------------|
| Tank | 304 Stainless Steel |
| Covers | 304 Stainless Steel |
| Agitator Support Stand | 304 Stainless Steel |
| Agitator Blades & Shaft | 304 Stainless Steel |
| Fasteners (B,N,W,Clips) in wetted area | 304 Stainless Steel |

Other: 1 Hi-Hi Level Floc Tank Probe

Speed Reducer: SEW Standard
with VFD speed adjustment

Motor: Toshiba C-face severe duty motor or equivalent
1.5 HP, 460V, 3ph

A. Proposed Equipment

3. Control Panel

| Quantity | Description |
|----------|-----------------|
| 2 | System Controls |

Screw Press Control Panel (60" x 36" x 16" NEMA 4X (304SS), Wall Mount w/ leg kit) including:

- Allen Bradley 5069-L310ER Processor w/ Ethernet Connection
 - Including:
 - 32 Digital Inputs
 - 16 Digital Outputs
 - 8 Analog Inputs
 - 8 Analog Outputs
- Allen Bradley, PanelView 5510, 10"
- Allen Bradley, Stratix 5200, Managed, 8-Port Copper, 2-Port Combo
- (Qty.1) Floc Tank Mixer VFD, 2 HP PowerFlex 525 w/ 3% Line Reactor & Ethernet Connection.
 - o HOA, running light, fail light & potentiometer.
- (Qty.1) Screw Press VFD, 7.5 HP PowerFlex 525 w/ 3% Line Reactor & Ethernet Connection.
 - o HOA, running light, fail light & potentiometer.
- (Qty.1) Conveyor Motor Starter, 7.5 HP IEC rated contactor.
 - o HOA, running light & fail light.
- (Qty.1) Conveyor Slide Gate
 - o Open-Close-Auto, open light & close light.
- Process Stop on Panel Door
- UPS 1000VA
- Air Conditioner – 1800 BTU
- TVSS & 480/120 VAC Transformer
- 120 VAC Power for (Qty. 1) - Polymer System
- Controls for (Qty. 5) – Washwater Solenoids.
- Controls via ethernet – Sludge feed pump & Polymer System

Instrumentation List

- (Qty. 2) Floc Tank Hi-Hi Level Switch (Warrick 316SS Probe w/ Electronics Module)
- (Qty. 2) Conveyor Discharge Hopper Hi-Hi Level Switch (Warrick 316SS Probe w/ Electronics Module)
- (Qty. 2) Headbox Level Transmitter (IFM 2" Sanitary Connection)

Spare Parts List

- (Qty. 10) Of each type of fuse used.
- (Qty. 2) Of each type of relay used.
- (Qty. 5) Of each type of light used.

A. Proposed Equipment

4. Shaftless Screw Conveyors

| Quantity | Description |
|----------|--|
| 1 | <p>14" Shaftless Conveyor (Screw Press Collection) Approximately 40ft Two (2) Screw Press to Conveyor inlet hopper One (1) Slide Gate 7.5 HP, 460V, 3ph, 1800 rpm motor</p> <p>Reducer: SEW Eurodrive, Type FAZ, Parallel Shaft Helical Gearmotors with stainless steel endcap and AM type "C" face adapter</p> <p>Spiral Flighting: Diameter of 14" minimum, 3" wide x 1" thick spiral. Spring effect at full load will not elongate more than .08" per foot of length. 8620 steel material. Drive end of flighting to include shop installed torque plate for bolting to drive shaft. Shop/field full penetration welds at all splice connections.</p> <p>Troughs: 10-gauge, 304 stainless steel formed flange u-troughs fabricated in maximum 8' lengths. Trough end plates will be minimum 3/8" thick 304 stainless steel. The screw conveyor trough will be provided with two 2-inch threaded out at the inlet end.</p> <p>Trough Liners: 1/2" thick UHMW trough liner in 4' long sections. Liners held in place with 304 stainless steel 1/2" square bar retaining rods.</p> <p>Covers: 10-gauge 304 stainless steel formed conveyor covers in maximum 48" lengths. Covers will be gasketed and bolted to trough flange.</p> <p>Inlet Chutes: Fabricated from 10-gauge, 304 stainless steel with inlet to match the Screw Press or other conveyor outlets and the slope of the conveyor (if applicable).</p> <p>Conveyor Supports: 3" x 3" x 1/4" 304 stainless steel angle as required.</p> |
| 1 | <p>12" Shaftless Conveyor Temp Install Approximately 40ft One (1) Screw Press to Conveyor inlet hopper 5.0 HP, 460V, 3ph, 1800 rpm motor</p> |

B. Miscellaneous

1. Delivery

Delivery will be within eight (8) months after approved submittals and notice to proceed with manufacturing.

2. Shipping Arrangements

The FKC screw press will be shipped via open top container from FKC Ishinomaki, Japan factory to a local port then best way overland to the WWTP.

Purchaser is responsible to remove the top of the container, unload the screw press and other miscellaneous crates/boxes via a crane, then replace and close up the container.

The flocculation tanks and other ancillary equipment provided will be delivered on a flatbed trailer from the FKC Port Angeles, WA facility then best way overland to the WWTP.

3. Price Summary

| Qty | Description | Price |
|--------------------------------|--|--------------------------------|
| 2 | Screw Press Model BHX-1350x7500L | \$1,500,000 |
| 2 | Flocculation Tank Model 540GL | Included |
| 2 | Control Panels | Included |
| 2 | Headbox Level Transmitter | Included |
| 2 | Hi-Hi Level Floc Tank Probe | Included |
| 1 | 14" Shaftless Screw Conveyor, 40' Long | \$96,000 |
| 1 | 12" Shaftless Screw Conveyor, 37' Long | \$65,000 |
| 1 | Submittal Package | \$250,000 |
| Total FOB Vancouver, WA | | \$ 1,911,000 |

temp conveyor

Pricing does not include taxes or bonding.

By Clark Regional
Wastewater District

Total cost carried in
Contractor bid before taxes
= \$1,661,000 (before tax)

4. Purchase Options Offered

No purchase options are offered at this time.

5. Effective Period

This proposal shall remain valid 30 days from the date of the proposal.

6. Payment Terms

30% with approved drawings & submittals
70% with delivery

Net 30 days

FKC realizes that up to 10% of the total purchase price may be retained until final performance testing and acceptance are completed or 1 year after delivery, whichever comes first.

7. Installation

The screw press is shipped as one piece. The screw press motor and coupling will require field installation by Purchaser.

Each piece of equipment offered is loose and separate. Purchaser would need to unload, field assemble, install and provide utilities and connections to and in between all pieces of equipment offered in this proposal.

Anchor bolts are to be provided by the Contractor.

Installation and erection assistance are not included in the price of the equipment and generally are not required. However, the service is available for our standard service rates found in paragraph B.12.

8. On-Site Services

Seven (7) days of on-site services are included with the price of this proposal. Each day consists of one man 8-hour day. Holidays and weekends days are not offered for on-site services. Time of on-site service is exclusive of travel time.

On-site services can include installation inspection, start-up, testing, calibration, performance, optimization, and training for the equipment. Operator & maintenance instruction is usually completed in one (1), 8-hour day. Performance testing normally occurs within two (2) consecutive days of operation.

9. Warranty

- A. Warranty shall extend for 12 months after start-up or 18 months after delivery, whichever comes first.
- B. Warranty shall include all parts, labor, and coatings for repairing or replacing equipment that fails during the warranty period. Defects occurring within the warranty period shall be repaired or replaced by the manufacturer at no cost to the OWNER.

10. Performance Guarantee

The performance figures and conditions denoted in section A of this proposal constitute FKC Co., Ltd.'s performance guarantee and the conditions required to meet the guarantee. All of the consistency figures are based on total solids (TS) not total suspended solids (TSS).

In the event that performance is not met, FKC will provide all parts, engineering, and labor associated with the work necessary to bring the equipment into conformance with the performance guarantee.

11. Documentation Schedule

- a. Submittals for Approval – Screw press and flocculation tank submittals and drawing within 4-6 weeks of written purchase order. Control panel submittal and drawing within six (6) weeks after receipt of purchase order.
- b. Certified Drawings - within 2 weeks after submittal approval
- c. Operation & Maintenance Manuals – before delivery of equipment

12. Spare Parts List

The following spare parts are provided with this quotation:

1. Screw Press
 - a. 4 each screens per screw press
 - b. 1 each motor coupling per screw press
2. Flocculation Tank
 - a. None.
3. Optional Spare Parts - \$55,000 adder
 - a. 1 cyclo gearbox for the screw press
 - b. 1 motor for the screw press

13. Service Rates

Note: For off-site work beyond this quotation scope of supply, final billing of airfare, lodging, and rental car expenses will be based on actual costs plus 10% for administrative costs.

Weekdays

\$2,015.00 - per eight (8) hour day on weekdays plus, lodging, & rental car expenses.

\$378.00 - per hour for all hours exceeding eight (8) hour workday on weekdays.

\$252.00 - per hour for office engineering services and telephone consultations.

Saturdays, Sundays and Holidays

\$3,025.00 - per eight (8) hour day plus lodging and rental car expenses.

\$567.00 - per hour for all hours exceeding eight (8) hour workday.

Travel Time - Weekdays

\$158.00 - per hour travel time.

Travel Time – Weekends and US Holidays

\$206.00 - per hour travel time

14. Notes and Clarifications

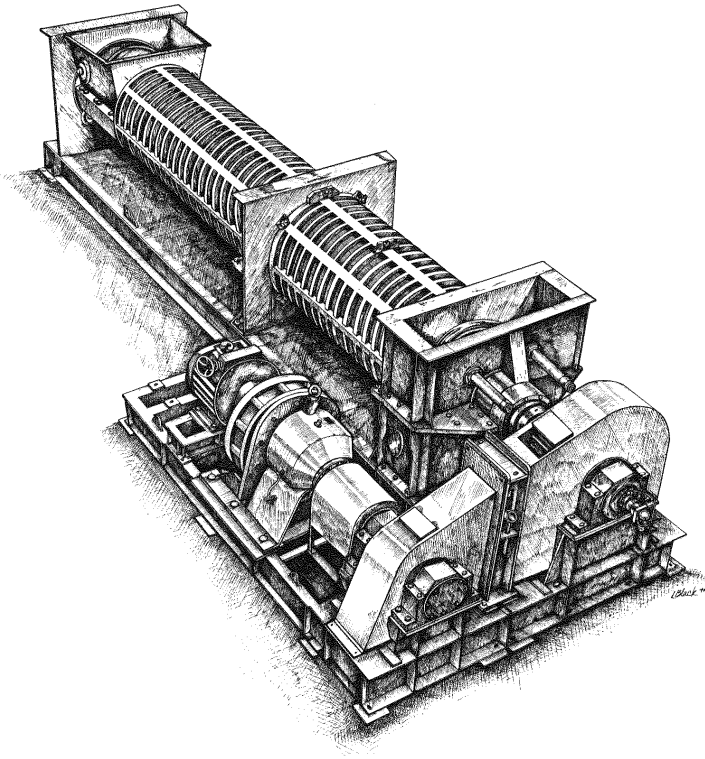
a. Screw Press and Flocculation Tank

- Supply of the anchor bolts is by purchaser.
- FKC proposal does not include the supply of polymer, grease, oil, water, sample containers, or lab testing of samples.



SCREW PRESS

**Submittals:
Screw Press
Salmon Creek WWTP
Vancouver, WA**



- ✘ Screw Press
- ✘ Flocculation Tank
- ✘ Conveyor

SUBMITTAL 467627-001.2

RELEASED to FKC for review

03_467627-001.2 FKC Dewatering BC Review.pdf

Clark Regional Wastewater District / Bob Sanguinetti

03/04/2026 9:28:48 AM

**Proj. 93-2021-0058 – SCTP Dewatering Equipment Replacement
SUBMITTAL REVIEW COMMENTS**

| | | | | | |
|-----------------------------|---------------------------------------|--------------|---|--------------------------------|-----------|
| Submittal No.: | 46 76 27-1 | Rev.: | 2 | Date Received: | 1/28/2026 |
| Reference Paragraph: | 1.03 | | | | |
| Submittal Title: | FKC Dewatering Equipment – Mechanical | | | Date Due to Contractor: | |

| | | | |
|---|---|---|---|
| Review is for general conformance with the Contract requirements and shall not relieve the Contractor of responsibility for any errors or omissions in such Submittals. | Review Action Legend: | Reviewer: | G. Dick, M. Koh, I. Howard, A. Moore |
| | Code 1 – No Exceptions Taken Code 2 – Make Corrections Noted Code 3 – Amend and Resubmit Code 4 – Rejected and Resubmit Code 5 – Not Subject to Review | Date Returned: | 3/2/2026 |
| | | Overall Review Action: (See Legend) | 3 |

| Item No. | Rev | Submittal Section/ Spec Reference | Review Action | Reviewer | Reviewer's Comments | Contractor's Response | Response Accepted? | Status |
|----------|-----|---|---------------|----------------------|--|--|--------------------|--------|
| 1 | 1 | 46 76 27 2.03.D Page 4 of 105 | 3 | G. Dick I. Howard | Provide two (2) polymer injection rings for installation upstream of the flocculation tank. | Added (2) 6" polymer injection rings | Yes | Closed |
| 2 | 1 | 46 76 27 1.06. B Pg 6 of 105 | 3 | G. Dick I. Howard | Specification state minimum 18% cake solids | See attached exceptions and clarifications sheet. | Yes | Closed |
| 3 | 1 | Page 4 of 105 and page 10 of 105 | 2 | G. Dick I. Howard | Page 4 shows approximately 37 ft; page 10 shows approximately 40 ft. Correct as needed. | Updated to 37 ft | Yes | Closed |
| 4 | 1 | 46 76 27 3.03.C Pg 12 of 105 Submittal | 3 | G. Dick I. Howard | Specifications calls for 10-days of onsite installation, 3 days for functional testing and 5 days of training, total of 18 days compared to 7 days listed. | Updated to meet specifications. See attached exceptions and clarifications sheet for more details. | Yes | Closed |
| 5 | 1 | 46 76 24 3.06A Pg. 12 of 105 | 3 | G. Dick I. Howard | Specification request 2 years after performance testing. Includes 1 year inspection compared to 12 months after start-up or 18 months after delivery. | Updated to meet specifications | Yes | Closed |
| 6 | 1 | Pg 15 of 105 and 7 of 105 | 3 | G. Dick I. Howard | Pages state 5 and 7.5 HP respectively, confirm and correct. | Updated Scope of Supply to state 5 hp motor | Yes | Closed |
| 7 | 1 | 46 76 27 2.03.C.4 Pg 19 of 105 | 3 | G. Dick I. Howard | each screw press shall be equipped with minimum of three (3) 6-inch vents to be connected to the odor control system. | Updated drawings to show 6-inch vents | Yes | Closed |

| Item No. | Rev | Submittal Section/ Spec Reference | Review Action | Reviewer | Reviewer's Comments | Contractor's Response | Response Accepted? | Status |
|----------|-----|---|---------------|----------------------|--|---|--------------------|--------|
| 8 | 1 | 72-M-301 | 2 | G. Dick I. Howard | Provide screw press with 12" filtrate connection | Updated filtrate connection to 12" | Yes | Closed |
| 9 | 1 | 46 76 27 2.03.B.2 | 3 | G. Dick I. Howard | The floc tank shall be equipped with a 6" nozzle for connection to the odor control system. | Updated drawing to show 6-inch vent | Yes | Closed |
| 10 | 1 | Pg 68 of 105 | 3 | G. Dick I. Howard | Provide weight of trough covers. Requested cover maximum length is 4'. | 5' cover weighs 50 lbs. See attached exceptions and clarifications sheet for | Yes | Closed |
| 11 | 1 | Pg 68 of 105 | 3 | G. Dick I. Howard | Provide capacity of screw conveyor in terms of cubic feet per hour and wet tons per hour. Provide maximum screw speed in rpms and fill capacity. | Added conveyor calculations | Yes | Closed |
| 12 | 1 | Pg 68 of 105 | 3 | G. Dick I. Howard | Provide conveyor with a minimum of 4" drain. | See attached exceptions and clarifications sheet for more deta | Yes | Closed |
| 13 | 1 | Pg. 10 and Pg 68 of 105 | 3 | G. Dick I. Howard | Table on page 68 differs from material shown on page 10 including cover length and gauge thickness of trough. Confirm and correct. | Scope of supply updated to match the conveyor BOM | Yes | Closed |
| 14 | 1 | Pg. 96 of 105 | 3 | M. Koh | Actuator voltage for 72G4301 was engineered to be 480 VAC. If 120/240 VAC is required, please submit deviation. | See attached exceptions and clarifications sheet for more details: The slide gate actuator is powered from the screw press control panel. Our standard is 120 VAC. | Yes | Open |
| 14 | 2 | Pg 102 of 125 Contract Drawing I-104 | 2 | M. Koh | The Owner would like the conveyor and gate power and control to be removed from the scew press control panel. This way, the conveyor and gate can still operate if one of the screw press panels is shut down. See comments on control panel submittal 467627-2.0. Remove conveyor power and control from FKC control panel. Coordinate with the Contractor. FOR CONTRACTOR: Design drawings currently show the Gate 72G4301 being powered by 480VAC from PP5B1. Submit RFI to Owner and Engineer with a proposed power source for the 120 VAC Gate. | | | |

| Item No. | Rev | Submittal Section/ Spec Reference | Review Action | Reviewer | Reviewer's Comments | Contractor's Response | Response Accepted? | Status |
|----------|-----|---|---------------|----------|--|---|--------------------|--------|
| 15 | 1 | Pg. 105 of 105 46 76 27 - 1.03.C.3 | 1 | M. Koh | Provide Control Panel Designs, Shop Drawings, and Data Sheets in forthcoming submittal | Control Panel was submitted on January 5th, 2026 | Yes | Closed |
| 16 | 1 | Pg. 68 of 105 | 3 | M. Koh | Provide Emergency Shut Down Pull Cord for conveyors | See attached exceptions and clarifications sheet for more details: Since the conveyor is below the platform, a pull chord would not be accessible. If there was a pull chord and it got tripped, you would be able to reach the reset button. No pull chord is recommended. | Yes | Closed |
| 17 | 1 | Pg. 15 of 105 | 3 | M. Koh | Provide Instrumentation as shown on contract drawings including floc tank level switch and screw press level transmitter. | Instrumentation was submitted with the control panel submittal. | No | Open |
| 17 | 2 | Pg. of 125 | 3 | M. Koh | Control panel submittal did not contain instrumentation. Provide instrumentation under this cover per the scope of supply (page 10). BC acknowledges the zero speed switch was submitted, but other instrumentation is missing: level switch for floc tank, screw press headbox level transmitter. | | | |
| 18 | 1 | Email: Quinn and Roger 46 76 27 - 2.07.F | 3 | M. Koh | Provide Screw Press Feed Pump monitoring and control from the Screw Press Control Panel. Provide Screen on HMI of the Screw Press Control Panel for monitoring and control. Spec Section 46 76 27 - 2.07.F was updated to include this new requirement. | See attached exceptions and clarifications sheet for more details: The sludge feed pump will be monitored and control by the screw press control panel via SCADA. See control description added to the submittal package | Yes | Closed |
| 19 | 1 | 46 76 27 - 1.03.C.3.b | 3 | M. Koh | Provide motor schematics for the motor control | Motor control was submitted with the control panel submittal. | Yes | Closed |
| 20 | 1 | 46 76 27 - 1.03.C.3.f | 3 | M. Koh | Provide Control description in conformance with this section and the strategies in 40 61 96. | Added control description. | Yes | Closed |
| 21 | 1 | Pg. 16 of 105 Pg. 17 of 105 | 3 | A. Moore | Match screwpress spacing dimensions shown in 1/72-S-102; distance between | Drawings have been updated. | Yes | Closed |

| Item No. | Rev | Submittal Section/ Spec Reference | Review Action | Reviewer | Reviewer's Comments | Contractor's Response | Response Accepted? | Status |
|----------|-----|---|---------------|----------|--|--|--------------------|--------|
| | | | | | units measured center-to-center = 9'-9" (117"). | | | |
| 22 | 1 | Pg. 16 of 105 | 3 | A. Moore | Confirm dimension between centerline of conveyer and centerline of flocculation tanks; dimension as modeled on 1/72-S-302 = 30'-11 1/4" (371 1/4"). | Drawings have been updated. | Yes | Closed |
| 23 | 1 | Pg. 10-11, 17, 69-71 of 105 01 73 24 | 3 | A. Moore | Provide stamped design drawings and calculations by a licensed engineer for frames, hangers, and anchors supporting the conveyor. See specifications for design requirements. Note that supports must bear on the centerline of concrete beams, not the slab. BC will provide steel beams to transfer loads to concrete beams. Include conveyor reactions for BC's design. | See attached exceptions and clarifications for more details. | Yes | Closed |
| 24 | 1 | Pg. 20 of 105 01 73 24 | 3 | A. Moore | Provide stamped design drawings and calculations by a licensed engineer for attachment of screwpress to steel framing below. See specifications for design requirements. | See attached exceptions and clarifications for more details. | Yes | Closed |
| 25 | 1 | Pg. 49 of 105 01 73 24 | 3 | A. Moore | Provide stamped design drawings and calculations by a licensed engineer for attachment of flocculation tank base to steel framing below. See specifications for design requirements. | See attached exceptions and clarifications for more details. | Yes | Closed |

Proj. 93-2021-0058 – SCTP Dewatering Equipment Replacement
SUBMITTAL REVIEW COMMENTS

| | | | | | |
|-----------------------------|---------------------------------------|--------------|---|--------------------------------|-----------|
| Submittal No.: | 46 76 27-1 | Rev.: | 1 | Date Received: | 12/9/2025 |
| Reference Paragraph: | 1.03 | | | | |
| Submittal Title: | FKC Dewatering Equipment – Mechanical | | | Date Due to Contractor: | |

| | | |
|---|---|--|
| Review is for general conformance with the Contract requirements and shall not relieve the Contractor of responsibility for any errors or omissions in such Submittals. | Review Action Legend: | Reviewer: G. Dick, M. Koh, I. Howard, A. Moore Date Returned: 1/9/2026 Overall Review Action: 3 (See Legend) |
| | Code 1 – No Exceptions Taken Code 2 – Make Corrections Noted Code 3 – Amend and Resubmit Code 4 – Rejected and Resubmit Code 5 – Not Subject to Review | |

| Item No. | Rev | Submittal Section/ Spec Reference | Review Action | Reviewer | Reviewer's Comments | Contractor's Response | Response Accepted? | Status |
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| 1 | 0 | 46 76 27 2.03.D Page 4 of 105 | 3 | G. Dick I. Howard | Provide two (2) polymer injection rings for installation upstream of the flocculation tank. | Added (2) 6" polymer injection rings. | | |
| 2 | 0 | 46 76 27 1.06. B Pg 6 of 105 | 3 | G. Dick I. Howard | Specification state minimum 18% cake solids | See attached exceptions and clarifications sheet. | | |
| 3 | 0 | Page 4 of 105 and page 10 of 105 | 2 | G. Dick I. Howard | Page 4 shows approximately 37 ft; page 10 shows approximately 40 ft. Correct as needed. | Updated to 37 ft. | | |
| 4 | 0 | 46 76 27 3.03.C Pg 12 of 105 Submittal | 3 | G. Dick I. Howard | Specifications calls for 10-days of onsite installation, 3 days for functional testing and 5 days of training, total of 18 days compared to 7 days listed. | Updated to meet specifications. See attached exceptions and clarifications sheet for more details. | | |
| 5 | 0 | 46 76 24 3.06A Pg. 12 of 105 | 3 | G. Dick I. Howard | Specification request 2 years after performance testing. Includes 1 year inspection compared to 12 months after start-up or 18 months after delivery. | Updated to meet specifications. | | |
| 6 | 0 | Pg 15 of 105 and 7 of 105 | 3 | G. Dick I. Howard | Pages state 5 and 7.5 HP respectively, confirm and correct. | Updated Scope of Supply to state 5 hp motor | | |
| 7 | 0 | 46 76 27 2.03.C.4 Pg 19 of 105 | 3 | G. Dick I. Howard | each screw press shall be equipped with minimum of three (3) 6-inch vents to be connected to the odor control system. | Updated drawings to show 6-inch vents. | | |

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|----------|-----|---|---------------|----------------------|---|--|--------------------|--------|
| 8 | 0 | 72-M-301 | 2 | G. Dick I. Howard | Provide screw press with 12" filtrate connection | Updated filtrate connection to 12" | | |
| 9 | 0 | 46 76 27 2.03.B.2 | 3 | G. Dick I. Howard | The floc tank shall be equipped with a 6" nozzle for connection to the odor control system. | Updated drawing to show 6-inch vent. | | |
| 10 | 0 | Pg 68 of 105 | 3 | G. Dick I. Howard | Provide weight of trough covers. Requested cover maximum length is 4'. | 5' cover weighs 50 lbs. See attached exceptions and clarifications sheet for | | |
| 11 | 0 | Pg 68 of 105 | 3 | G. Dick I. Howard | Provide capacity of screw conveyor in terms of cubic feet per hour and wet tons per hour. Provide maximum screw speed in rpms and fill capacity. | Added conveyor calculations | | |
| 12 | 0 | Pg 68 of 105 | 3 | G. Dick I. Howard | Provide conveyor with a minimum of 4" drain. | See attached exceptions and clarifications sheet for more details. | | |
| 13 | 0 | Pg. 10 and Pg 68 of 105 | 3 | G. Dick I. Howard | Table on page 68 differs from material shown on page 10 including cover length and gauge thickness of trough. Confirm and correct. | Scope of supply updated to match the conveyor BOM. | | |
| 14 | 0 | Pg. 96 of 105 | 3 | M. Koh | Actuator voltage for 72G4301 was engineered to be 480 VAC. If 120/240 VAC is required, please submit deviation. | See attached exceptions and clarifications sheet for more details. | | |
| 15 | 0 | Pg. 105 of 105 46 76 27 - 1.03.C.3 | 1 | M. Koh | Provide Control Panel Designs, Shop Drawings, and Data Sheets in forthcoming submittal | Control Panel was submitted on January 5 th , 2026 | | |
| 16 | 0 | Pg. 68 of 105 | 3 | M. Koh | Provide Emergency Shut Down Pull Cord for conveyors | See attached exceptions and clarifications sheet for more details. | | |
| 17 | 0 | Pg. 15 of 105 | 3 | M. Koh | Provide Instrumentation as shown on contract drawings including floc tank level switch and screw press level transmitter. | Instrumentation was submitted with the control panel submittal. | | |
| 18 | 0 | Email: Quinn and Roger 46 76 27 - 2.07.F | 3 | M. Koh | Provide Screw Press Feed Pump monitoring and control from the Screw Press Control Panel. Provide Screen on HMI of the Screw Press Control Panel for monitoring and control. | See attached exceptions and clarifications sheet for more details. | | |

| Item No. | Rev | Submittal Section/ Spec Reference | Review Action | Reviewer | Reviewer's Comments | Contractor's Response | Response Accepted? | Status |
|----------|-----|---|---------------|----------|--|--|--------------------|--------|
| | | | | | Spec Section 46 76 27 - 2.07.F was updated to include this new requirement. | | | |
| 19 | 0 | 46 76 27 - 1.03.C.3.b | 3 | M. Koh | Provide motor schematics for the motor control | Motor control was submitted with the control panel submittal. | | |
| 20 | 0 | 46 76 27 - 1.03.C.3.f | 3 | M. Koh | Provide Control description in conformance with this section and the strategies in 40 61 96. | Added control description. | | |
| 21 | 1 | Pg. 16 of 105 Pg. 17 of 105 | 3 | A. Moore | Match screwpress spacing dimensions shown in 1/72-S-102; distance between units measured center-to-center = 9'-9" (117"). | Drawings have been updated. | | |
| 22 | 1 | Pg. 16 of 105 | 3 | A. Moore | Confirm dimension between centerline of conveyer and centerline of flocculation tanks; dimension as modeled on 1/72-S-302 = 30'-11 1/4" (371 1/4"). | Drawings have been updated. | | |
| 23 | 1 | Pg. 10-11, 17, 69-71 of 105 01 73 24 | 3 | A. Moore | Provide stamped design drawings and calculations by a licensed engineer for frames, hangers, and anchors supporting the conveyor. See specifications for design requirements. Note that supports must bear on the centerline of concrete beams, not the slab. BC will provide steel beams to transfer loads to concrete beams. Include conveyor reactions for BC's design. | See attached exceptions and clarifications sheet for more details. | | |
| 24 | 1 | Pg. 20 of 105 01 73 24 | 3 | A. Moore | Provide stamped design drawings and calculations by a licensed engineer for attachment of screwpress to steel framing below. See specifications for design requirements. | See attached exceptions and clarifications sheet for more details. | | |
| 25 | 1 | Pg. 49 of 105 01 73 24 | 3 | A. Moore | Provide stamped design drawings and calculations by a licensed engineer for attachment of flocculation tank base to steel framing below. See specifications for design requirements. | See attached exceptions and clarifications sheet for more details. | | |

January 28, 2026

RE: Section 46 76 27 Screw Press Dewatering Systems
Submittal Comments Response FKC Co., LTD

Submittal Review Comments:

Brown & Caldwell Comments:

1. Added (2) 6" injection rings to submittal
2. FKC has done multiple lab testing of the Salmon Creek sludge over the years. Although typical anaerobic sludge can get over 18% TS cake solids, we have not seen that with the Salmon Creek sludge. FKC can guarantee 15% TS cake solids and design the system to get higher cake solids is the sludge characteristics improve.
3. They conveyor will be 37', submittal has been updated.
4. Scope of Supply updated to reflect onsite services. Please note that there is a total of 34 days onsite. This was not included in our original quotes as we did not have the specifications. Since the specifications require a credit back for unused service days, FKC will have a price added to our final pricing.
5. Scope of Supply has been updated to reflect a 2-year warranty with 2 inspections. Please note the warranty starts after startup and beneficial use or 2.5 years after delivery. FKC cannot account for delays out of our control.
6. Scope of Supply updated to 5hp motor.
7. Drawings updated to show 6" vents in 3 locations.
8. Filtrate flange updated to 12".
9. Vent added to floc tank.
10. The covers weigh 50lbs. FKC standard is 5' covers and trough sections. This allows better overlap for our bracing and seams, which creates a stiffer and stronger conveyor trough.
11. Added conveyor calculations to the submittal.
12. Since the conveyor is horizontal, any liquid that runs into the conveyor will drain out the slide gate. For a drain to be effective the conveyor would have to tilt back slightly. FKC can and a drain if required
13. Scope of supply has been updated.
14. The slide gate actuator is powered from the screw press control panel. Our standard is 120 VAC.
15. Control panel was in a separate submittal.

16. Since the conveyor is below the platform, a pull chord would not be accessible. If there was a pull chord and it got tripped, you would be able to reach the reset button. No pull chord is recommended.
17. Instrumentation was submitted with the control panel submittal.
18. The sludge feed pump will be monitored and control by the screw press control panel via SCADA. See control description added to the submittal package.
19. Motor control was submitted with the control panel submittal.
20. Control description was added to the submittal package.
21. Drawings have been updated.
22. Drawings have been updated.
23. The current drawings do not show any beam or locations for supports. FKC will work with the engineer in the design of these. Anchor bolt calculations will be done after finalization of all drawings.
24. Anchor bolt calculations will be done after finalization of all drawings.
25. Anchor bolt calculations will be done after finalization of all drawings.

District Comments:

1. FKC is supply four extra screens and one motor coupling pre screw press. The motor couplings are not spares but are supplied to couple the motor and gearbox. It is called out as a spare because our parent company in Japan supplies the couplings, translation error.
2. The one exception to the performance specs is the call out for 18% cake solids concentration, spec 46 76 27 1.06, B. FKC has performed several lab tests with the sludge from the plant with a variety of outcomes. FKC can guarantee 15% cake dryness or higher. No exceptions taken
3. No comment
4. Odor control vents were added.
5. FKC has updated our layout drawings per the Brown & Caldwell drawings. We will work with the engineers to make sure the locations are correct. Anchor bolt calculations will be done when all drawings are finalized.
6. Controls have been submitted.

Section 46 76 27 Screw Press Dewatering Systems – Exceptions and Clarifications

- 1.02, D. – A total of 34 days onsite is listed in the specifications. This is more than typically required. Since the specs call for a credit for unused days, FKC will require a price added from our original quote. Remove credit requirement
- 1.05, 3. - Based on previous lab testing and data FKC can guarantee >15% cake solids. We are currently getting a new sludge sample for more data. No exceptions taken
- 1.05, 4. - FKC cannot guarantee the current polymer is the best for the screw presses. If a different polymer is selected and a months supply is required, FKC will have to add a price adder as this was out of our original scope. Please note switching polymers is very common and easy. No exceptions taken
- 2.03, B.6. - The floc tank has a high-level switch. It is not a level sensor. The level sensor is located on the screw press for control of the head box level. No exceptions taken

- 2.03, C.12. - FKC has a total of three shower spray bars. These spray bars are stationary and our on user adjustable setpoints for on and off times. **No exceptions taken**
- 2.03, C.13. - FKC can supply expansion joints for the connections to the flocculation tank inlet flange, screw press filtrate flange, and discharge chute connection to the conveyor but will require a price adder as this was out of our original scope of supply and are typically supplied by the contractor. **Contractor shall supply**
FKC does not supply flexible connections for the screw press and flocculate motor connections or other electrical connections.
- 2.03, C.17. - FKC can supply a spreader bar but will require a price adder as this was out of our original scope of supply. **Removed from spec. Not needed**
- 2.13 – FKC can provide factory testing reports for the screw presses, flocculation tanks, conveyor, and control panels. These would be separate FAT reports from our parent company in Japan, our panel supplier in Seattle, WA and from FKC in Port Angeles, WA. FKC does not recommend having the FAT be witnessed as this would require a weeklong trip to Japan, Seattle, and Port Angeles. If FAT witness testing is required, FKC would need a price adder to our original price as this was not in our scope of supply. **non-witnessed test agreeable**
- 3.01 - FKC requests removing this requirement per the above statement. **non-witnessed test agreeable**

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Scope of Supply

FKC CO., LTD.

2708 West 18th Street
Port Angeles, WA 98363



(360) 452-9472
FAX (360) 452-6880

November 5, 2025

Quinn Behnke, P.E.
Heyward Florida Incorporated
Brown and Caldwell
Portland, OR

Email: qbehnke@brwncald.com

Re: FKC Co., Ltd. BHX-1350x7500L
Clark County, Salmon Creek WWTP

Attached is a proposal for FKC's BHX 1350x7500L, which has a capacity of 11.0 BDST/D or 916 Dry Lbs. / Hr. of sludge. In summary the following equipment is included:

- (2) BHX-1350x7500L screw press
- (2) 540GL flocculation tank
- (2) Standard Control Panel
- (2) Headbox level transmitter
- (2) Hi-Hi Level Flocc Tank Probe
- (2) 6" Polymer Injection Rings
- (1) 14" Shaftless Screw Conveyor, 40' Long
- (1) 12" Shaftless Screw Conveyor, 37' Long – Temp Install

Additional ancillary equipment necessary for a complete dewatering system such as pumps, polymer systems, valves, disposal bin, etc. are not included. We can quote these if desired.

Along with this pricing you will find information on other miscellaneous information such as delivery, payment terms, warranty, and performance guarantees.

We hope this information is helpful. Please contact this office if you have questions or require any further information.

Thank you,

Paul Kohl

Paul Kohl
FKC Co., Ltd.

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A. Proposed Equipment

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A. Proposed Equipment

1. Screw Press

| Quantity | Description |
|----------|---|
| 2 | FKC Screw Press Model BHX 1350x7500L |
| | Material to process: Anaerobic |
| | Inlet Consistency: 2.0% Total Solids |
| | Average Flow: 91 gpm @ 2.0 % Total Solids (polymer excluded) |
| | Average Solids Thru put: 916 dry pounds per hour 11.0 BDST/D |
| | Outlet Consistency: 15% or greater w/ polymer use |
| | Solids Capture: 92% minimum |
| | Typical Operation: 24 hours per Day |

A. Proposed Equipment

2. Flocculation Tank

| Quantity | Description |
|----------|-------------|
|----------|-------------|

2 FKC Flocculation Tank
Model 540GL

Material to flocculate: Anaerobic

Inlet Consistency: 2.0 % Total Solids

Average Flow: 91 gpm @ 2.0% Total Solids (polymer excluded)

Ave Detention Time: 5.9 minutes @ 2.0% Total Solids

Materials of Construction:

| | |
|--|---------------------|
| Tank | 304 Stainless Steel |
| Covers | 304 Stainless Steel |
| Agitator Support Stand | 304 Stainless Steel |
| Agitator Blades & Shaft | 304 Stainless Steel |
| Fasteners (B,N,W,Clips) in wetted area | 304 Stainless Steel |

Other: 1 Hi-Hi Level Floc Tank Probe

Speed Reducer: SEW Standard
with VFD speed adjustment

Motor: Toshiba C-face severe duty motor or equivalent
1.5 HP, 460V, 3ph

A. Proposed Equipment

3. Control Panel

| Quantity | Description |
|----------|-----------------|
| 2 | System Controls |

Screw Press Control Panel (60" x 36" x 16" NEMA 4X (304SS), Wall Mount w/ leg kit) including:

- Allen Bradley 5069-L310ER Processor w/ Ethernet Connection
 - Including:
 - 32 Digital Inputs
 - 16 Digital Outputs
 - 8 Analog Inputs
 - 8 Analog Outputs
- Allen Bradley, PanelView 5510, 10"
- Allen Bradley, Stratix 5200, Managed, 8-Port Copper, 2-Port Combo
- (Qty.1) Floc Tank Mixer VFD, 2 HP PowerFlex 525 w/ 3% Line Reactor & Ethernet Connection.
 - o HOA, running light, fail light & potentiometer.
- (Qty.1) Screw Press VFD, 7.5 HP PowerFlex 525 w/ 3% Line Reactor & Ethernet Connection.
 - o HOA, running light, fail light & potentiometer.
- (Qty.1) Conveyor Motor Starter, 7.5 HP IEC rated contactor.
 - o HOA, running light & fail light.
- (Qty.1) Conveyor Slide Gate
 - o Open-Close-Auto, open light & close light.
- Process Stop on Panel Door
- UPS 1000VA
- Air Conditioner – 1800 BTU
- TVSS & 480/120 VAC Transformer
- 120 VAC Power for (Qty. 1) - Polymer System
- Controls for (Qty. 5) – Washwater Solenoids.
- Controls via ethernet – Sludge feed pump & Polymer System

Instrumentation List

- (Qty. 2) Floc Tank Hi-Hi Level Switch (Warrick 316SS Probe w/ Electronics Module)
- (Qty. 2) Conveyor Discharge Hopper Hi-Hi Level Switch (Warrick 316SS Probe w/ Electronics Module)
- (Qty. 2) Headbox Level Transmitter (IFM 2" Sanitary Connection)

Spare Parts List

- (Qty. 10) Of each type of fuse used.
- (Qty. 2) Of each type of relay used.
- (Qty. 5) Of each type of light used.

A. Proposed Equipment

4. Shaftless Screw Conveyors

| Quantity | Description |
|----------|--|
| 1 | <p>14" Shaftless Conveyor (Screw Press Collection) Approximately 40ft Two (2) Screw Press to Conveyor inlet hopper One (1) Slide Gate 7.5 HP, 460V, 3ph, 1800 rpm motor</p> <p>Reducer: SEW Eurodrive, Type FAS and AM type "C" face adapter</p> <p>Spiral Flighting: Diameter of 14" minimum, 4" wide x 1" thick spiral. Spring effect at full load will not elongate more than .08" per foot of length. 8620 steel material. Drive end of flighting to include shop installed torque plate for bolting to drive shaft. Shop/field full penetration welds at all splice connections.</p> <p>Troughs: 7-gauge, 304 stainless steel formed flange u-troughs fabricated in 5' lengths. Trough end plates will be minimum 1/4" thick 304 stainless steel. The screw conveyor trough will be provided with two 2-inch threaded out at the inlet end.</p> <p>Trough Liners: 1/2" thick UHMW trough liner in 4' long sections. Liners held in place with 304 stainless steel 1/2" square bar retaining rods.</p> <p>Covers: 10-gauge 304 stainless steel formed conveyor covers in maximum 60" lengths. Covers will be gasketed and bolted to trough flange.</p> <p>Inlet Chutes: Fabricated from 10-gauge, 304 stainless steel with inlet to match the Screw Press or other conveyor outlets and the slope of the conveyor (if applicable).</p> |
| 1 | <p>12" Shaftless Conveyor Temp Install Approximately 37ft One (1) Screw Press to Conveyor inlet hopper 5.0 HP, 460V, 3ph, 1800 rpm motor</p> |

B. Miscellaneous

1. Delivery

Delivery will be within eight (8) months after approved submittals and notice to proceed with manufacturing.

2. Shipping Arrangements

The FKC screw press will be shipped via open top container from FKC Ishinomaki, Japan factory to a local port then best way overland to the WWTP.

Purchaser is responsible to remove the top of the container, unload the screw press and other miscellaneous crates/boxes via a crane, then replace and close up the container.

The flocculation tanks and other ancillary equipment provided will be delivered on a flatbed trailer from the FKC Port Angeles, WA facility then best way overland to the WWTP.

3. Payment Terms

FKC realizes that up to 10% of the total purchase price may be retained until final performance testing and acceptance are completed or 1 year after delivery, whichever comes first.

4. Installation

The screw press is shipped as one piece. The screw press motor and coupling will require field installation by Purchaser.

Each piece of equipment offered is loose and separate. Purchaser would need to unload, field assemble, install and provide utilities and connections to and in between all pieces of equipment offered in this proposal.

Anchor bolts are to be provided by the Contractor.

Installation and erection assistance are not included in the price of the equipment and generally are not required. However, the service is available for our standard service rates found in paragraph B.12

5. On-Site Services

The following on-site services are included in this scope.

Installation – 10 days onsite
Field Functional Testing – 3 days onsite
Field Optimization – 5 days onsite
Field Performance – 2 days onsite
Vendor Training – 10 days onsite, 2 trips
Warranty Inspection – 4 days onsite, 2 trips

6. Warranty

- A. Warranty will extend 2 years after startup and beneficial use of the equipment or 2.5 years after delivery, whichever comes first.
- B. Warranty shall include all parts, labor, and coatings for repairing or replacing equipment that fails during the warranty period. Defects occurring within the warranty period shall be repaired or replaced by the manufacturer at no cost to the OWNER.
- C. The warranty will include (2) inspection trips, (1) trip at the end of each year of the warranty. Each trip will include (2) days onsite.

7. Performance Guarantee

The performance figures and conditions denoted in section A of this proposal constitute FKC Co., Ltd.'s performance guarantee and the conditions required to meet the guarantee. All of the consistency figures are based on total solids (TS) not total suspended solids (TSS).

In the event that performance is not met, FKC will provide all parts, engineering, and labor associated with the work necessary to bring the equipment into conformance with the performance guarantee.

8. Documentation Schedule

- a. Submittals for Approval – Screw press and flocculation tank submittals and drawing within 4-6 weeks of written purchase order. Control panel submittal and drawing within six (6) weeks after receipt of purchase order.
- b. Certified Drawings - within 2 weeks after submittal approval
- c. Operation & Maintenance Manuals – before delivery of equipment

9. Spare Parts List

The following spare parts are provided with this quotation:

1. Screw Press
 - a. 4 each screens per screw press
 - b. 1 each motor coupling per screw press
2. Flocculation Tank
 - a. None.
3. Optional Spare Parts - \$55,000 adder
 - a. 1 cyclo gearbox for the screw press
 - b. 1 motor for the screw press

10. Service Rates

Note: For off-site work beyond this quotation scope of supply, final billing of airfare, lodging, and rental car expenses will be based on actual costs plus 10% for administrative costs.

Weekdays

\$2,015.00 - per eight (8) hour day on weekdays plus, lodging, & rental car expenses.

\$378.00 - per hour for all hours exceeding eight (8) hour workday on weekdays.

\$252.00 - per hour for office engineering services and telephone consultations.

Saturdays, Sundays and Holidays

\$3,025.00 - per eight (8) hour day plus lodging and rental car expenses.

\$567.00 - per hour for all hours exceeding eight (8) hour workday.

Travel Time - Weekdays

\$158.00 - per hour travel time.

Travel Time – Weekends and US Holidays

\$206.00 - per hour travel time

11. Notes and Clarifications

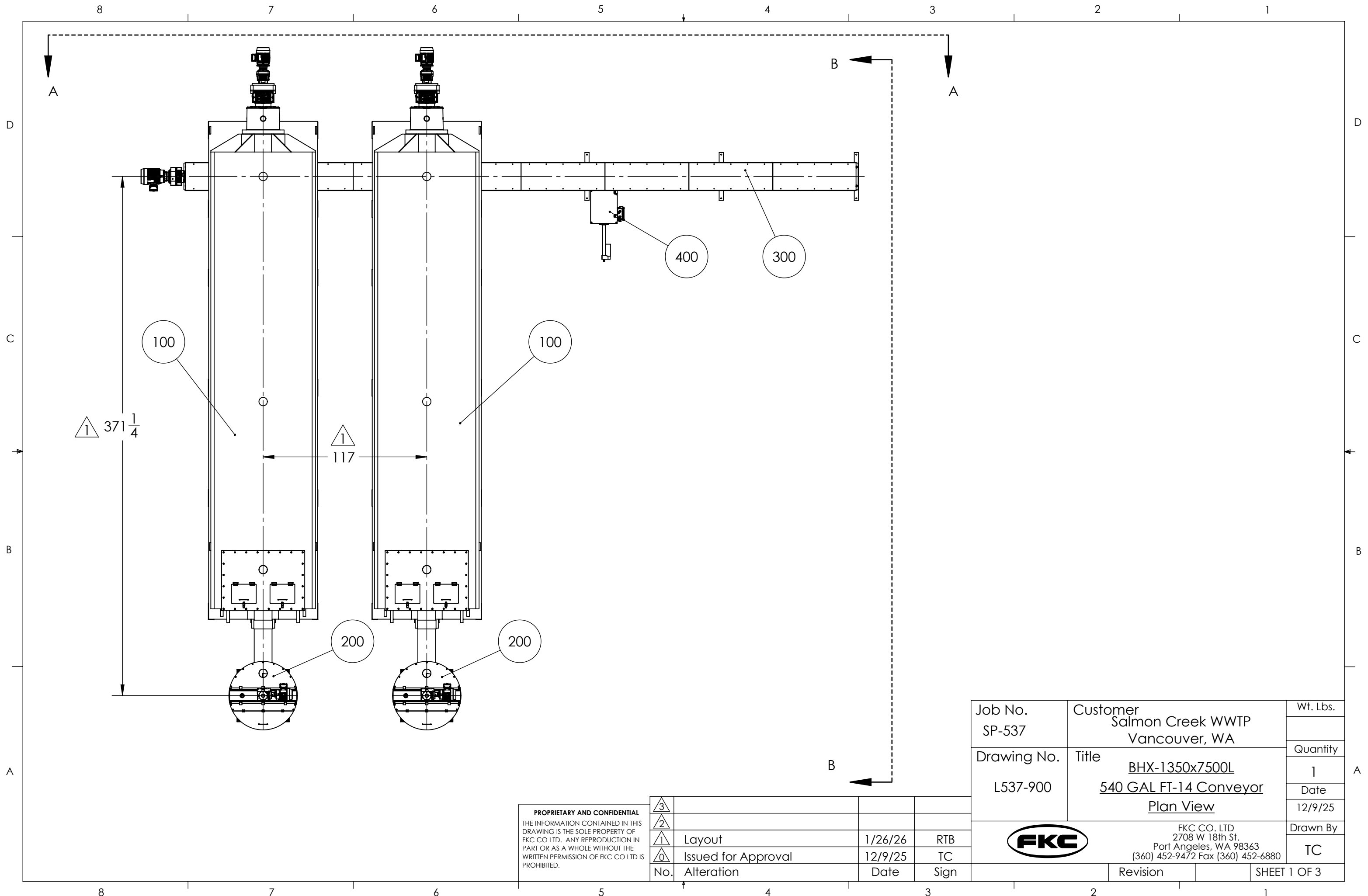
a. Screw Press and Flocculation Tank

- Supply of the anchor bolts is by purchaser.
- FKC proposal does not include the supply of polymer, grease, oil, water, sample containers, or lab testing of samples.

Screw Press


Salmon Creek WWTP Vancouver, WA
 BHX-1350x7500L Screw Press
 FKC Bill of Materials

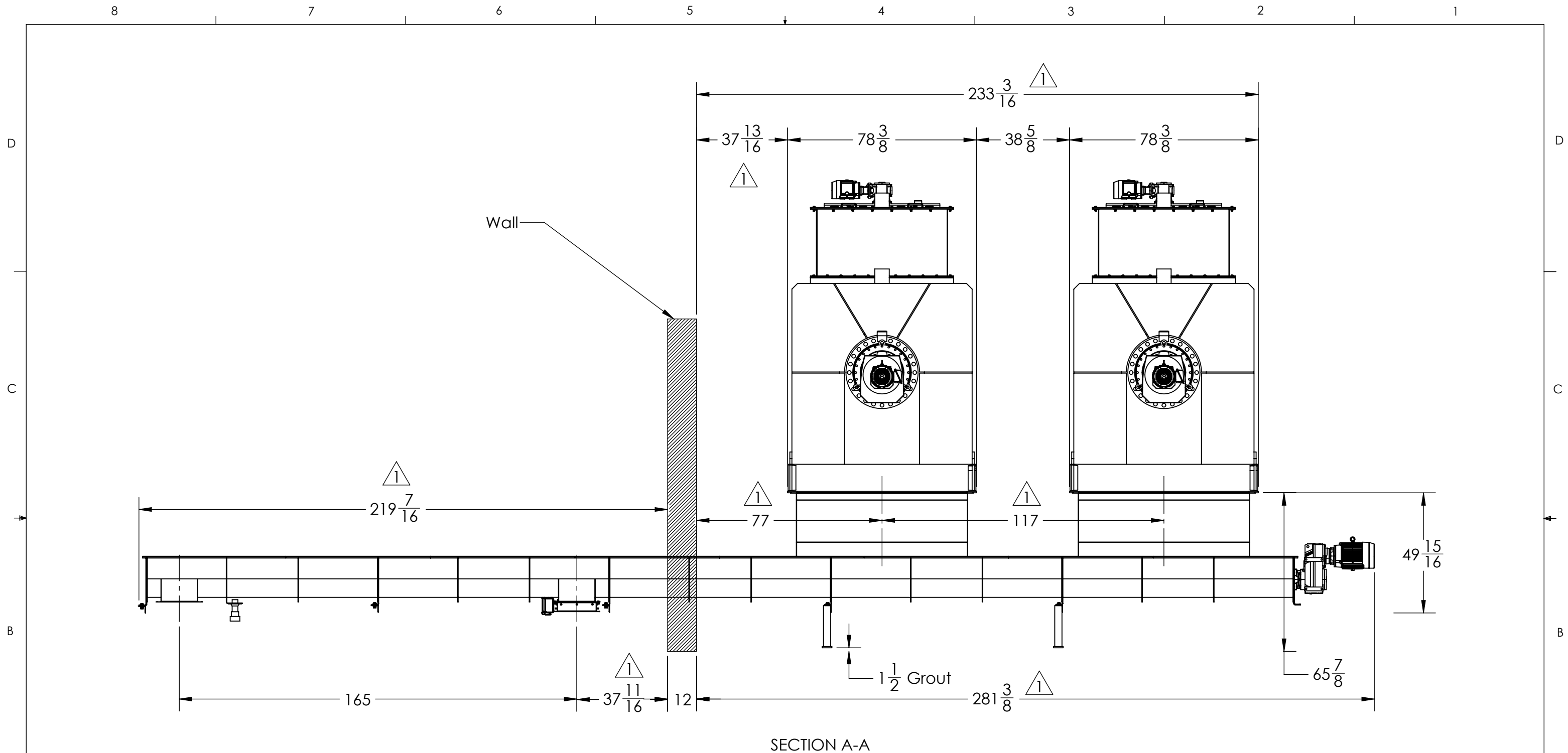
| Item # | Screw Press - BHX 1350 x 7500L - 2 Req. | Manufacturer | Part Number | Quantity (Per Screw Press) | Material of Construction |
|--------|---|---------------|------------------------|-------------------------------|--------------------------|
| 101 | Motor 5 HP 1800 RPM | Toshiba | 0054SDSR44A-P | 1 | CS |
| 102 | Drive | SEW Eurodrive | PF062 RF137R77AMS184 | 1 | CS |
| 103 | Screw | FKC | Screw 1350 x 7500 | 1 | 304LSS |
| 104 | Drums | FKC | Drum 1350 x 1500 | 1 | 304LSS |
| 105 | Drums | FKC | Drum 1350 x 1000 | 5 | 304LSS |
| 106 | Drum Half | FKC | Inlet Drum 1350 x 1000 | 1 | 304LSS |
| 107 | Covers | FKC | Covers | 29 | 304LSS |
| 108 | Head Box | FKC | Head Box 1000 | 1 | 304LSS |
| 109 | Discharge Bearing Housing | FKC | NA | 1 | CS / Painted |
| 110 | Outlet Discharge Box | FKC | NA | 1 | 304 SS Wetted Parts |
| 111 | Cone | FKC | NA | 1 | 304LSS |
| 112 | Spring Cone Arbors | FKC | NA | 3 | CS / Painted |
| 113 | Base | FKC | NA | 1 | Galvanized CS |
| 114 | Showers Headers | FKC | NA | 3 | 304LSS |
| 115 | Shower Nozzles | FKC | 1/4MVVP2*90/6.5 | 11 | 304 SS |
| 116 | Shower Nozzles | FKC | 1/4JXP2*90/5 | 114 | 304 SS |
| 117 | Solenoid Valve 1-1/2" | ASCO | 8221G011 | 5 | Brass |



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| | | | |
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| 3 | | | |
| 2 | | | |
| 1 | Layout | 1/26/26 | RTB |
| 0 | Issued for Approval | 12/9/25 | TC |
| No. | Alteration | Date | Sign |

| | | |
|---|--|-----------------|
| Job No. SP-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. L537-900 | Title BHX-1350x7500L 540 GAL FT-14 Conveyor Plan View | Quantity 1 |
| FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Date 12/9/25 |
|  | | Drawn By TC |
| Revision | | SHEET 1 OF 3 |



SECTION A-A

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| 2 | | | |
| 1 | Layout | 1/26/26 | RTB |
| 0 | Issued for Approval | 12/9/25 | TC |
| No. | Alteration | Date | Sign |

| | | |
|---|---|-----------------|
| Job No. SP-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. L537-901 | Title BHX-1350x7500L Section View A-A Layout Details | Quantity 1 |
|  FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Date 12/9/25 |
| | | Drawn By TC |
| Revision | | SHEET 2 OF 3 |

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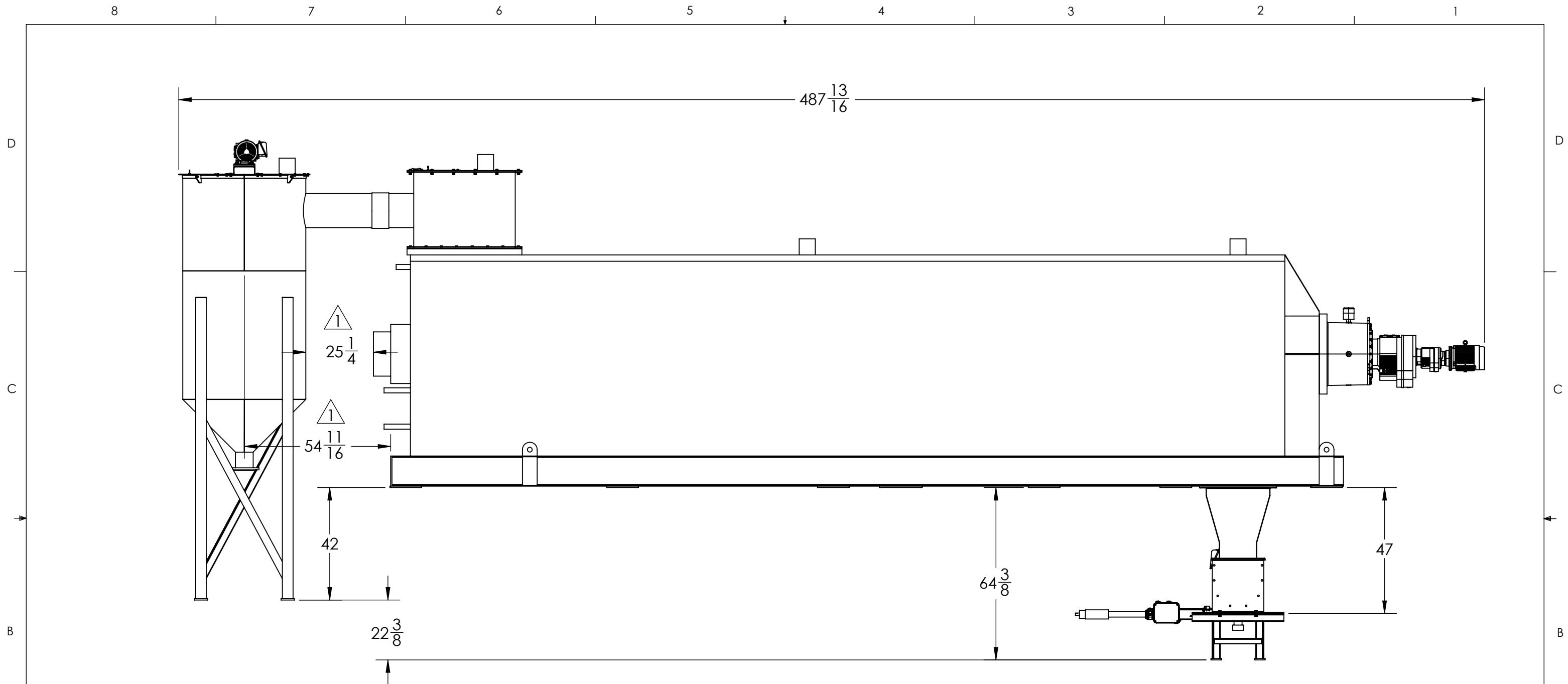
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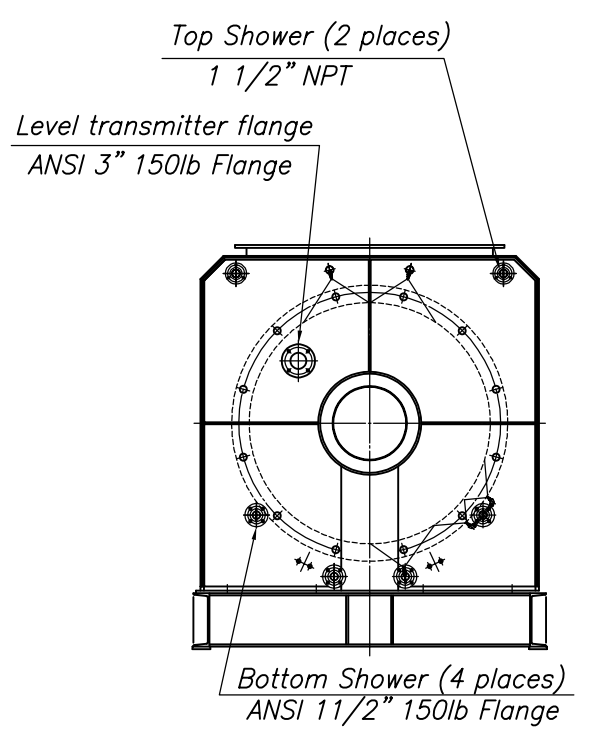
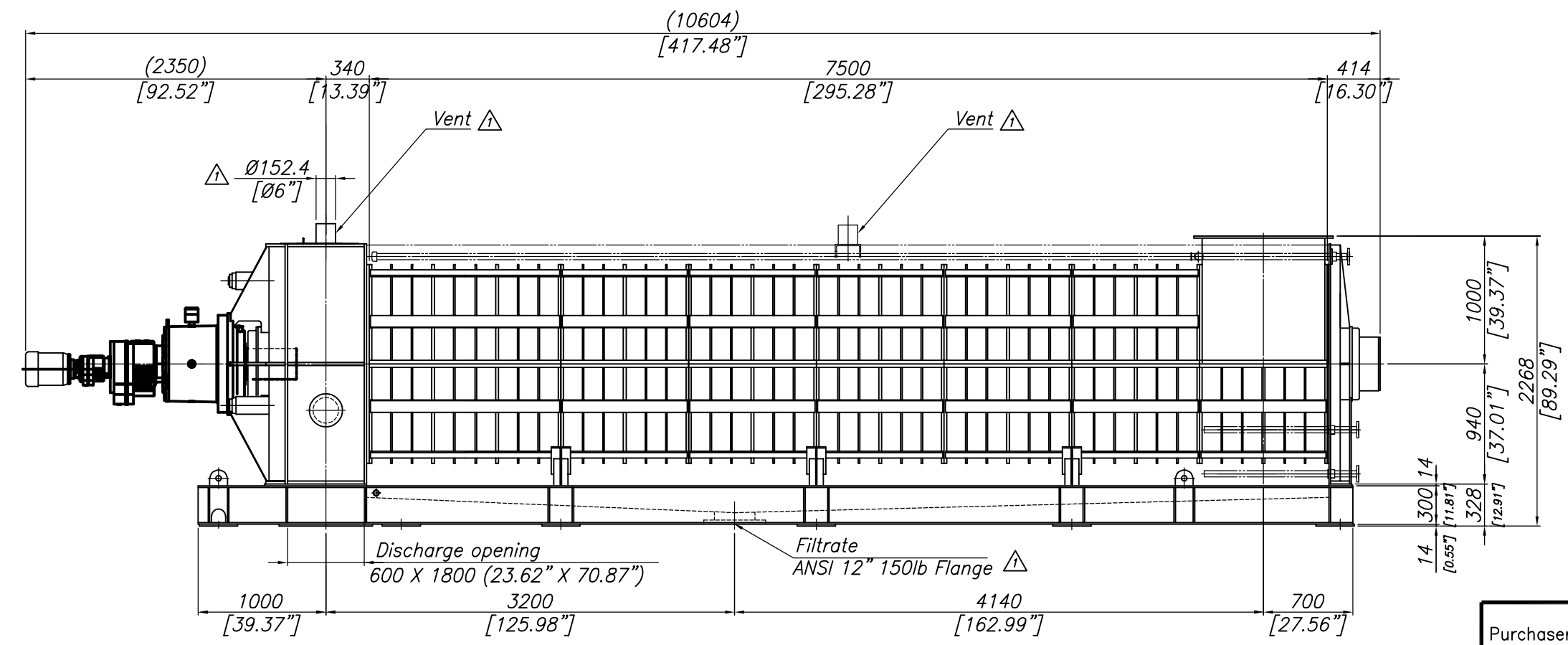
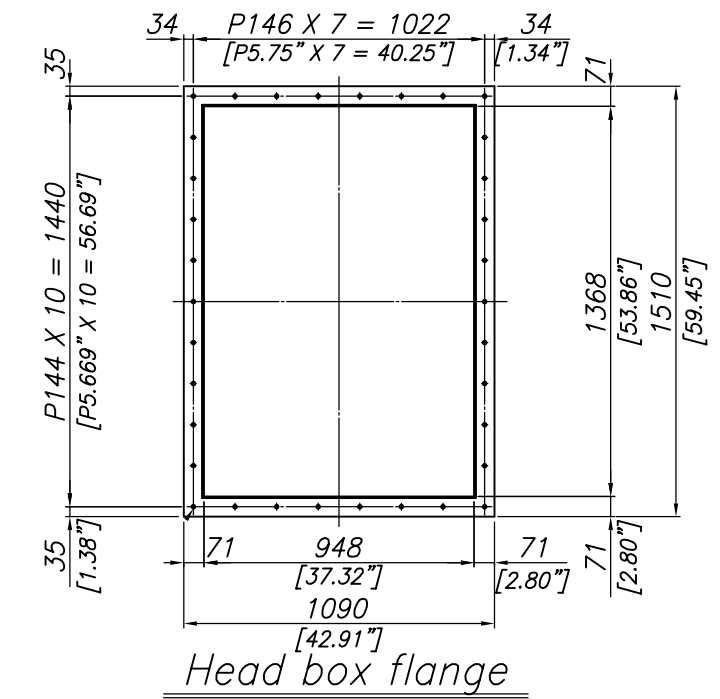
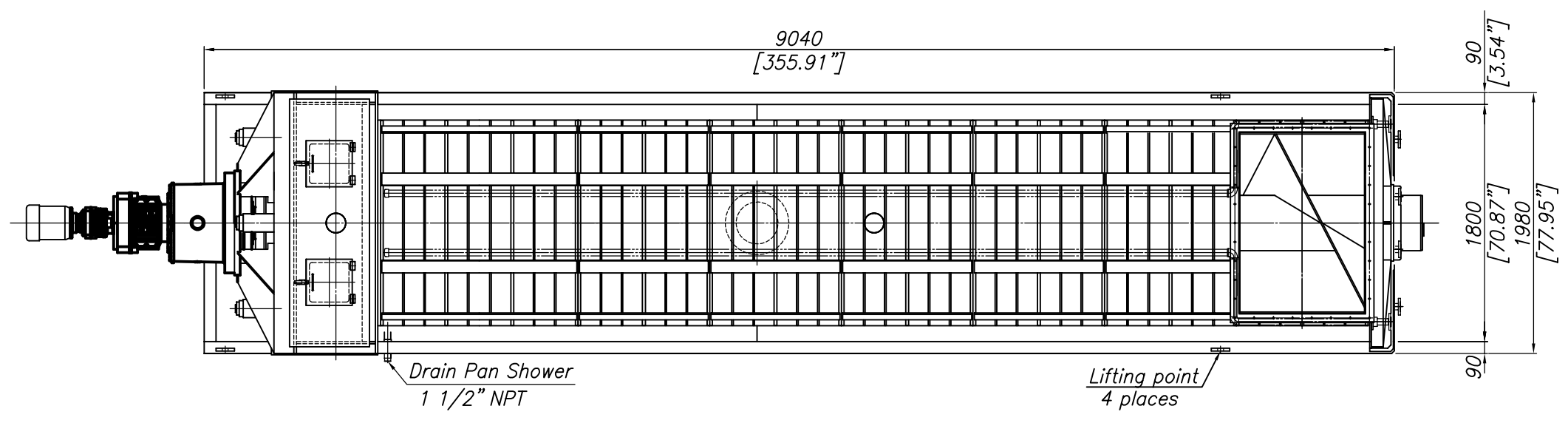


SECTION B-B

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| 3 | | | |
| 2 | | | |
| 1 | Layout | 1/26/26 | RTB |
| 0 | Issued for Approval | 12/9/25 | TC |
| No. | Alteration | Date | Sign |

| | | |
|---|---|-----------------|
| Job No. SP-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. L537-902 | Title BHX-1350x7500L Section View B-B Layout Details | Quantity 1 |
|  FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Date 12/9/25 |
| | | Drawn By TC |
| Revision | | SHEET 3 OF 3 |



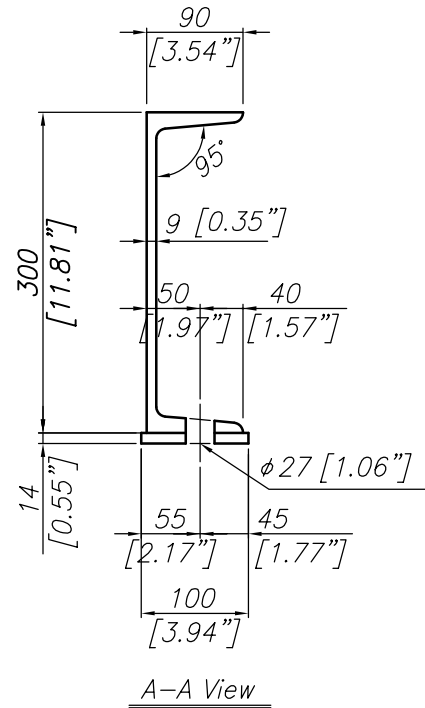
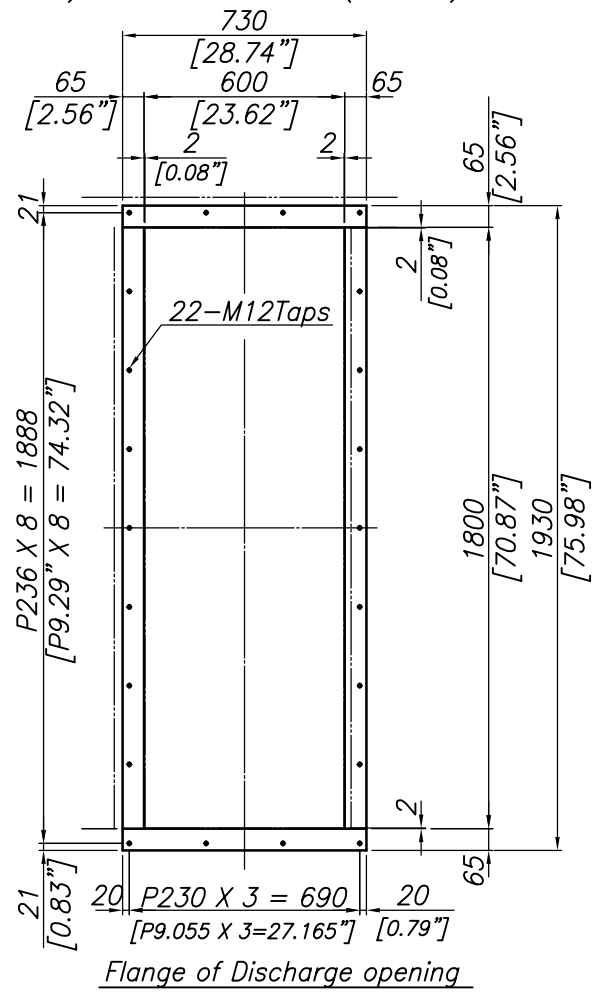
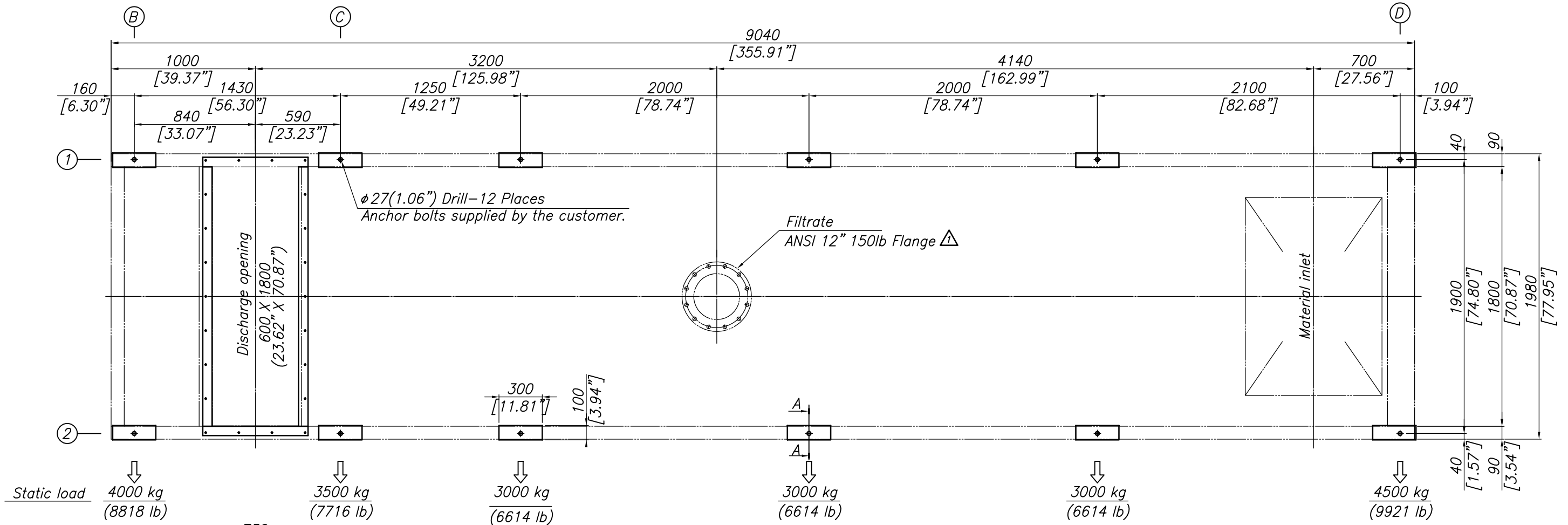
SEW Eurodrive
Planetary gear reducer
PF062 RF137R77AMS184
Motor 5 HP, 1800rpm (184TC)

Total weight = 17,000 kg (37,479 lbs)
Operating weight = 21,000 kg (46,297 lbs)

Screw rev.
0~1800 X 1/6865 = ~0.262 rpm

| | | | |
|-----------|------------------------------------|--------------|--|
| Purchaser | FKC CO., LTD. | Quantity | |
| End user | Salmon Creek WWTP Vancouver, WA | 2 | |
| Job name | BHX-1350X7500L Screw press | Scale | |
| Dwg. name | Assembly | 1/30 | |
| Job No. | M-3628 | | |
| Dwg. No. | S3628-1001 | Ref. job No. | |

| | | | | | |
|------|----------|------------------|----------|---------|----------|
| Rev. | Date | Description | Drawn by | Rev. by | Appd. by |
| 1 | 1/26 '26 | Vents & Filtrate | RTB | | |
| 2 | 12/5 '25 | Approval | S.ENDO | Y.ITO | H.ABE |



Dynamic load

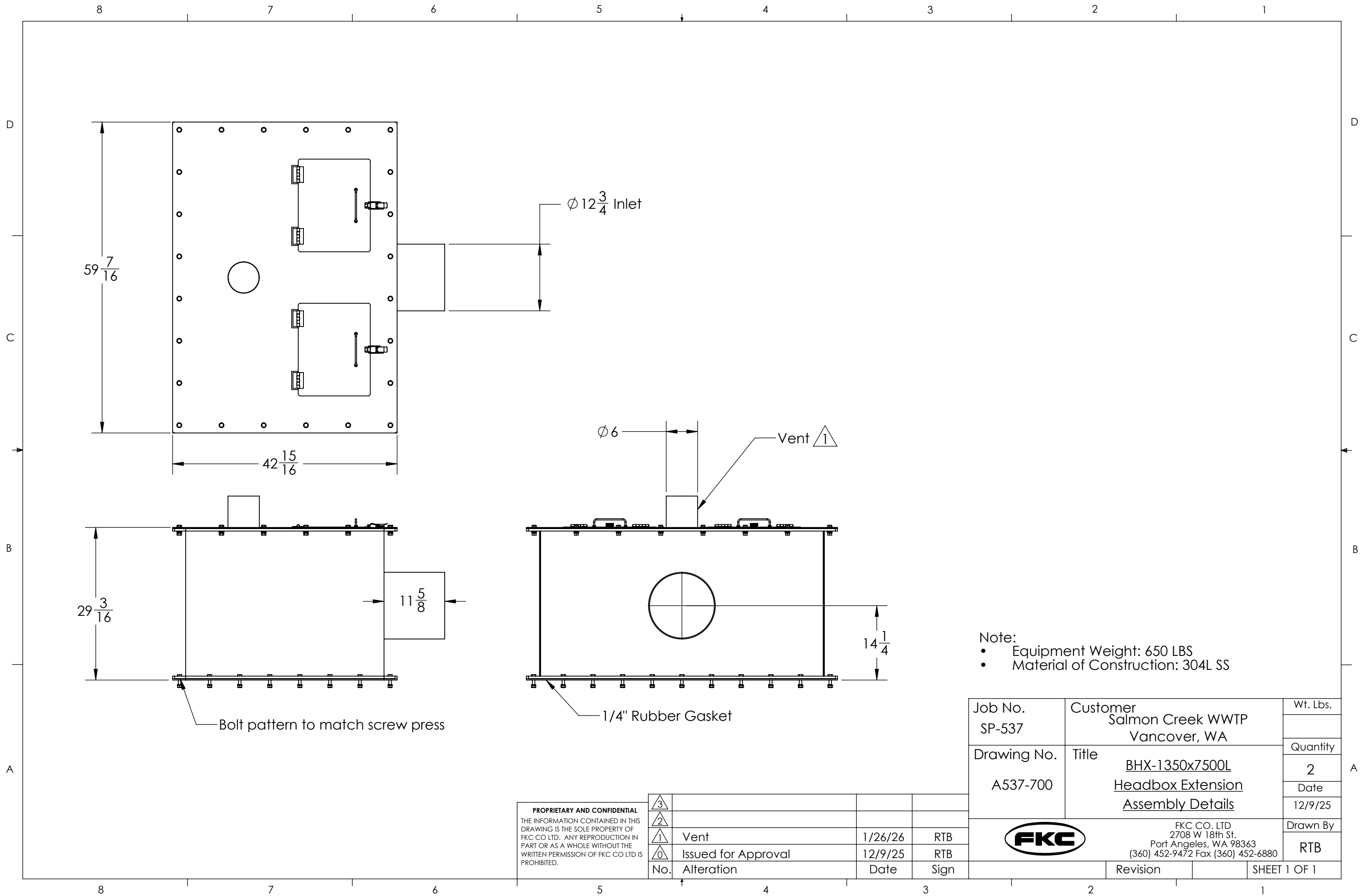
| | B | C | D |
|---|--------------------------|--------------------------|---------------------------|
| 1 | 465 Kg ↓ (1025 lbs) | 663 Kg ↓ (1462 lbs) | -1128 Kg ↑ (-2487 lbs) |
| 2 | -465 Kg ↑ (-1025 lbs) | -663 Kg ↑ (-1462 lbs) | 1128 Kg ↓ (2487 lbs) |

Note: Loads shown above are worst case dynamic loads during plugged condition.

Total weight = 17,000 kg (37,479 lbs)
Operating weight = 21,000 kg (46,297 lbs)

| | | Quantity |
|-----------|------------------------------------|--------------|
| Purchaser | FKC CO., LTD. | 2 |
| End user | Salmon Creek WWTP Vancouver, WA | Scale |
| Job name | BHX-1350X7500L | 1/20 |
| Dwg. name | Foundation | |
| Job No. | M-3628 | |
| Dwg. No. | S3628-1002 | Ref. job No. |

| Rev. | Date | Description | Drawn by | Rev. by | Appd. by |
|------|----------|-----------------|----------|---------|----------|
| 1 | 1/26 '26 | Filtrate Flange | RTB | | |
| 2 | 12/5 '25 | Approval | S.ENDO | Y.ITO | H.ABE |



Note:
 • Equipment Weight: 650 LBS
 • Material of Construction: 304L SS

| | | |
|---|--|-----------------|
| Job No. SP-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. A537-700 | Title BHX-1350x7500L Headbox Extension Assembly Details | Quantity 2 |
| | | Date 12/9/25 |
|  FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Drawn By RTB |
| Revision | | SHEET 1 OF 1 |

| | | | |
|---|---------------------|---------|------|
| PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FKC CO LTD. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FKC CO LTD IS PROHIBITED. | | | |
| 3 | | | |
| 2 | | | |
| 1 | Vent | 1/26/26 | RTB |
| 0 | Issued for Approval | 12/9/25 | RTB |
| No. | Alteration | Date | Sign |

Gearbox

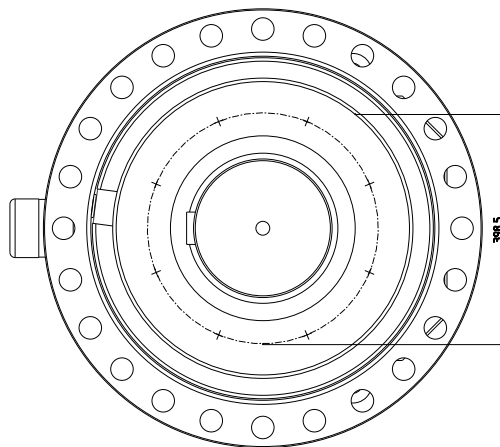
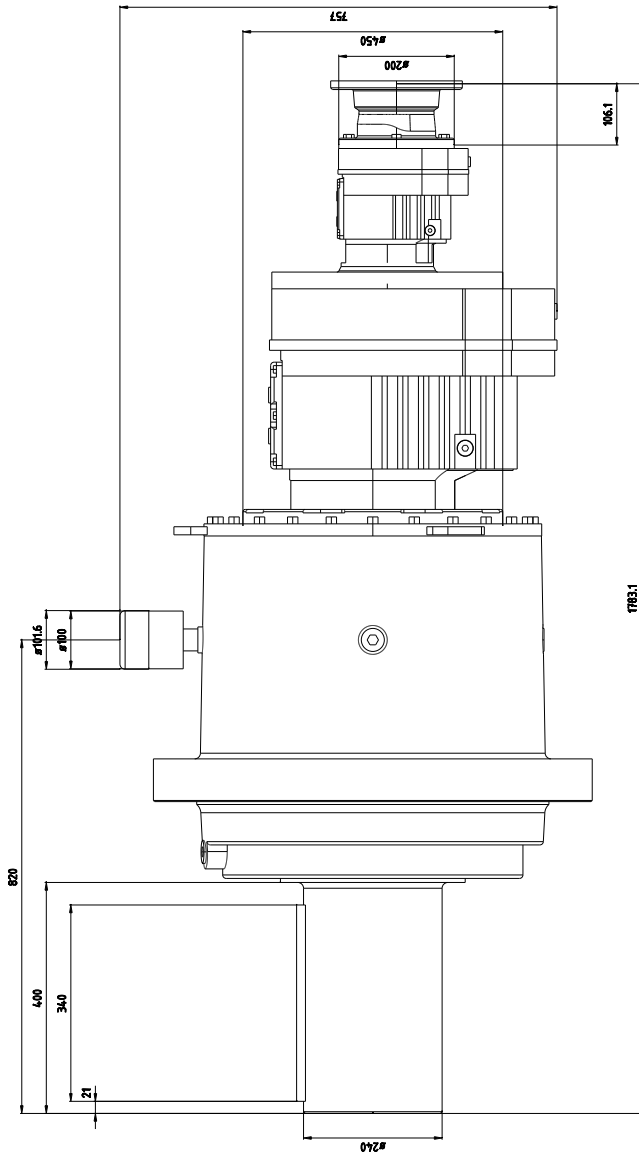
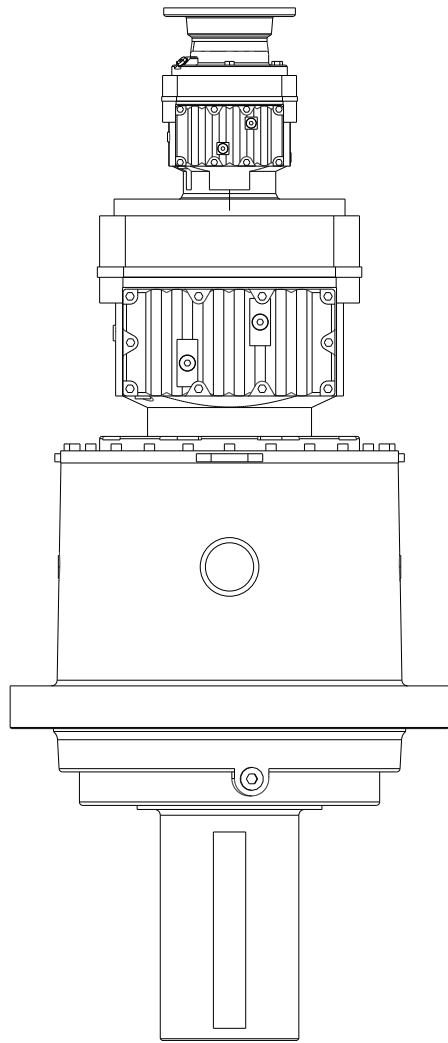
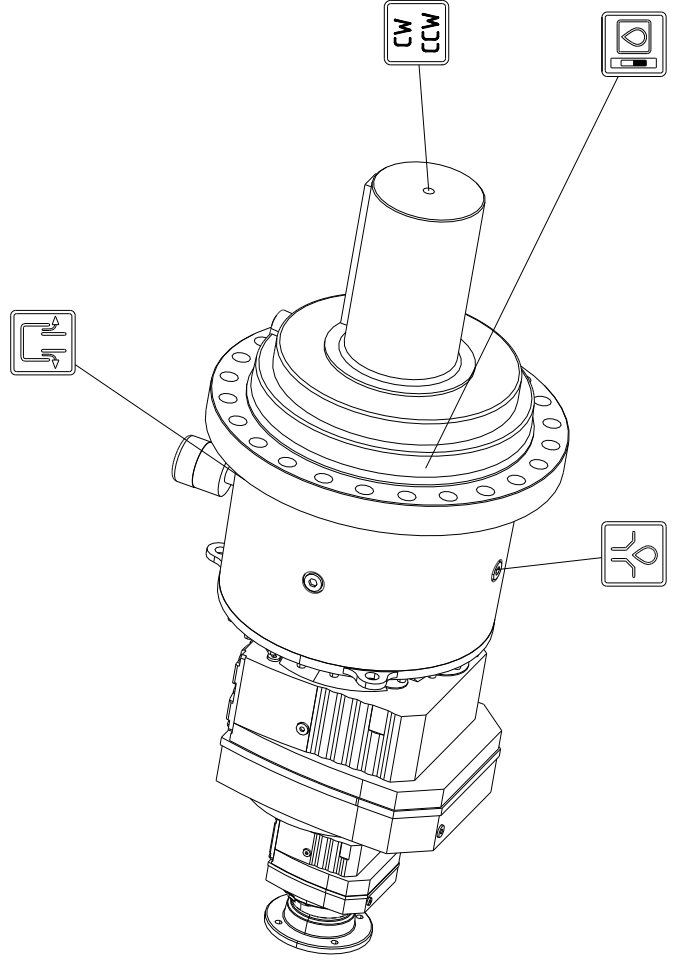
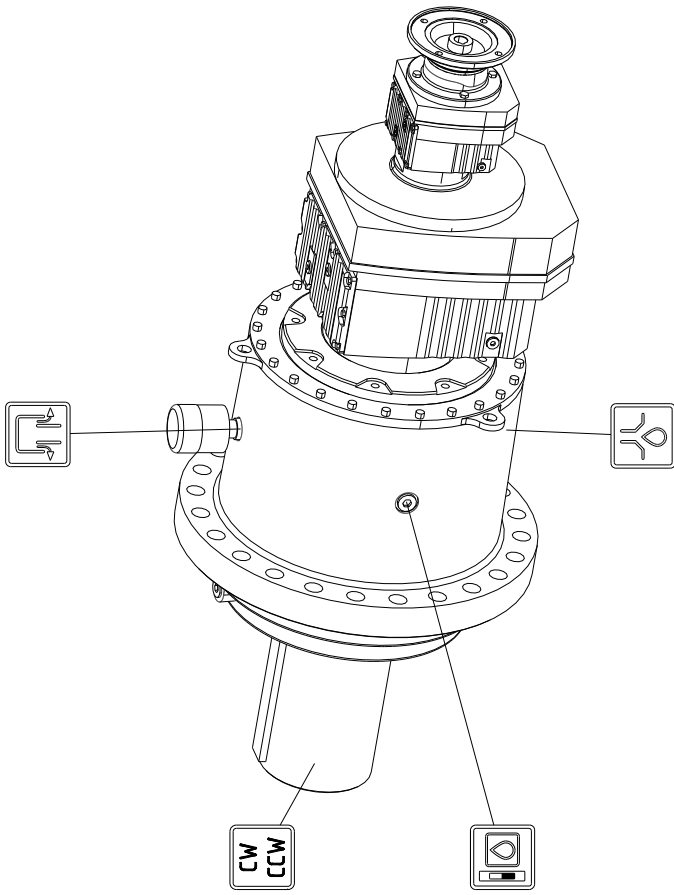
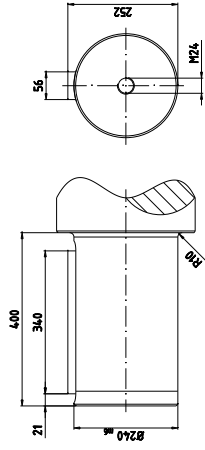
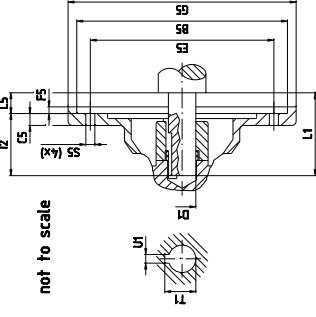


FIG. 1

| | | | |
|--|----------|-------------|--------|
| DATE | REVISED | BY | REASON |
| | | | |
| DESIGN | APPROVED | DATE | |
| | | | |
| PROJECT NO. | | SHEET NO. | |
| P1562 | | 1 | |
| Dimension Drawing | | | |
| P1562 REPT. RTT. AMS184 | | | |
| TYPE P1562 | | | |
| RTT | | | |
| AMS184 | | | |
| DATE | BY | CHKD. | APP'D. |
| | | | |
| SCALE | | SHEET NO. | |
| 1:1 | | 1 | |
| THIS DRAWING IS THE PROPERTY OF THE COMPANY AND IS NOT TO BE REPRODUCED OR USED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF THE COMPANY. | | | |
| ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED. | | | |
| TOLERANCES UNLESS OTHERWISE SPECIFIED: | | | |
| FRACTIONS: ±0.10mm | | | |
| DECIMALS: ±0.05mm | | | |
| HOLE DIA: ±0.05mm | | | |
| TAP DIA: ±0.05mm | | | |
| SURFACE FINISH: Ra 3.2 | | | |
| MATERIALS: AS SPECIFIED | | | |
| DRAWN BY: P1562 | | | |
| CHECKED BY: RTT | | | |
| DATE: AMS184 | | | |
| SHEET NO. | | SHEET TOTAL | |
| 1 | | 1 | |
| DATE | | SCALE | |
| | | 1:1 | |
| BY | | CHKD. | |
| | | | |
| DATE | | DATE | |
| | | | |

U1 = 6,35
 T1 = 31,7
 S5 = 15
 L3 = 30
 L1 = 63,9
 L2 = 66,5
 G5 = 228
 F5 = 5
 E5 = 184
 D1 = 28,575
 C5 = 10
 B5 = 215,9



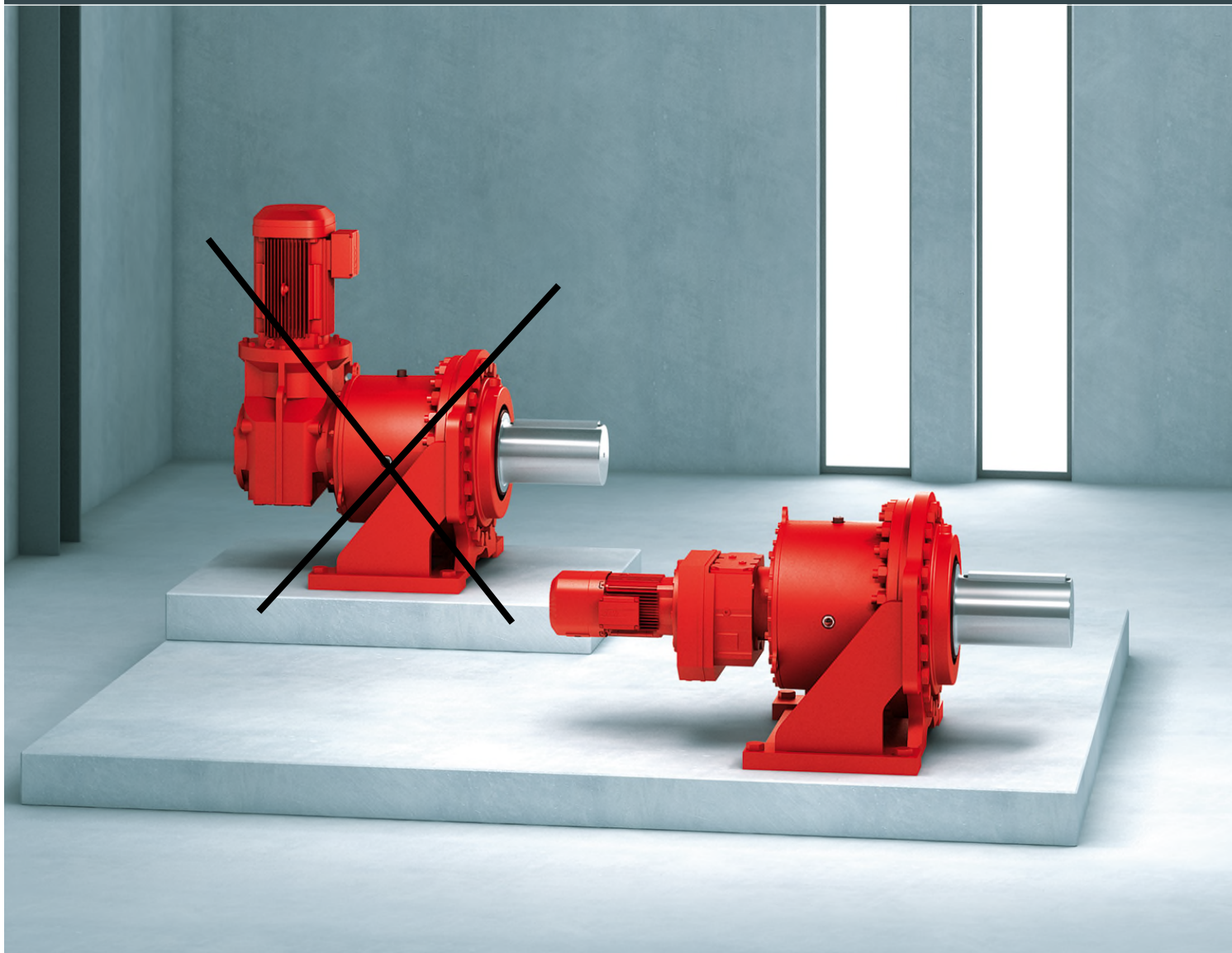
| | | | | | |
|---|----------|----------|-----------|--------------|----------|
| Drawn | Checked | Approved | Scale | Material No. | Material |
| | | | | | |
| Dimension Drawing PFE62, RFB7, RTT, AMS184 | | | | | |
| Part Name: PFE62, RFB7, RTT, AMS184 | | | | | |
| Part No. | Rev. No. | Date | Alt. Cor. | Sh. 2 / 2 | |
| | | | | | |



SEW
EURODRIVE

Catalog

Model: PF062RF137 AM184



Industrial Gear Units

P.002 – P.102 Series Planetary Gearmotors (60 Hz)

Torque Classes from 24 – 631 kNm

2 Product description and overview of types

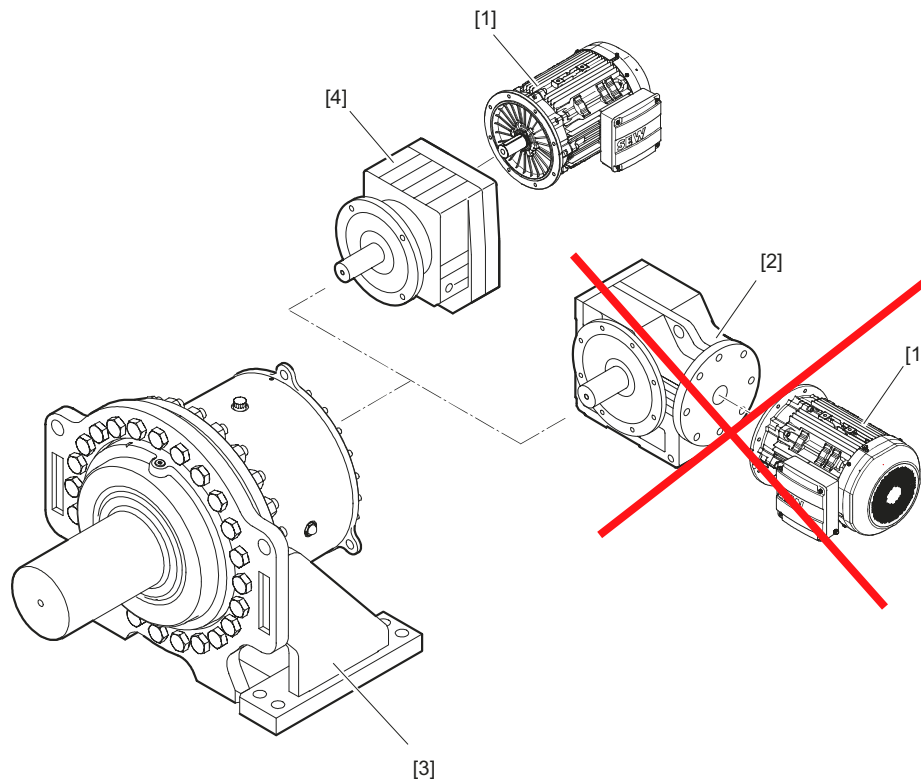
Planetary gearmotors are a combination of the following:

- P.. planetary gear unit output stage
- ~~KF../K.. or BF.. primary gear unit~~
- Mount-on components: Motor, coupling, adapter, and backstop

There are 11 sizes of planetary gear units with rated torques from 24830 Nm to 631300 Nm.

The load distribution to several planet wheels results in a significantly higher power density and consequently in smaller dimensions compared to helical and bevel-helical gear units.

The following figure shows a sample combination of a planetary gear unit, a primary gear unit and a motor.



18014404759276299

- [1] Motor
- ~~[2] KF../K.. Helical bevel gear unit (flange-mounted design)~~
- [3] P.. Planetary gear unit
- [4] RF.. Helical gear unit (flange-mounted design)

2.1 Design features

Planetary gear units ...

- can transmit high torques
- are very compact
- offer a high degree of torsional rigidity

Primary gearmotors ...

- offer a large variance on the input side
- are variable in the gear reduction range
- can be combined with the planetary gear unit in helical or bevel designs

2

2.2 Overview of advantages

- Perfectly matched units (gear unit and motor)
- Large range of options thanks to the SEW-EURODRIVE modular concept
- Short, compact design because there is no need for couplings and adapter flanges
- Standardized units, which means excellent price/performance ratio and short delivery times

2.3 Application areas

Planetary gearmotors are mainly used in applications where low output speeds and high torques are required.

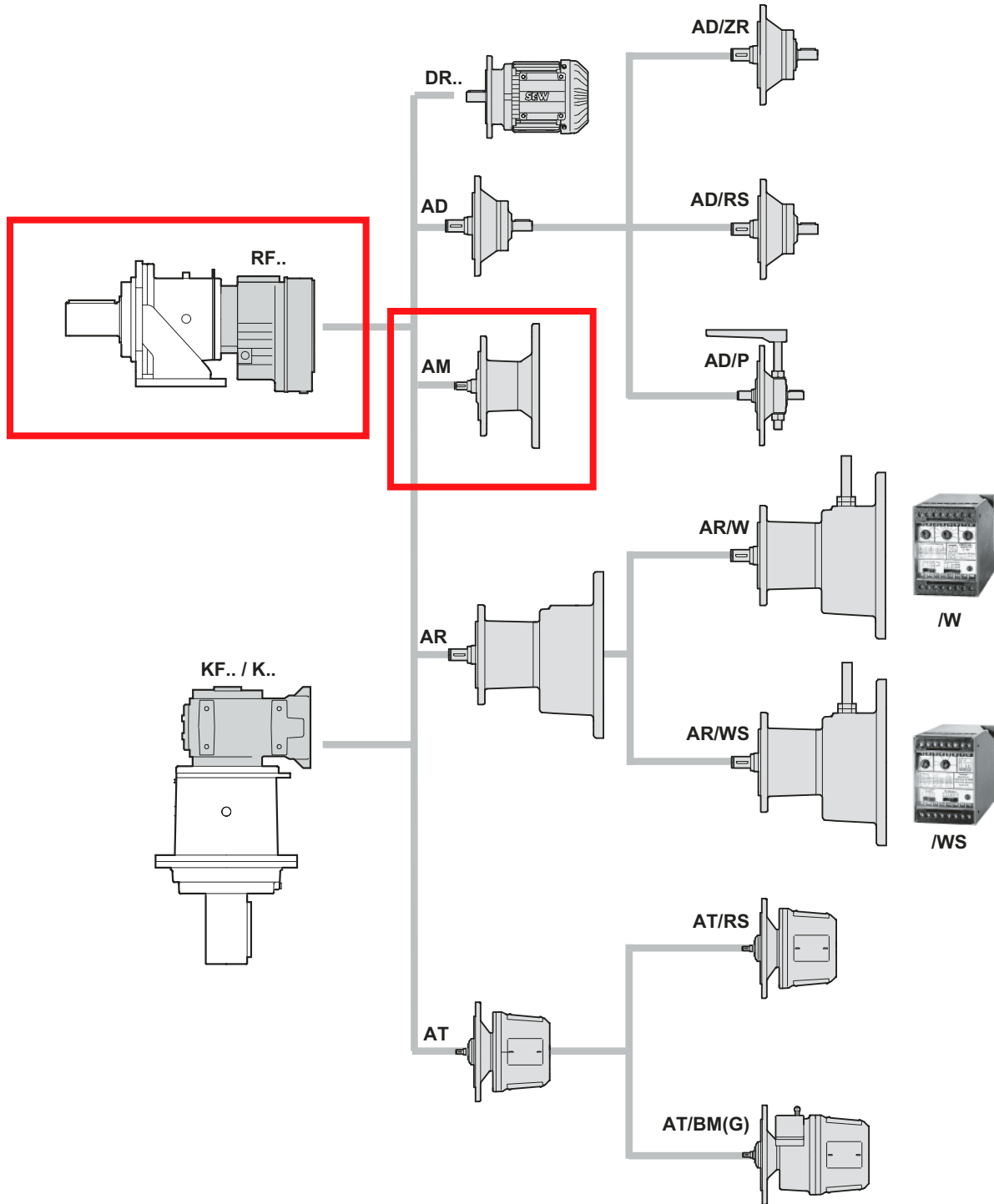
For example:

- For drying processes in the construction materials industry
- For filling processes in the cement industry
- For slow-running material processing systems, e.g. mixers, rotary filters
- For all branches of industry with similar requirements
- For conveyor belts, e.g. apron conveyors
- In the food industry

2.7.3 Components on the input side

The following figure shows the components on the input side.

2



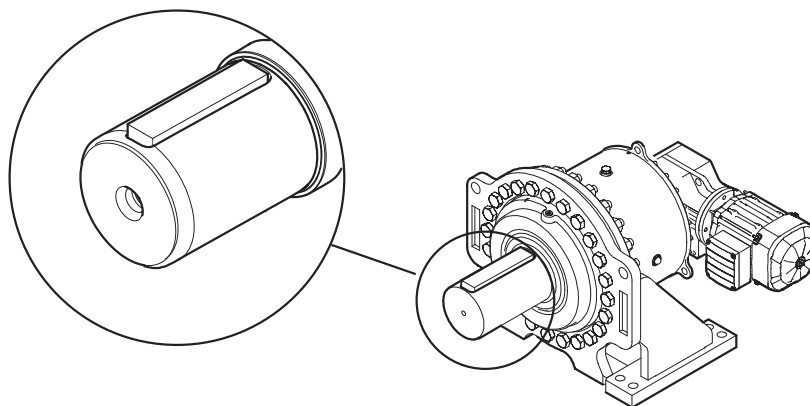
18014404808099979

23488859/EN – 02/2017

2.7.4 Output shaft variants

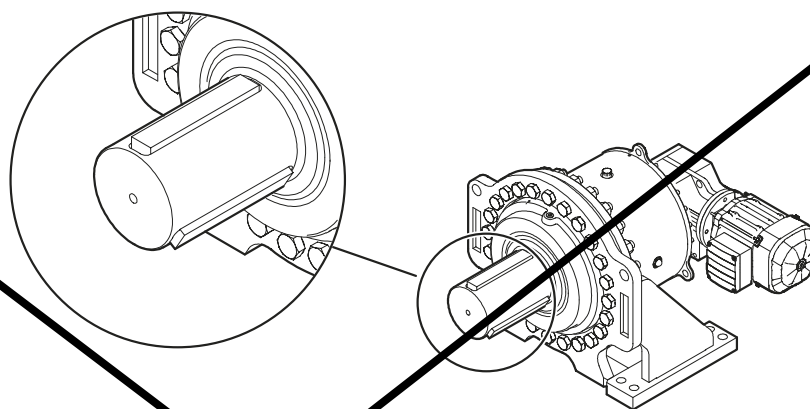
The [LSS] output shaft of the planetary gearmotor can have the following design as standard:

P.. Solid shaft with key



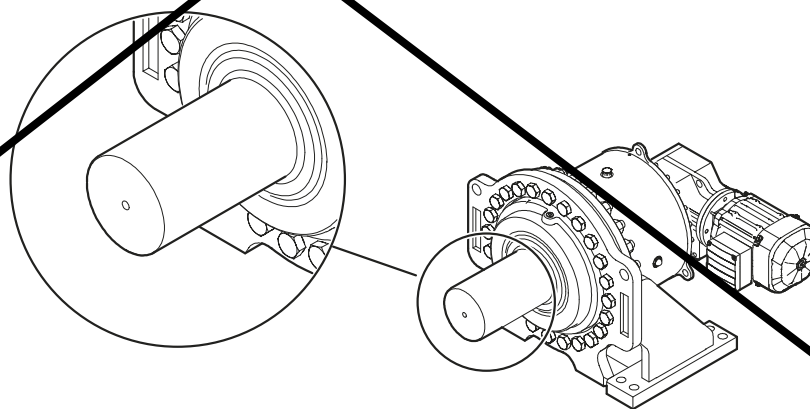
9007205553361675

P.. Solid shaft with 2 keys



17863528331

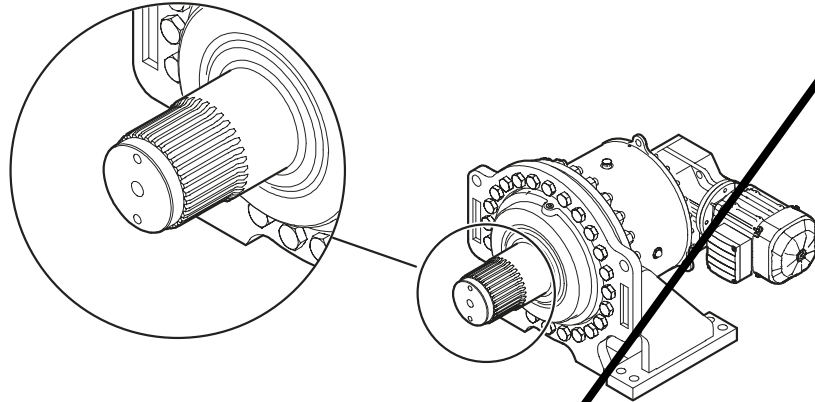
PR.. Smooth solid shaft



17863531659

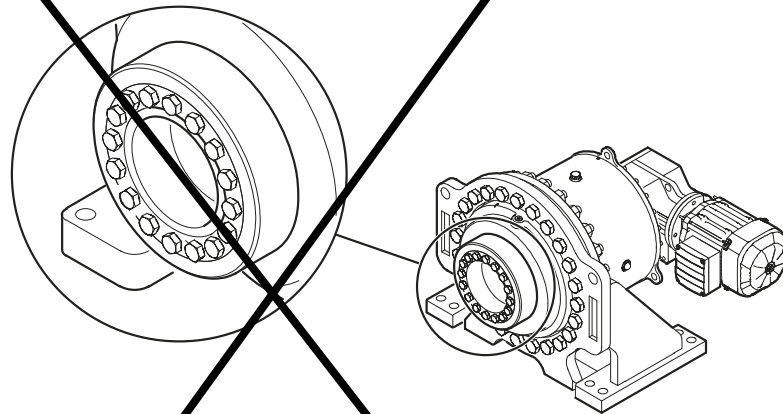
23488859/EN – 02/2017

PL.. Splined solid shaft



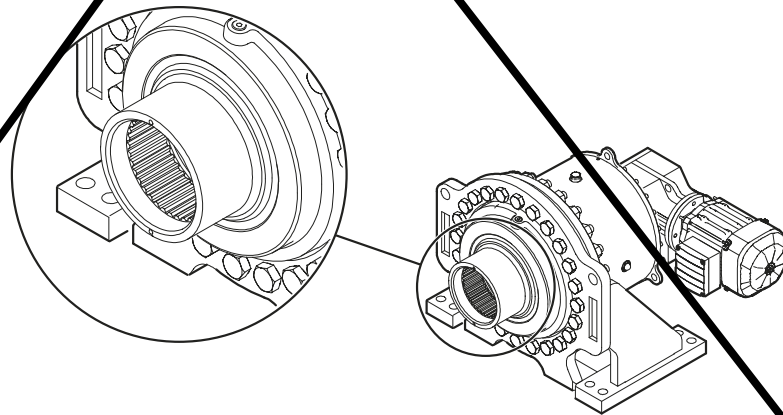
17863714187

PH.. Hollow shaft with shrink disk



9007205553363339

PV.. Splined hollow shaft



17863717515

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2.8 Type designations for gear units and options

2.8.1 P..RF.. helical-planetary gear units

| Gear unit design | Abbreviation | Meaning |
|--------------------------------------|----------------------|---|
| Foot-mounted design (solid shaft) | P..RF.. | <ul style="list-style-type: none"> Solid shaft with key Solid shaft with 2 keys (optional) |
| | PR..RF.. | Smooth solid shaft |
| | PL..RF.. | Splined solid shaft |
| Flange-mounted design (solid shaft) | PF..RF.. | <ul style="list-style-type: none"> Solid shaft with key Solid shaft with 2 keys (optional) |
| | PRF..RF.. | Smooth solid shaft |
| | PLF..RF.. | Splined solid shaft |
| Foot-mounted design (hollow shaft) | PH..RF.. | Hollow shaft with shrink disk |
| | PV..RF.. | Splined hollow shaft |
| Flange-mounted design (hollow shaft) | PHF..RF.. | Hollow shaft with shrink disk |
| | PVF..RF.. | Splined hollow shaft |

2.8.2 ~~P..KF../P..K.. bevel-planetary gear unit~~

| Gear unit design | Abbreviation | Meaning |
|--------------------------------------|------------------------|--|
| Foot-mounted design (solid shaft) | P..KF../ P..K.. | <ul style="list-style-type: none"> Solid shaft with key Solid shaft with 2 keys (optional) |
| | PR..KF../ PR..K.. | Smooth solid shaft |
| | PL..KF../ PL..K.. | Splined solid shaft |
| Flange-mounted design (solid shaft) | PF..KF../ PF..K.. | <ul style="list-style-type: none"> Solid shaft with key Solid shaft with 2 keys (optional) |
| | PRF..KF../ PRF..K.. | Smooth solid shaft |
| | PLF..KF../ PLF..K.. | Splined solid shaft |
| Foot-mounted design (hollow shaft) | PH..KF../ PH..K.. | Hollow shaft with shrink disk |
| | PV..KF../ PV..K.. | Splined hollow shaft |
| Flange-mounted design (hollow shaft) | PHF..KF../ PHF..K.. | Hollow shaft with shrink disk |
| | PVF..KF../ PVF..K.. | Splined hollow shaft |

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~~2.8.3 Additional features of gear units~~

| Designation | |
|-------------|-----------------|
| /T | With torque arm |

~~2.8.4 Input shaft assembly~~

| Designation | |
|-------------|-------------------------|
| AD | Input shaft assembly |
| .../P | With motor platform |
| .../RS | With backstop |
| .../ZR | With centering shoulder |

2.8.5 Adapters

| Designation | |
|---------------|---|
| AM | Adapter for mounting IEC/NEMA motors |
| AQ | Adapter for mounting servomotors |
| AT | Adapter with hydraulic start-up coupling |
| .../RS | And backstop |
| .../BM(G) | And disk brake |
| .../HF | With manual brake release, lockable |
| .../HR | With manual brake release with automatic re-engaging function |

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2 Product description and overview of types

Corrosion and surface protection

2.11 Corrosion and surface protection

2.11.1 OS surface protection

Gear units are available with surface protection OS1, OS2, OS3, and OS4.

The following table provides an overview of coating and surface protection systems.

| SEW-EURODRIVE design | OS1 Low environmental impact | OS2 Medium environmental impact | OS3 High environmental impact | OS4 High environmental impact |
|---|--|--|---|--|
| Used as surface protection with typical ambient conditions Corrosivity categories DIN EN ISO 12944-2 | | | | |
| | Suited for environments prone to condensation and atmospheres with low humidity or contamination, such as outdoor applications under roof or with protection, unheated buildings where condensation can build up: According to corrosivity category: C2 (low) | Suited for environments with high humidity or moderate atmospheric contamination, such as applications outdoors, subject to direct weathering. According to corrosivity category: C3 (moderate) | Suitable for environments with high humidity and occasionally severe atmospheric and chemical contamination. Occasionally acidic or caustic wet cleaning. Also for applications in coastal areas with moderate salt load. According to corrosivity category: C4 (high) | Suitable for environments with permanent humidity or severe atmospheric or chemical contamination. Regular acidic and caustic wet cleaning, also with chemical cleaning agents. According to corrosivity category: C5 (very high) |
| Sample applications | <ul style="list-style-type: none"> • Systems in saw mills • Agitators and mixers | <ul style="list-style-type: none"> • Applications in gravel plants • Cableways | <ul style="list-style-type: none"> • Port cranes • Sewage treatment plants • Mining applications | <ul style="list-style-type: none"> • Drives in malting plants • Wet areas in the beverage industry • Conveyor belts in the food industry |
| Condensation test ISO 6270 | 120 h | 120 h | 240 h | 360 h |
| Salt spray test ISO 7253 | – | 240 h | 480 h | 600 h |
| Top coat color ¹⁾ | RAL 7031 | RAL 7031 | RAL 7031 | RAL 7031 |
| Color according to RAL | Yes | Yes | Yes | Yes |
| Uncoated parts shaft end/flanges | Water and hand perspiration repelling anticorrosion agent applied at the factory for external preservation | | | |

¹⁾ Standard color, can deviate depending on the order, see order documents.

INFORMATION



Sheet metal parts (e.g. protection covers) are painted in RAL 1003.

Special surface protection is also available, please contact SEW-EURODRIVE.

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Motor

TOSHIBA
 Leading Innovation >>>



Efficiency, Quality, & Performance (EQP) —
 The EQP Global® SD is Toshiba's next-generation NEMA Premium® efficiency motor series.

This cutting-edge motor product line is designed to meet or exceed the competitive demands of the global market, as well as the requirements of the Energy Independence & Security Act of 2007 (EISA), while maintaining the high reliability and quality expected from Toshiba.

The EQP Global SD motor series is designed for severe duty applications. Building on over 20 years of success with our EQPIII motor series, the EQP Global SD features multiple new design enhancements that make it one of the lowest cost-of-ownership products in the industry.

Our EQP philosophy extends beyond great products. We provide solutions and Global Supply Chain Management Systems (GSCMS) to meet the evolving needs of our global customers.

- NEMA Premium® Efficiency (1 through 500 HP)
- Meets or Exceeds Energy Independence & Security Act of 2007 (EISA)
- Addresses Global Motor Specifications Including CE, NEMA, & IEC
- Dual-Frequency 50/60 Hz Design (50/60 Hz Listed on Nameplate on 1 through 75 HP)
- Inverter-Duty Rated
- Multi-Mount on 140 through 445 & N449 Frames
- Cast Iron Conduit Box as Standard



3 THREE YEAR WARRANTY

| | |
|-----------------------------|--|
| Horsepower | ¼ to 700 HP |
| Speed (60 Hz) (50 Hz)* | 3600, 1800, or 1200 RPM 3000, 1500, or 1000 RPM |
| Voltage (60 Hz) (50 Hz)* | 230/460, 460, or 575 V 190/380 or 380 V |
| Enclosure | Totally Enclosed Fan Cooled |
| Frame Size | 143T through 5810U |
| Protection | IP54 |
| Construction | Cast Iron (Frame, Brackets, & Conduit Box) |
| Insulation | Class F, Exceeds NEMA MG1 Part 31 (Inverter Duty) |
| Vibration | Typically 0.08 Inches/Second or Less (Unfiltered) |
| Mounting | Motors Suitable for Horizontal & Vertical Mounting; Motors also Available with C-Face Mounting |
| Environment | Severe Duty, Suitable for Use in Division 2 Hazardous Locations |

*50/60 Hz Listed on Nameplate on 1 through 75 HP



EQP Global SD

**LOW VOLTAGE MOTOR
 SEVERE DUTY**





BUILT FOR SEVERE DUTY APPLICATIONS



Nameplate

- Stainless Steel
- NEMA Premium® Design
- Etched Lettering
- Dual-Frequency 50/60 Hz on Nameplate
- Inverter Duty Rating on Nameplate (1 to 200 HP, 4- & 6-Pole)



Construction

- Cast Iron Frame & Bearing Brackets
- Shaft Slinger Protection
- Multi-Mount on 140 Through 445 & N449 Frames
- Gasket Provided Between Motor Frame & Conduit Box
- Typical Unfiltered Vibration Levels of 0.08 Inches/Second or Less
- IP54 Protection
- Multiple Drain Provisions for Horizontal & Vertical Mounting



Conduit Box

- Gasketed Cast Iron Construction
- Provision for Grounding
- Terminal Lugs on 280 Frame & Larger
- Rotatable (90°)
- NPT Drill & Tap Conduit Opening



Bearing System

- Oversized 300 Series Bearings on All Frames (DE & ODE)
- Regreasable 280 Frame & Larger
- Locked Drive-End Bearing 210 Frame & Larger
- Low Temperature-Rise for Extended Life
- L-10 Life of 150,000 Hours for Direct-Coupled Applications
- L-10 Life of 40,000 Hours for Belted Applications



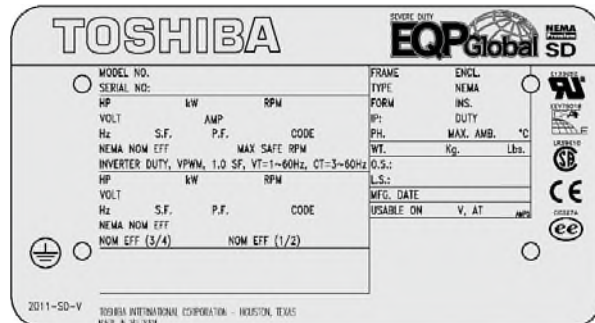
Insulation System

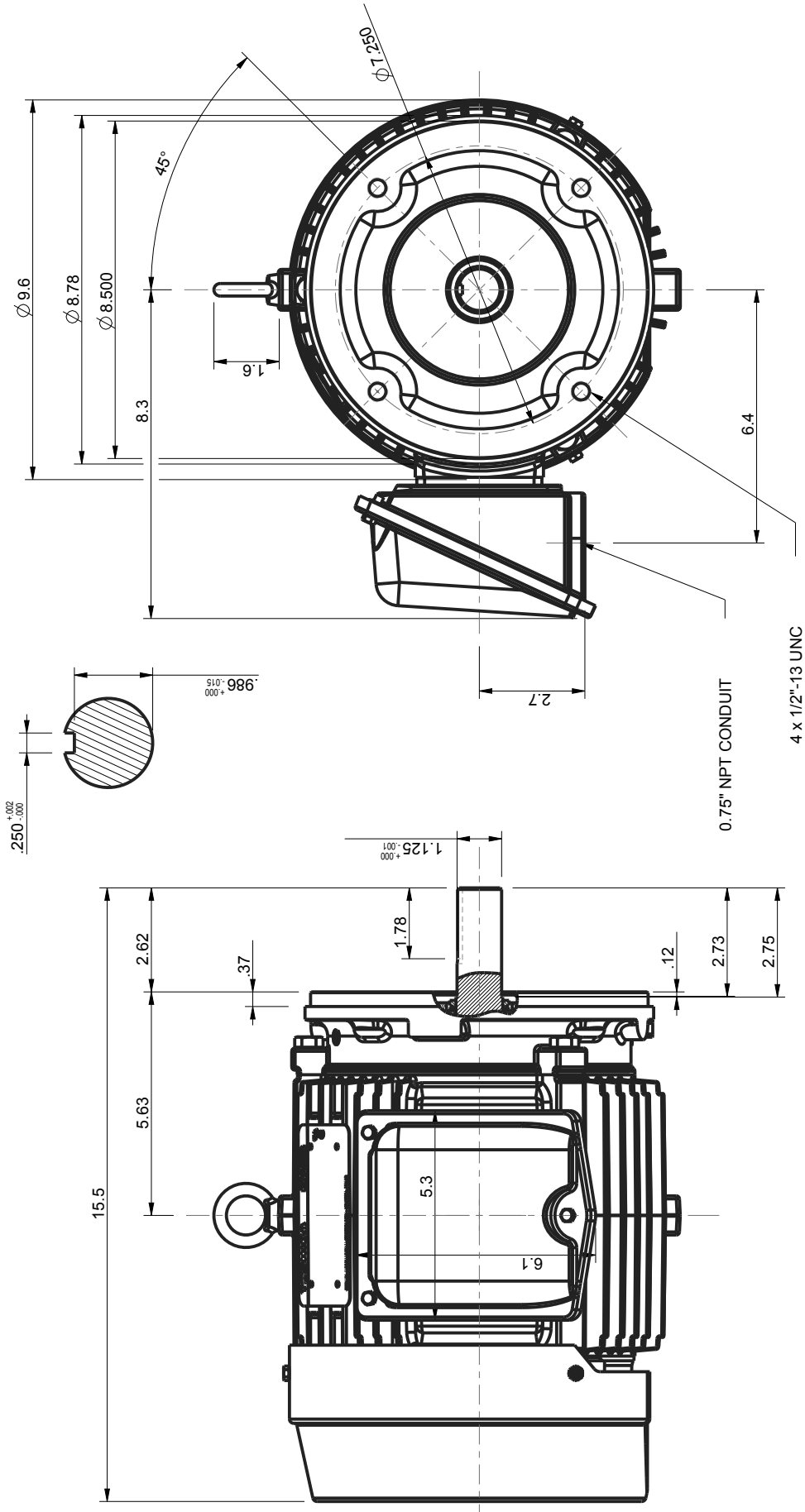
- Major Components Made from Class H Rated Materials
- Low-Loss Electrical Steel
- Exceeds NEMA MG1 Part 31
- 20:1 Constant Torque & 60:1 Variable Torque (1 to 200 HP, 4- & 6-Pole)
- Voltage Withstand Capability of 2000 V in 0.1 μs
- Large Thermal Margins for Extended Life & Reliability
- Phase Paper & Coil Bracing on Both Ends on All Motor Ratings



Testing

- 100% No-Load Commercial Test per IEEE 112 on All Motors
- On 440 Frame & Larger:
 - » Commercial Test & Vibration Test
 - » 100% of Bearings are Ball-Pass Frequency Tested





UNITS: INCHES
 ROTATION FROM NDE
 CCW CW

NOTES:
 1. MAIN CONDUIT BOX MAY BE ROTATED IN 90° INCREMENTS
 2. STANDARD PRODUCT USES BI-DIRECTIONAL FAN. OPPOSITE ROTATION AVAILABLE ONLY BY CONNECTION CHANGE.
 3. KEY DIMENSIONS EQUAL 0.250"x0.250"x1.75" (MOTOR SUPPLIED WITH KEY)

TOSHIBA RESERVES THE RIGHT TO MAKE CHANGES OF TECHNICAL IMPROVEMENT AND THE DATA MAY CHANGE WITHOUT NOTICE

DO NOT USE FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS THE DRAWING IS MARKED AS CERTIFIED

TOTALLY ENCLOSED FAN COOLED
 ROUND BODY C-FACED
 3 PHASE INDUCTION MOTOR
 182TC-184TC F1 ASSEMBLY

DRAWING #: MDSL205-02

REV. DATE: 06/21/18 REV. #: 2 PER.: M. O'DOWD

REV. DESCRIP.:

TOSHIBA
 www.toshiba.com/tic
 SEVERE DUTY **EQP** SD
 TOSHIBA INTERNATIONAL CORPORATION

PRELIMINARY

CERTIFIED



| | | | |
|-------------|------------|------------|--|
| Issued Date | 12/18/2019 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

TYPICAL MOTOR PERFORMANCE DATA

Model: 0054SDSR44A-P

| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
|-----------|-----|------------|--------|-------|----------------|-------------|----------|--------------|
| 5 | 3.7 | 4 | 1750 | 184TC | 230/460 | 60 | 3 | 13.0/6.5 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.15 | CONT | 89.5 | B | J | 40 C |

| Load | HP | kW | Amperes | Efficiency (%) | Power Factor (%) |
|--------------|------|-----|---------|----------------|------------------|
| Full Load | 5 | 3.7 | 6.5 | 89.7 | 81.2 |
| ¾ Load | 3.75 | 2.8 | 5.0 | 89.3 | 77.6 |
| ½ Load | 2.50 | 1.9 | 4.0 | 87.6 | 69.1 |
| ¼ Load | 1.25 | 0.9 | 2.8 | 81.7 | 51.1 |
| No Load | | | 2.7 | | 5.9 |
| Locked Rotor | | | 46 | | 52.8 |

| Torque | | | | Rotor wk ² Inertia (lb-ft ²) |
|-------------------|----------------------|-----------------|--------------------|---|
| Full Load (lb-ft) | Locked Rotor (% FLT) | Pull Up (% FLT) | Break Down (% FLT) | |
| 15 | 255 | 240 | 370 | 0.50 |

| Safe Stall Time(s) | | Sound Pressure dB(A) @ 1M | Bearings* | | Approx. Motor Weight (lbs) |
|--------------------|-----|---------------------------|-----------|----------|----------------------------|
| Cold | Hot | | DE | NDE | |
| 35 | 15 | - | 6306ZZC3 | 6306ZZC3 | 115 |

*Bearings are the only recommended spare part(s).

Motor Options:
 Product Family:EQP Global SD
 Mounting:C-Face Round,Shaft:T Shaft

| | |
|-------------|--|
| Customer | |
| Customer PO | |
| Sales Order | |
| Project # | |

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|-----------|------------------|-------------|-------------|---------------|
| Engineering | zxie | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1119 / 1 |
| Engr. Date | 7/19/2019 | Doc. Approved By | M. Campbell | Doc. Issued | 9/20/2019 |



| | | | |
|-------------|------------|------------|--|
| Issued Date | 12/18/2019 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

TYPICAL MOTOR PERFORMANCE DATA

Model: 0054SDSR44A-P

| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
|-----------|-----|------------|--------|-------|----------------|-------------|----------|--------------|
| 5 | 3.7 | 4 | 1430 | 184TC | 190/380 | 50 | 3 | 16.6/8.3 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.0 | CONT | 86.5 | B | H | 40 C |

| Load | HP | kW | Amperes | Efficiency (%) | Power Factor (%) |
|--------------|------|-----|---------|----------------|------------------|
| Full Load | 5 | 3.7 | 8.3 | 86.4 | 79.0 |
| ¾ Load | 3.75 | 2.8 | 6.5 | 87.7 | 74.6 |
| ½ Load | 2.50 | 1.9 | 5.0 | 87.1 | 64.7 |
| ¼ Load | 1.25 | 0.9 | 4.0 | 81.1 | 43.3 |
| No Load | | | 3.8 | | 6.5 |
| Locked Rotor | | | 52.9 | | 63.2 |

| Torque | | | | Rotor wk ² Inertia (lb-ft ²) |
|-------------------|----------------------|-----------------|--------------------|---|
| Full Load (lb-ft) | Locked Rotor (% FLT) | Pull Up (% FLT) | Break Down (% FLT) | |
| 18.4 | 220 | 200 | 280 | 0.43 |

| Safe Stall Time(s) | | Sound Pressure dB(A) @ 1M | Bearings* | | Approx. Motor Weight (lbs) |
|--------------------|-----|---------------------------|-----------|----------|----------------------------|
| Cold | Hot | | DE | NDE | |
| 35 | 15 | - | 6306ZZC3 | 6306ZZC3 | 115 |

*Bearings are the only recommended spare part(s).

Motor Options:
 Product Family:EQP Global SD
 Mounting:C-Face Round,Shaft:T Shaft

| | |
|-------------|--|
| Customer | |
| Customer PO | |
| Sales Order | |
| Project # | |

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|----------|------------------|-------------|-------------|---------------|
| Engineering | garce | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1119 / 1 |
| Engr. Date | 6/5/2015 | Doc. Approved By | M. Campbell | Doc. Issued | 9/20/2019 |



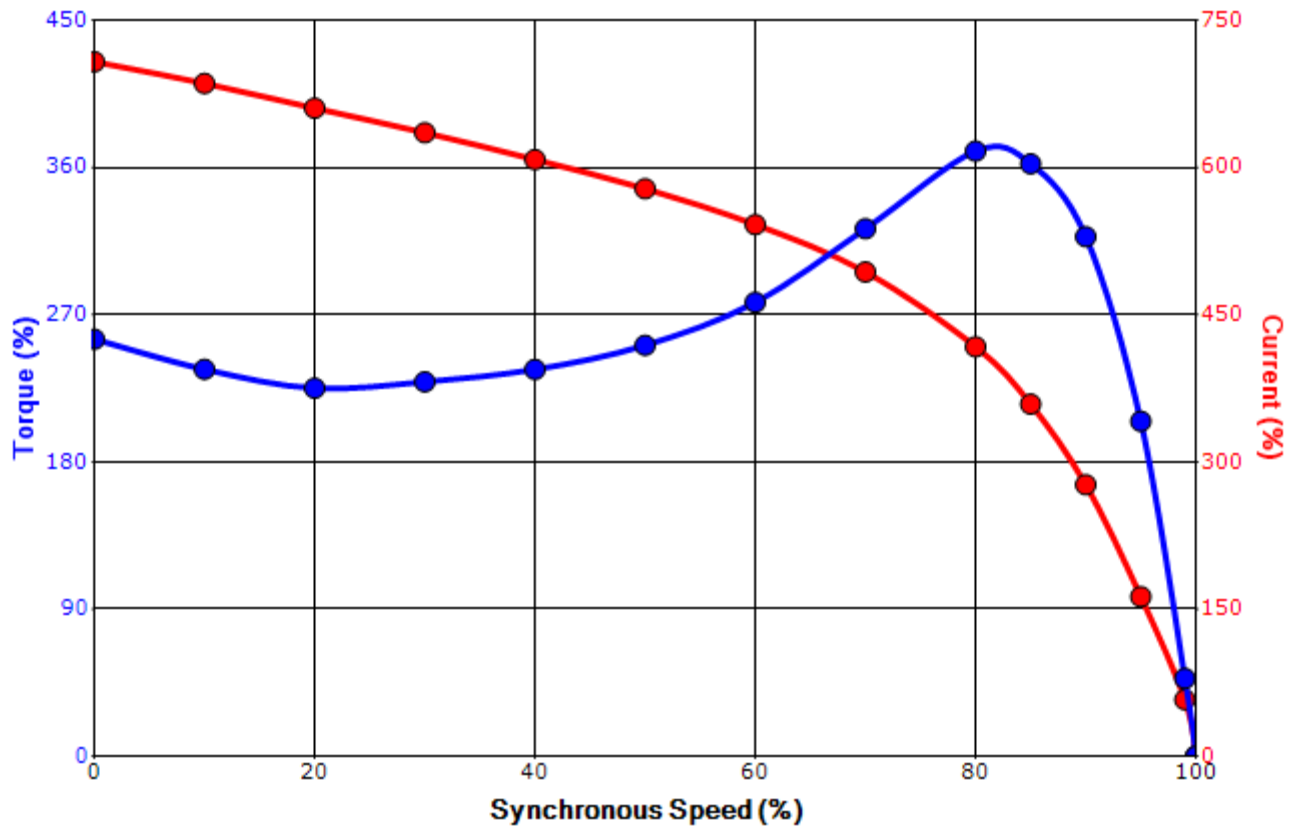
| | | | |
|-------------|------------|------------|--|
| Issued Date | 12/18/2019 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

SPEED TORQUE/CURRENT CURVE

Model: 0054SDSR44A-P

| | | | | | | | | |
|-------------------|---|-------------------|------------------|-------|----------------|-------------|----------------|--------------|
| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
| 5 | 3.7 | 4 | 1750 | 184TC | 230/460 | 60 | 3 | 13.0/6.5 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.15 | CONT | 89.5 | B | J | 40 C |
| Locked Rotor Amps | Rotor wk ² Inertia (lb-ft ²) | Torque | | | | Pull Up (%) | Break Down (%) | |
| | | Full Load (lb-ft) | Locked Rotor (%) | | | | | |
| 46 | 0.50 | 15 | 255 | | 240 | 370 | | |

Design Values



| | | | |
|-------------|--|--|-----|
| Customer | | wk ² Load Inertia (lb-ft ²) | - |
| Customer PO | | Load Type | - |
| Sales Order | | Voltage (%) | 100 |
| Project # | | Accel. Time | - |

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|-----------|------------------|-------------|-------------|-------------|
| Engineering | zxie | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1121/1 |
| Engr. Date | 7/19/2019 | Doc. Approved By | M. Campbell | Doc. Issued | 9/20/2019 |



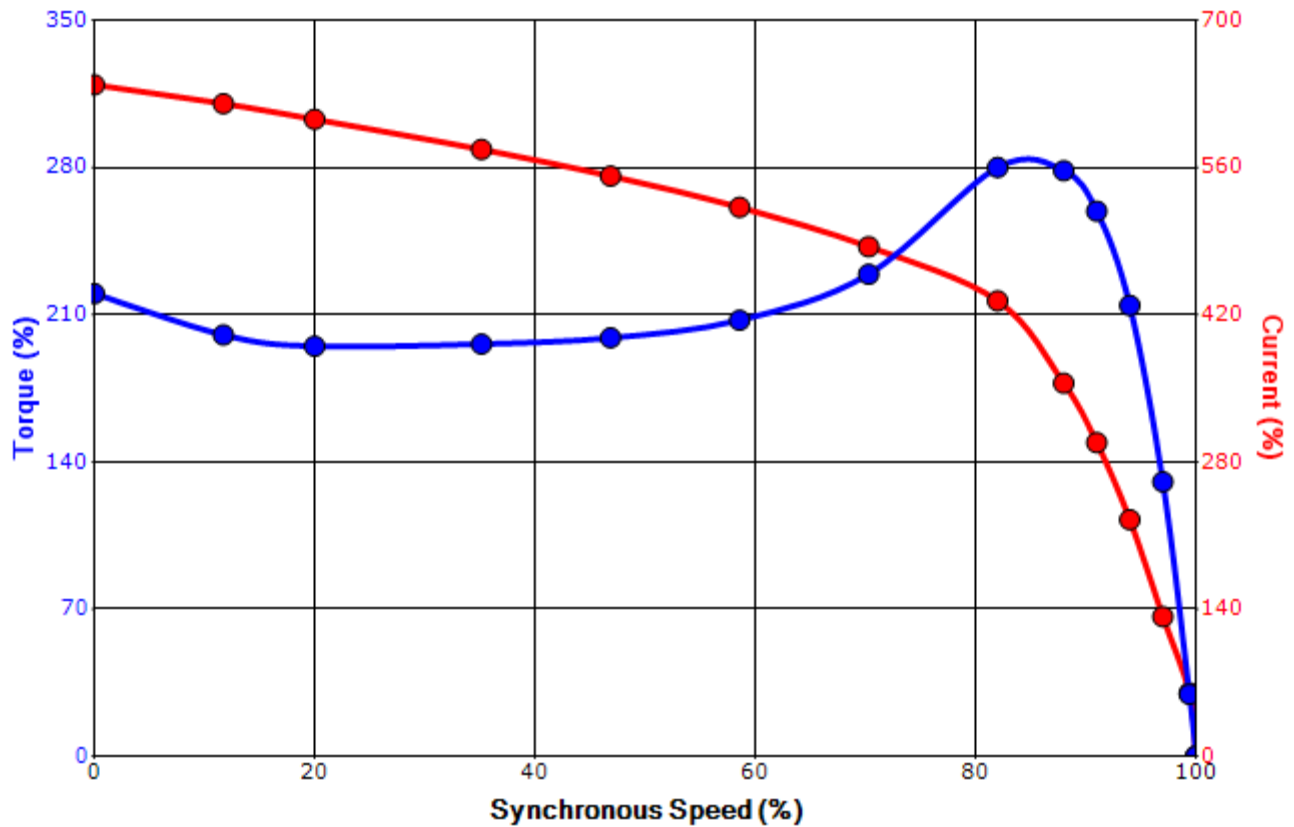
| | | | |
|-------------|------------|------------|--|
| Issued Date | 12/18/2019 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

SPEED TORQUE/CURRENT CURVE

Model: 0054SDSR44A-P

| | | | | | | | | |
|-------------------|---|-------------------|------------------|-------------|----------------|-------------|----------|--------------|
| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
| 5 | 3.7 | 4 | 1430 | 184TC | 190/380 | 50 | 3 | 16.6/8.3 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.0 | CONT | 86.5 | B | H | 40 C |
| Locked Rotor Amps | Rotor wk ² Inertia (lb-ft ²) | Torque | | | | | | |
| | | Full Load (lb-ft) | Locked Rotor (%) | Pull Up (%) | Break Down (%) | | | |
| 52.9 | 0.43 | 18.4 | 220 | 200 | 280 | | | |

Design Values



| | | | |
|-------------|--|--|-----|
| Customer | | wk ² Load Inertia (lb-ft ²) | - |
| Customer PO | | Load Type | - |
| Sales Order | | Voltage (%) | 100 |
| Project # | | Accel. Time | - |

Tag:

All characteristics are average expected values.

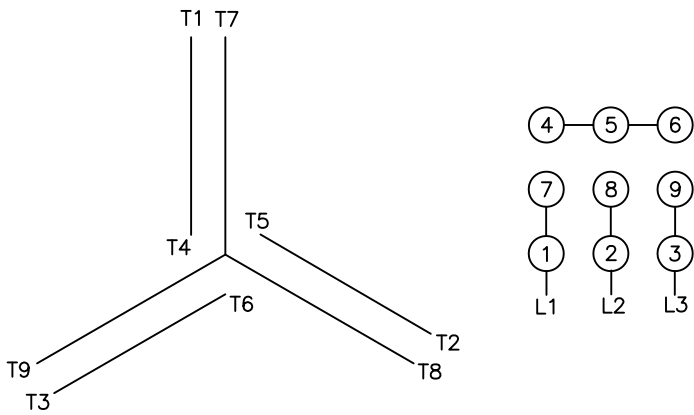
TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|----------|------------------|-------------|-------------|-------------|
| Engineering | garce | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1121/1 |
| Engr. Date | 6/5/2015 | Doc. Approved By | M. Campbell | Doc. Issued | 9/20/2019 |

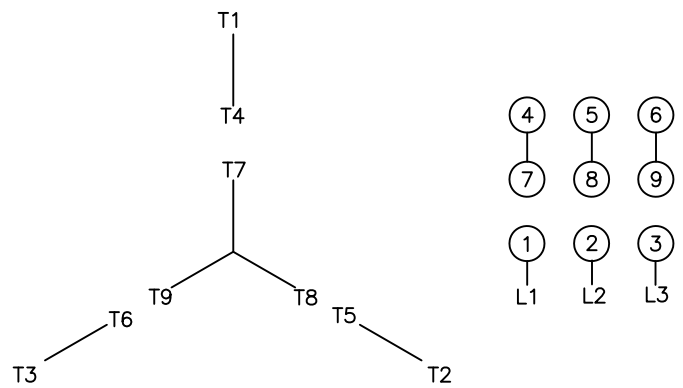
Motor Connection Diagrams
9 Leads

Across-the-Line Starting / Running Connections

Low Voltage Wye



High Voltage Wye



Switch L1 and L2 to reverse rotation

Solenoids

Features

- Pilot operated, normally open or **normally closed**
- Snubber slows disc closing speed to protect system against water hammer damage more effectively than other techniques
- Pressure spike due to water hammer is reduced to a point eliminating the need for suppressors or other controls in most water systems
- Fluid Controls Institute Inc. evaluations have classified these valves:

| | |
|---------------------------------------|-----------------------|
| Pipe Sizes | FCI-82-1 Class |
| 3/8", 1/2" 3/4" | CC |
| 1", 1 1/4" 1 1/2" , 2", 2 1/2" | BB |

Construction

| Valve Parts in Contact with Fluids | |
|------------------------------------|--------------------------|
| Body | Brass |
| Disc | NBR |
| Seals | PTFE & NBR |
| Core Tube | 305 Stainless Steel |
| Core and Plugnut | 430F Stainless Steel |
| Springs | 302 Stainless Steel |
| Piston | Stainless Steel or Brass |
| Shading Coil | Copper |

Electrical

| Standard Coil and Class of Insulation | Watt Rating and Power Consumption | | | | Spare Coil Part No. | | | |
|---------------------------------------|-----------------------------------|-------|------------|-----------|---------------------|--------|----------------|--------|
| | DC Watts | AC | | | General Purpose | | Explosionproof | |
| | | Watts | VA Holding | VA Inrush | AC | DC | AC | DC |
| F | 11.6 | 6.1 | 16 | 30 | 238210 | 238710 | 238214 | 238714 |
| F | 16.8 | 16.1 | 35 | 95 | 272610 | 97617 | 272614 | 97617 |
| F | 22.6 | - | - | - | - | 238710 | - | 238714 |

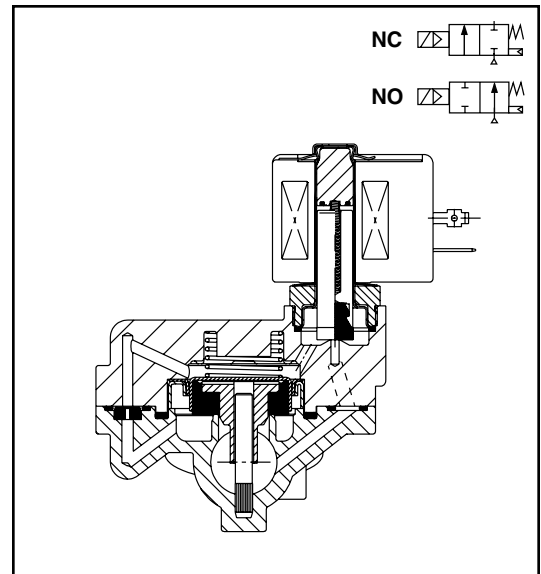
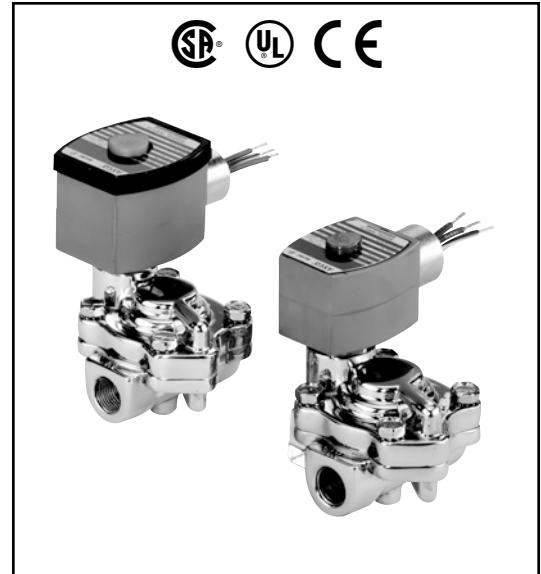
Standard Voltages: 24, 120, 240, 480 volts AC, 60 Hz (or 110, 220 volts AC, 50 Hz).
 6, 12, 24, 120, 240 volts DC. Must be specified when ordering.
 Other voltages are available when required.

Solenoid Enclosures

Standard: RedHat II - Watertight, Types 1, 2, 3, 3S, 4, and 4X; RedHat - Type I.

Optional: RedHat II - Explosionproof and Watertight, Types 3, 3S, 4, 4X, 6, 6P, 7, and 9; RedHat - Explosionproof and Raintight, Types 3, 7, and 9. (To order, add prefix "EF" to catalog number.)

See *Optional Features Section* for other available options.



Nominal Ambient Temp. Ranges:

- RedHat II/
- RedHat AC: 32°F to 125°F (0°C to 52°C)
- RedHat II DC: 32°F to 104°F (0°C to 40°C)
- RedHat DC: 32°F to 77°F (0°C to 25°C)
 (104°F/40°C occasionally)

Refer to *Engineering Section* for details.

Approvals:

- CSA certified (Excludes 8221G015, -035, -G035).
- UL listed, General Purpose Valves.
- RedHat II meets applicable CE directives.

Refer to *Engineering Section* for details.

Specifications (English units)

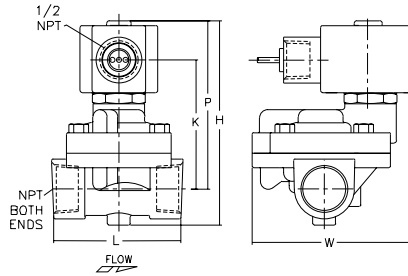
| Pipe Size (in) | Orifice Size (in) | Cv Flow Factor | Operating Pressure Differential (psi) | | | Max. Fluid Temp. °F | | Brass Body Catalog Number | Const. Ref. | Watt Rating/ Class of Coil Insulation ③ | |
|---|-------------------|----------------|---------------------------------------|-----------------|-----------------|---------------------|-----|---------------------------|-------------|---|--------|
| | | | Min. ① | Max. AC Water ② | Max. DC Water ② | AC | DC | | | AC | DC |
| NORMALLY CLOSED (Closed when de-energized) | | | | | | | | | | | |
| 3/8 | 9/16 | 3 | 5 | 150 | 125 | 180 | 150 | 8221G001 | 1 | 6.1/F | 11.6/F |
| 1/2 | 9/16 | 3.5 | 5 | 150 | 125 | 180 | 150 | 8221G003 | 1 | 6.1/F | 11.6/F |
| 3/4 | 3/4 | 5.5 | 5 | 150 | 125 | 180 | 150 | 8221G005 | 2 | 6.1/F | 11.6/F |
| 1 | 1 | 11.5 | 5 | 150 | 125 | 180 | 150 | 8221G007 | 5 | 6.1/F | 11.6/F |
| 1 1/4 | 1 1/8 | 13 | 5 | 150 | 125 | 180 | 150 | 8221G009 | 6 | 6.1/F | 11.6/F |
| 1 1/2 | 1 1/4 | 24 | 5 | 150 | 125 | 180 | 150 | 8221G011 | 7 | 6.1/F | 11.6/F |
| 2 | 1 3/4 | 36 | 5 | 150 | 125 | 180 | 150 | 8221G013 | 11 | 6.1/F | 22.6/F |
| 2 1/2 | 1 3/4 | 38 | 5 | 150 | 125 | 180 | 150 | 8221G015 ④ | 12 | 6.1/F | 22.6/F |
| NORMALLY OPEN (Open when de-energized) | | | | | | | | | | | |
| 3/8 | 9/16 | 3 | 5 | - | 125 | - | 150 | 8221 021 | 15 | - | 16.8/F |
| 3/8 | 9/16 | 3 | 5 | 150 | - | 180 | - | 8221G021 | 3 | 16.1/F | - |
| 1/2 | 9/16 | 3.5 | 5 | - | 125 | - | 150 | 8221 023 | 15 | - | 16.8/F |
| 1/2 | 9/16 | 3.5 | 5 | 150 | - | 180 | - | 8221G023 | 3 | 16.1/F | - |
| 3/4 | 3/4 | 5.5 | 5 | - | 125 | - | 150 | 8221 025 | 16 | - | 16.8/F |
| 3/4 | 3/4 | 5.5 | 5 | 150 | - | 180 | - | 8221G025 | 4 | 16.1/F | - |
| 1 | 1 | 11.5 | 5 | - | 125 | - | 150 | 8221 027 | 17 | - | 16.8/F |
| 1 | 1 | 11.5 | 5 | 150 | - | 180 | - | 8221G027 | 8 | 16.1/F | - |
| 1 1/4 | 1 1/8 | 13 | 5 | - | 125 | - | 150 | 8221 029 | 18 | - | 16.8/F |
| 1 1/4 | 1 1/8 | 13 | 5 | 150 | - | 180 | - | 8221G029 | 9 | 16.1/F | - |
| 1 1/2 | 1 1/4 | 24 | 5 | - | 125 | - | 150 | 8221 031 | 19 | - | 16.8/F |
| 1 1/2 | 1 1/4 | 24 | 5 | 150 | - | 180 | - | 8221G031 | 10 | 16.1/F | - |
| 2 | 1 3/4 | 36 | 5 | - | 125 | - | 150 | 8221 033 | 20 | - | 16.8/F |
| 2 | 1 3/4 | 36 | 5 | 150 | - | 180 | - | 8221G033 | 13 | 16.1/F | - |
| 2 1/2 | 1 3/4 | 38 | 5 | - | 125 | - | 150 | 8221 035 ④ | 21 | - | 16.8/F |
| 2 1/2 | 1 3/4 | 38 | 5 | 150 | - | 180 | - | 8221G035 ④ | 14 | 16.1/F | - |

① Valves require a 5 psi Minimum Pressure Differential to open. Once open, they remain open with 3 psi differential pressure.
 ② Refer to Steam/Hot Water Valve Series for Hot Water constructions.
 ③ On 50 hertz service, the watt rating for the 6.1/F solenoid is 8.1 watts.
 ④ Not CSA certified.

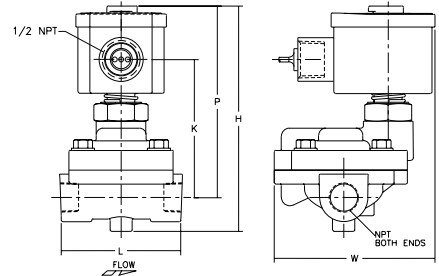
Dimensions: inches (mm)

| Const. Ref. | | H | K | L | P | W |
|-------------|----|------|------|------|------|------|
| 1 | in | 4.34 | 2.69 | 2.72 | 3.59 | 3.41 |
| | mm | 110 | 68 | 69 | 91 | 87 |
| 2 | in | 4.53 | 2.85 | 2.78 | 3.75 | 3.41 |
| | mm | 115 | 72 | 71 | 95 | 87 |
| 3 | in | 5.22 | 3.14 | 2.72 | 4.47 | 3.69 |
| | mm | 133 | 80 | 69 | 114 | 94 |
| 4 | in | 5.41 | 3.30 | 2.78 | 4.62 | 3.69 |
| | mm | 137 | 84 | 71 | 117 | 94 |
| 5 | in | 5.62 | 3.15 | 3.75 | 4.03 | 3.16 |
| | mm | 143 | 80 | 95 | 102 | 80 |
| 6 | in | 5.56 | 3.15 | 3.66 | 4.03 | 3.56 |
| | mm | 141 | 80 | 93 | 102 | 90 |
| 7 | in | 6.12 | 3.30 | 4.38 | 4.19 | 4.12 |
| | mm | 156 | 84 | 111 | 106 | 105 |
| 8 | in | 6.53 | 3.59 | 3.75 | 4.91 | 3.16 |
| | mm | 166 | 91 | 95 | 125 | 80 |
| 9 | in | 6.47 | 3.59 | 3.56 | 4.91 | 3.56 |
| | mm | 164 | 91 | 93 | 125 | 90 |
| 10 | in | 7.03 | 3.74 | 4.38 | 5.06 | 4.12 |
| | mm | 179 | 95 | 111 | 129 | 105 |
| 11 | in | 7.38 | 3.71 | 5.06 | 4.59 | 4.72 |
| | mm | 188 | 94 | 129 | 117 | 120 |
| 12 | in | 7.38 | 3.71 | 5.50 | 4.59 | 5.19 |
| | mm | 188 | 94 | 140 | 117 | 132 |
| 13 | in | 8.22 | 4.15 | 5.06 | 5.47 | 4.72 |
| | mm | 209 | 105 | 129 | 139 | 120 |
| 14 | in | 8.22 | 4.15 | 5.50 | 5.47 | 5.19 |
| | mm | 209 | 105 | 140 | 139 | 132 |
| 15 | in | 5.22 | - | 2.72 | 4.47 | 3.69 |
| | mm | 133 | - | 69 | 114 | 94 |
| 16 | in | 5.41 | - | 2.78 | 4.62 | 3.69 |
| | mm | 137 | - | 71 | 117 | 94 |
| 17 | in | 6.53 | - | 3.75 | 4.91 | 3.16 |
| | mm | 166 | - | 95 | 125 | 80 |
| 18 | in | 6.47 | - | 3.66 | 4.91 | 3.56 |
| | mm | 164 | - | 93 | 125 | 90 |
| 19 | in | 7.03 | - | 4.38 | 5.06 | 4.12 |
| | mm | 179 | - | 111 | 129 | 105 |
| 20 | in | 8.22 | - | 5.06 | 5.47 | 4.72 |
| | mm | 209 | - | 129 | 139 | 120 |
| 21 | in | 8.22 | - | 5.50 | 5.47 | 5.19 |
| | mm | 209 | - | 140 | 139 | 132 |

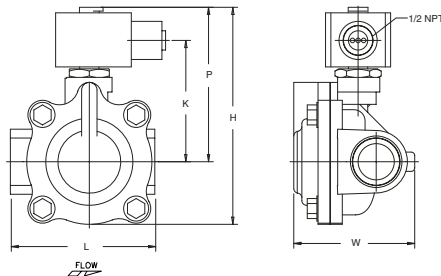
Const. Ref. 1, 2



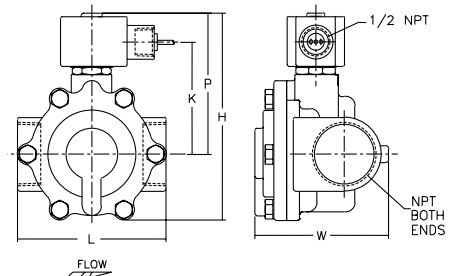
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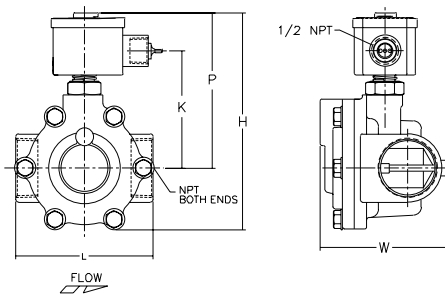
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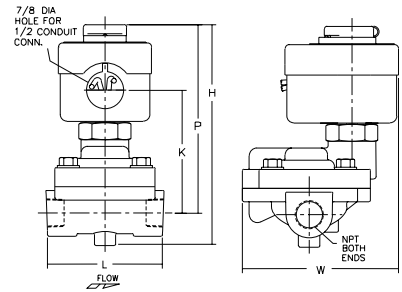
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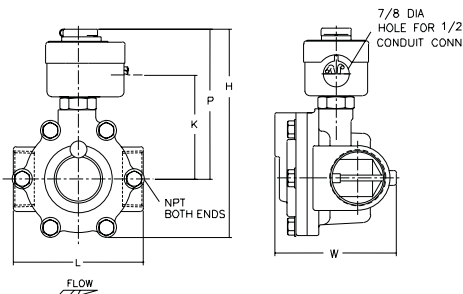
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Const. Ref. 15, 16



Const. Ref. 17 - 21

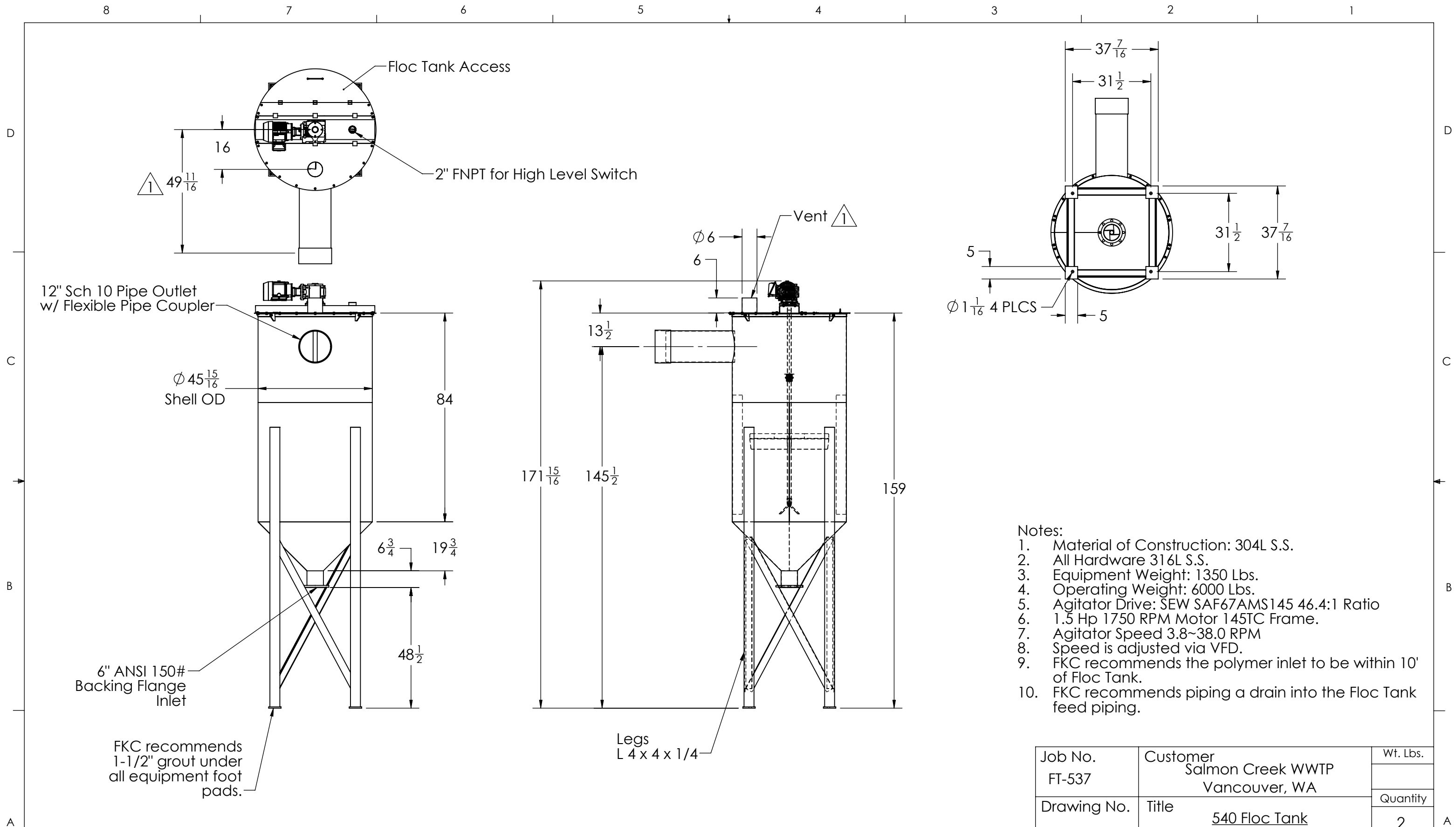


IMPORTANT: Valves may be mounted in any position.

Flocculation Tank

Salmon Creek WWTP Vancouver, WA
 BHX-1350x7500L Screw Press
 FKC Bill of Materials

| Item # | 540 Gal. Flocculation Tank - 2 Req. | Manufacturer | Part Number | Quantity (Per Tank) | Material of Construction |
|--------|-------------------------------------|--------------|---------------|------------------------|-----------------------------|
| 201 | Motor 1.5 HP 1800 RPM | Toshiba | Y154SDSR42A-P | 1 | CS |
| 202 | Gear Box | SEW | SAF67AMS145 | 1 | CS |
| 203 | Tank Body | FKC | -- | 1 | 304LSS |
| 204 | Agitator Shaft | FKC | -- | 1 | 304LSS |
| 205 | Agitator Base | FKC | -- | 1 | 304LSS |
| 206 | Covers | FKC | -- | 1 | 304LSS |
| 207 | Flexible Pipe Coupler | Fernco | 1056-1010 | 1 | Rubber |
| 208 | Capacitance Level Switch | Warrick | 3E2B | 1 | See CP Submittal |

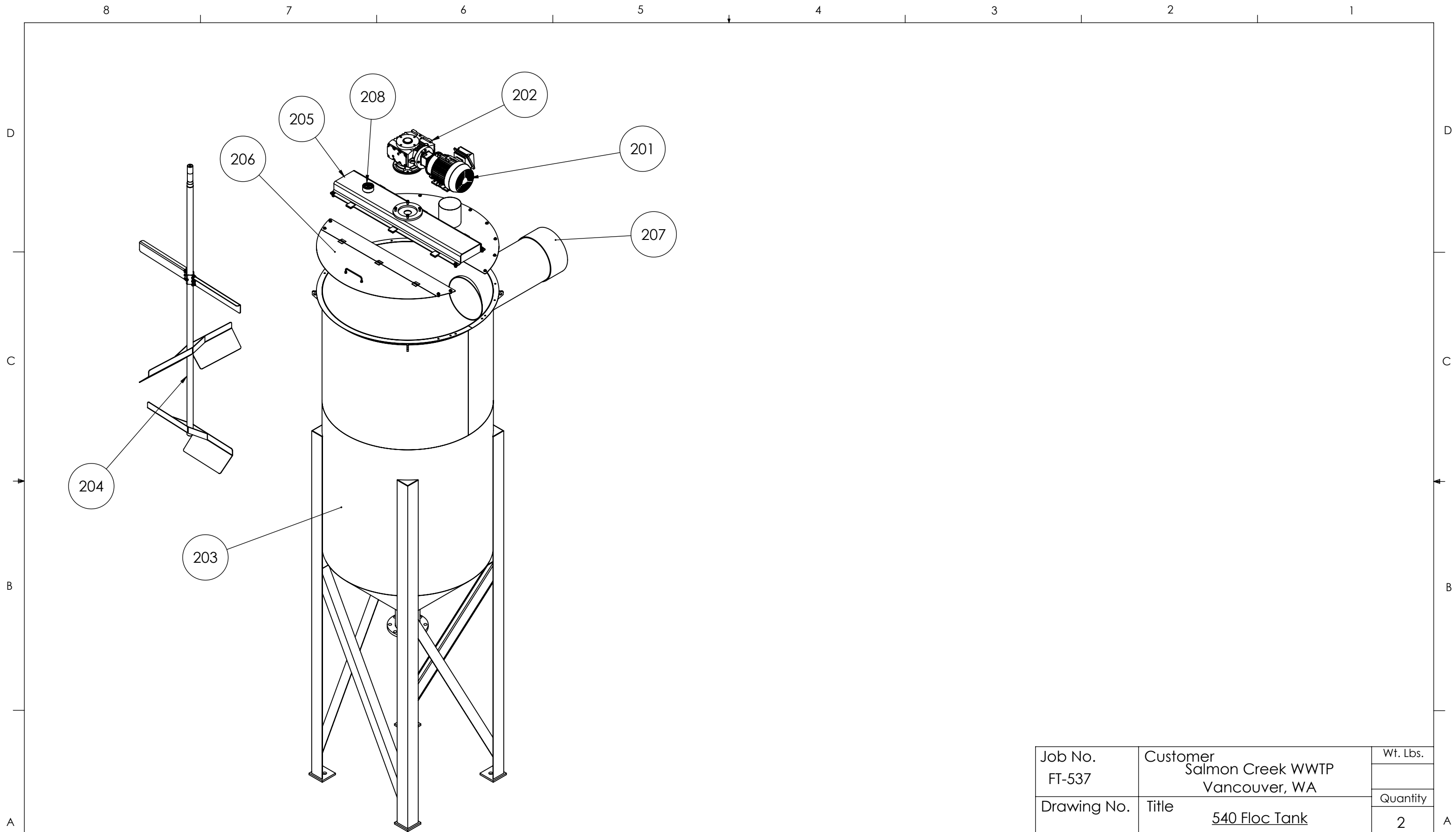


- Notes:
1. Material of Construction: 304L S.S.
 2. All Hardware 316L S.S.
 3. Equipment Weight: 1350 Lbs.
 4. Operating Weight: 6000 Lbs.
 5. Agitator Drive: SEW SAF67AMS145 46.4:1 Ratio
 6. 1.5 Hp 1750 RPM Motor 145TC Frame.
 7. Agitator Speed 3.8~38.0 RPM
 8. Speed is adjusted via VFD.
 9. FKC recommends the polymer inlet to be within 10' of Floc Tank.
 10. FKC recommends piping a drain into the Floc Tank feed piping.

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 THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FKC CO LTD. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FKC CO LTD IS PROHIBITED.

| | | | |
|-----|----------------------|---------|------|
| 3 | | | |
| 2 | | | |
| 1 | Vent & Outlet Length | 1/26/26 | RTB |
| 0 | Issued for Approval | 12/8/25 | TC |
| No. | Alteration | Date | Sign |

| | | |
|---|--|-----------------|
| Job No. FT-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. A537-200 | Title <u>540 Floc Tank</u> <u>Assembly Details</u> | Quantity 2 |
| | | Date 12/8/25 |
|  FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Drawn By TC |
| | Revision | SHEET 1 OF 2 |



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| | | | |
|-----|---------------------|---------|------|
| 3 | | | |
| 2 | | | |
| 1 | | | |
| 0 | Issued for Approval | 12/8/25 | TC |
| No. | Alteration | Date | Sign |

| | | |
|---|--|-----------------|
| Job No. FT-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. G537-201 | Title <u>540 Floc Tank</u> <u>Parts List</u> | Quantity 2 |
| | | Date 12/8/25 |
|  FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Drawn By TC |
| Revision | | SHEET 2 OF 2 |

Gearbox

PRODUCT FOCUS



S-Series Helical-Worm Gearmotors

SEW-Eurodrive's S-Series right angle gearmotors offer helical-worm gearing that combines durability with exceptional performance in a compact design. Its helical input stage provides greater efficiency than a single stage worm unit. An additional helical gear unit added to the input enables very large ratios.

Product Range

- Power ratings from 0.05 to 46 HP
- Ratios from 3.97 to 33,818
- Output torques to 35,400 lb-in

Reducer

- Efficiency up to 94%, depending on ratio
- Worm shaft and helical gears manufactured from certified steel, heat treated to a case hardness of 58-62 Rockwell C for infinite fatigue strength
- Gears are milled, hardened and ground to assure minimum noise, minimum heat, and maximum efficiency
- Torque rating based upon mechanical capacity under continuous duty operation
- Gearcases made of high strength gray cast iron, SAE Class 30 or equivalent (GG20)
- Anti-friction bearings for optimum load capacity and long life
- Captured keys on input and output shafts
- O-ring on flange to prevent oil leakage when mounted on a surface that is not totally flat
- High cross-section modulus design, rugged monobloc design for maximum rigidity
- Center tapped holes on output shafts to aid the installation of shaft components
- Exclusive interlocking 2-piece seal design consisting of a patented bi-helix FKM inner seal and a double-lip Nitrile (Buna N) outer seal – provides three sealing surfaces against contaminants
- Metric or Inch dimension output shaft
- Removable inspection cover
- Shock capacity meets or exceeds AGMA 6009-A00



Motor

- Inverter duty
- Connection terminals
- Low rotor inertia for high cycling and tight control
- EISA (IE3) "Premium" available
- 50Hz, 60Hz, or 50/60Hz global motor
- **CE** for shipment into Europe

Mounting

- Torque arm for shaft mounting
- B14 or B5 flange with centering tenon
- Foot mounting
- Can be ordered for any mounting orientation

Optional Features

- C-Face or IEC motor adapter
- TorqLOC® taper hollow shaft
- Corrosion and/or long term storage protection
- FKM seals instead of NBR
- High cycling fail-safe brake
- Forced cooling fan for low frequency operation
- Thermostat or thermistor protection
- Plug connectors for quick motor replacement
- Two-speed motor
- Motor encoder - built-in or externally mounted
- CSA hazardous location and ATEX rated motors
- Servo Motor



U.S. Operations:

Midwest Region

SEW-Eurodrive, Inc.
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cstroy@seweurodrive.com

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About SEW-Eurodrive

Our product is motion. Our focus is solutions. As a worldwide supplier of innovative gearing, motor, and electronic drive technology, we have been solving problems in large and small applications within virtually every industry for over 80 years.

We also specialize in reducing the total cost of ownership with our customer-specific energy saving solutions.

Globally, we have assembly centers in 44 countries, along with 15 production plants. Therefore, we are able to provide uniform quality standards and international application experience.

Locally, we provide final assembly and custom modifications plus assistance with project planning, startup, and training. All products are backed by our industry-leading 24/7 support program.

SEW-Eurodrive ... Driving the World

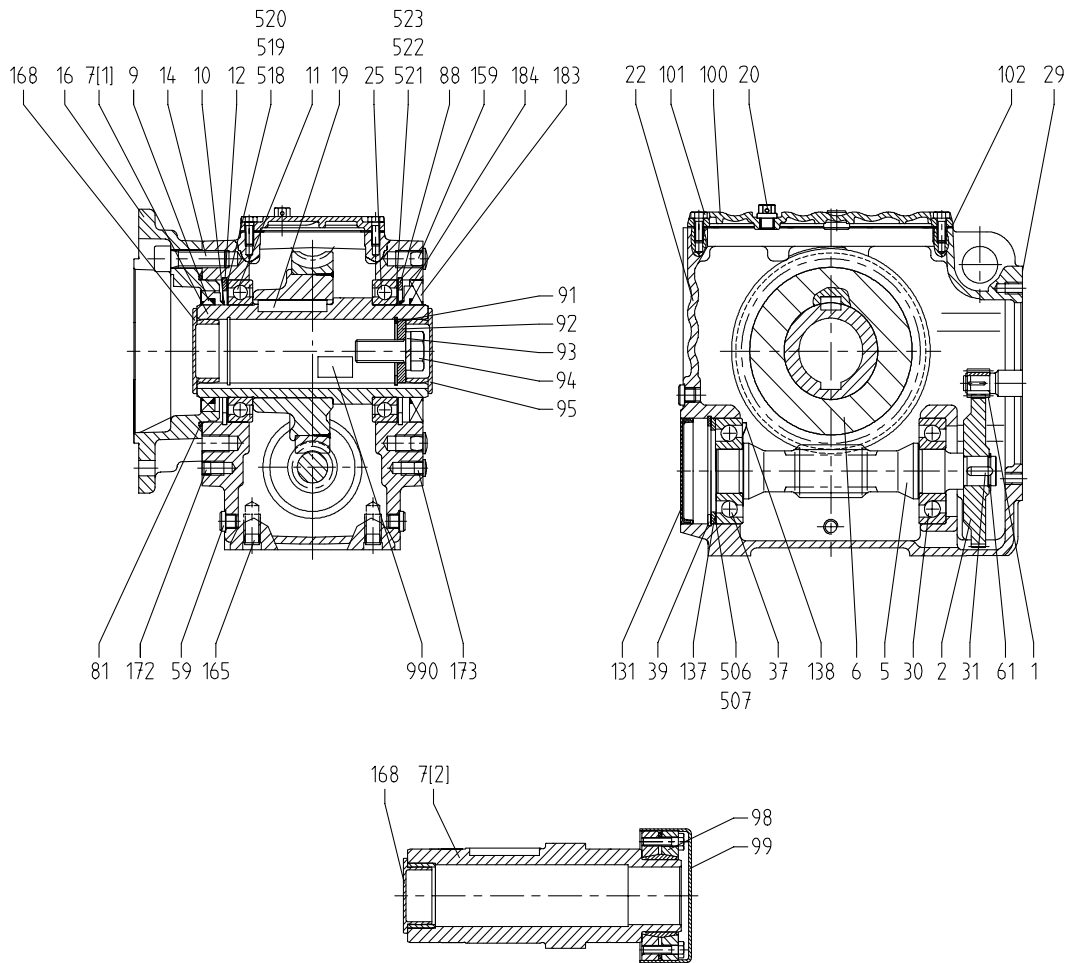


Parts List

Helical-worm gear units SAF67 [1], SHF67A [2]

28 263 096

Page 1 of 2



| No. | Description | DIN standard label | Part No. | Qty | No. | Description | DIN standard label | Part No. | Qty |
|-----|--------------------------------------|------------------------|-------------|-----|-----|--------------------------|------------------------|----------------|-----|
| 1 | Pinion | | * | 1 | 22 | Gear Housing | | 0 644 021 5 | 1 |
| 2 | Gear wheel | | * | 1 | 25 | Deep Groove Ball Brg | DIN625 6013-Z | 0 010 544 9 | 1 |
| 5 | Worm | | * | 1 | 29 | Surface sealing compound | | 0 910 255 8 X) | |
| 6 | Worm wheel | | * | 1 | 30 | Angul.Cont. BallBrg. | DIN628 7306B | 0 010 564 3 | 1 |
| 7 | Hollow Shaft \varnothing 40 [1] d) | | 0 644 055 X | 1 | 31 | Key | DIN6885 B 6x6x12-55HRC | 0 013 483 X | 1 |
| 7 | Hollow Shaft \varnothing 45 [1] e) | | 0 644 031 2 | 1 | 37 | Angul.Cont. BallBrg. | DIN628 7306B | 0 010 564 3 | 1 |
| 7 | Hollow Shaft Compl. [2] | | 0 644 215 3 | 1 | 39 | Circlip/Snap r. | DIN472 72x2,5 | 0 010 322 5 | 1 |
| 9 | Oil Seal | BA-SF 65x85x12/8-NBR | 0 017 777 6 | 1 | 59 | Screw Plug | M10x1 | 0 011 426 X | 6 |
| 10 | Oil Seal a) | B1-SF65x79x10/14,5-FPM | 0 017 422 X | 1 | 61 | Circlip/Snap r. | DIN471 20x1,2 | 0 010 271 7 | 1 |
| 11 | Deep Groove Ball Brg | DIN625 6013-Z | 0 010 544 9 | 1 | 81 | O-Ring | 95x2 | 0 017 666 4 | 1 |
| 12 | Circlip/Snap r. | DIN472 100x3 | 0 010 327 6 | 1 | 88 | Circlip/Snap r. | DIN472 100x3 | 0 010 327 6 | 1 |
| 14 | Slotted Head Screw | DIN912 M 12x40-8.8 | 0 013 215 2 | 4 | 91 | Circlip/Snap r. d) | DIN472 40x1,75 | 0 010 316 0 | 1 |
| 16 | Output Flange | | 0 644 038 X | 1 | 91 | Circlip/Snap r. e) | DIN472 45x1,75 | 0 013 009 5 | 1 |
| 19 | Key | DIN6885 A 12x8x50-C45K | 0 010 033 1 | 1 | 92 | Disc d) | 17x39,5x6 | 0 103 973 3 | 1 |
| 20 | Vent Valve | M10x1-ST | 0 013 570 4 | 1 | 92 | Disc e) | 17x44,5x6 | 0 103 428 6 | 1 |

* Gearing parts have embossed part numbers. These must always be quoted.

X) As required

a) Double sealing

c) Only for mounting position H4

d) Hollow shaft bore \varnothing 40

e) Hollow shaft bore \varnothing 45

When ordering spare parts always quote nameplate data with serial number and designation with part number!

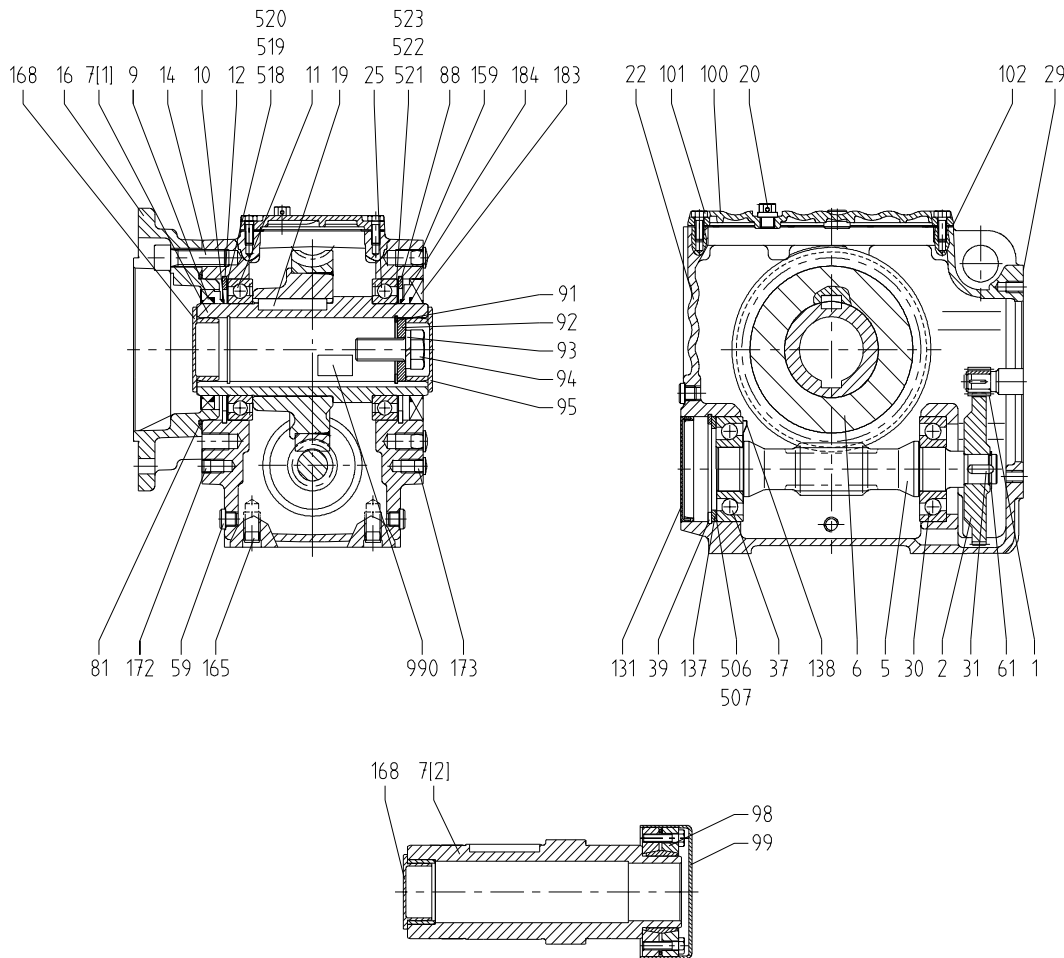
Mount-on gear units have motors, variable speed gear units or special input shaft assemblies mounted at the drive end. For parts see appropriate parts list.

Parts List

Helical-worm gear units SAF67 [1], SHF67A [2]

28 263 096

Page 2 of 2



| No. | Description | DIN standard label | Part No. | Qty | No. | Description | DIN standard label | Part No. | Qty |
|-----|-----------------------|---------------------|-------------|-----|-----|-----------------------|------------------------|-------------|-----|
| 93 | Lock Washer | DIN128 A 16 | 0 010 995 9 | 1 | 168 | Protection Cap [1] e) | 45,5 | 0 114 659 9 | 1 |
| 94 | Hexagon Head Screw | ISO4017 M 16x40-8.8 | 0 010 127 3 | 1 | 168 | Protection Cap [2] | 40,6 | 0 114 093 0 | 1 |
| 95 | Protection Cap d) | 40,6 | 0 114 093 0 | 1 | 172 | Plug | 9,5 | 0 011 371 9 | 5 |
| 95 | Protection Cap e) | 45,5 | 0 114 659 9 | 1 | 173 | Plug | 9,5 | 0 011 371 9 | 5 |
| 98 | Shrink Disc | 50x90 | 0 643 475 4 | 1 | 183 | Oil Seal | BA-SF 65x100x12/8-NBR | 0 017 776 8 | 1 |
| 99 | Hood Cover | | 0 114 094 9 | 1 | 184 | Oil Seal a) | B1-SF65x94x10/14,5-FPM | 0 017 421 1 | 1 |
| 100 | Gear Cover Plate | | 0 643 210 7 | 1 | 506 | Shim | DIN988 56x72x0,1 | 0 010 377 2 | X) |
| 101 | Hexagon Head Screw | ISO4017 M 6x16-8.8 | 0 010 105 2 | 8 | 507 | Shim | DIN988 56x72x0,3 | 0 010 401 9 | X) |
| 102 | Gasket | | 0 643 505 X | 1 | 518 | Shim | DIN988 80x100x0,1 | 0 010 381 0 | X) |
| 131 | Closing Cap | 72x9 | 0 010 692 5 | 1 | 519 | Shim | DIN988 80x100x0,3 | 0 010 405 1 | X) |
| 137 | Spacer | DIN988 S 56x72x3 | 0 010 356 X | 1 | 520 | Shim | DIN988 80x100x0,5 | 0 010 427 2 | X) |
| 138 | Nilos Ring c) | 7306 AVH | 0 013 683 2 | 1 | 521 | Shim | DIN988 80x100x0,1 | 0 010 381 0 | X) |
| 159 | Plug | 10,5 | 0 011 372 7 | 4 | 522 | Shim | DIN988 80x100x0,3 | 0 010 405 1 | X) |
| 165 | Plug | 10,7 | 0 013 615 8 | 4 | 523 | Shim | DIN988 80x100x0,5 | 0 010 427 2 | X) |
| 168 | Protection Cap [1] d) | 40,6 | 0 114 093 0 | 1 | 990 | Contactcorros.Inhib. | | 0 910 503 4 | 1 |

* Gearing parts have embossed part numbers. These must always be quoted.

X) As required

a) Double sealing

c) Only for mounting position H4

d) Hollow shaft bore \varnothing 40

e) Hollow shaft bore \varnothing 45

When ordering spare parts always quote nameplate data with serial number and designation with part number!

Mount-on gear units have motors, variable speed gear units or special input shaft assemblies mounted at the drive end. For parts see appropriate parts list.

Parts List

23 268 06 00



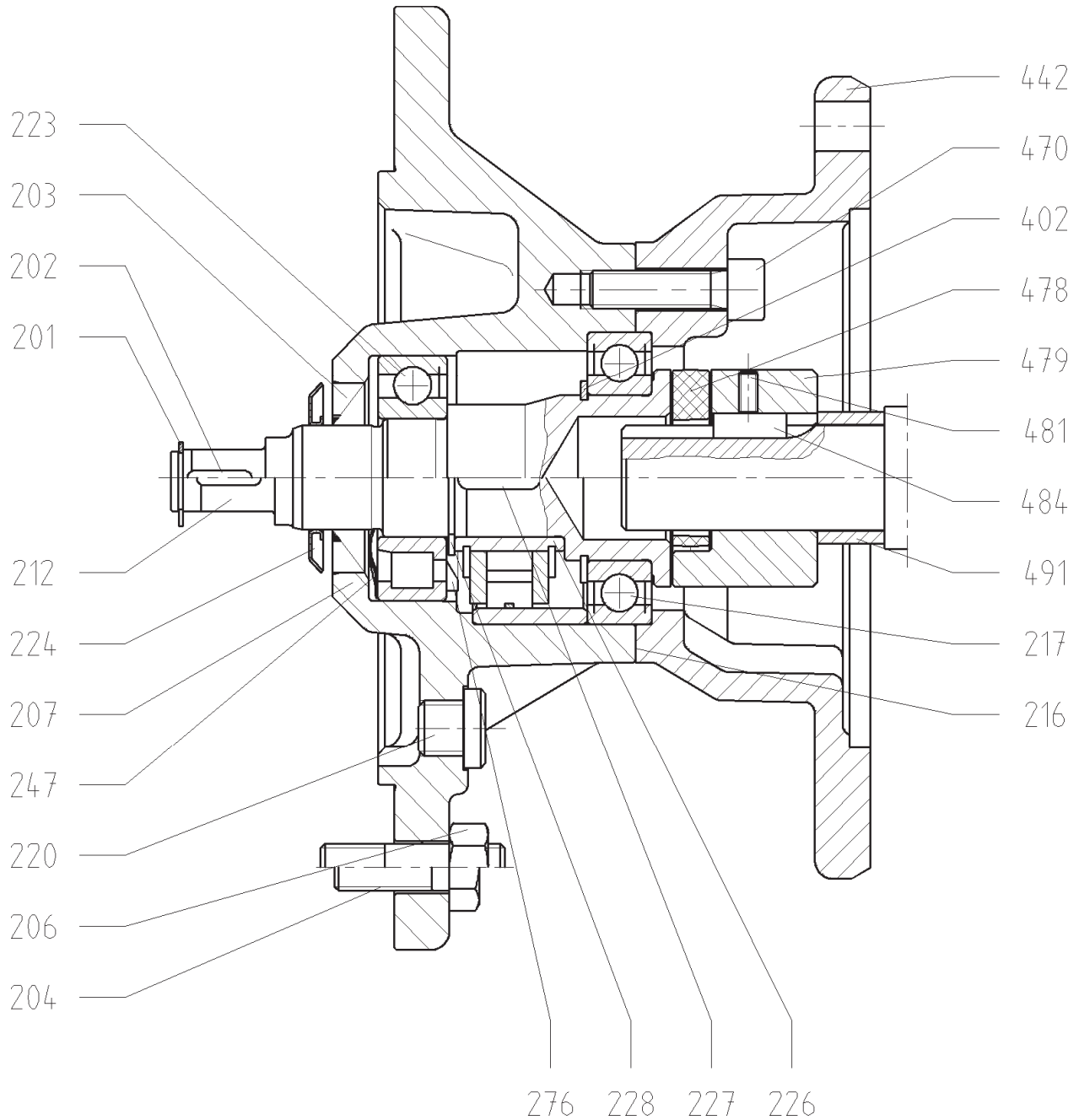
Adapter

EN Page 1 / 2

AM143, AM145

EG 15.04.2014

Backstop for mounting NEMA motors version with dog clutch



When ordering spare parts always quote nameplate data with serial number and designation with part number!

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Parts List

23 268 06 00



Adapter

EN Page 2 / 2

AM143, AM145

EG 15.04.2014

Backstop for mounting NEMA motors version with dog clutch

| No. | Description | Additional specifications | SEW standard label | Part No. | Qty. |
|-----|----------------------------|--|--------------------------|----------|------|
| 201 | Snap ring | pinion shaft end Ø12 | W4173 SW11x1-FS | 00115207 | 1 |
| 201 | Retaining ring | pinion shaft end Ø14 | DIN471 14x1-FS | 00102660 | 1 |
| 202 | Key | pinion shaft end Ø12 | DIN6885-1 A3x3x14 +C | 00100692 | 1 |
| 202 | Key | pinion shaft end Ø14 | DIN6885-1 A3x3x14 +C | 00100692 | 1 |
| 203 | Oil seal | | DIN A22x40x7-NBR | 00120790 | 1 |
| 203 | Oil seal | optional oil seal in FKM; ATEX model according to category II2GD | W A22x40x7-FKM | 00175404 | 1 |
| 204 | Hex head screw | for flange Ø200 | ISO4017 M10x25-8.8-A2F | 00101168 | 4 |
| 204 | Hex head screw | for flange Ø250 | ISO4017 M12x30-8.8-A2F | 00101222 | 4 |
| 204 | Stud | for flange Ø120 | DIN939 M6x18-8.8-A2F | 00134074 | 4 |
| 204 | Stud | for flange Ø160 | DIN939 M8x25-8.8-A2F | 13303481 | 4 |
| 204 | Stud | mounting to R27;F27;W37 | W4061 M6x18-8.8-A2F | 00132918 | 4 |
| 204 | Stud | mounting to W47 | DIN835 M8x25-8.8-A2F | 13229397 | 4 |
| 206 | Hexagon nut | for flange Ø120 | ISO4032 M6-8-St-A2F | 00101982 | 4 |
| 206 | Hexagon nut | for flange Ø160 | ISO4032 M8-8-St-A2F | 00101990 | 4 |
| 207 | Flange | | Ø120mm | 0165036X | 1 |
| 207 | Flange | | Ø160mm | 01650386 | 1 |
| 207 | Flange | | Ø200mm | 01650408 | 1 |
| 207 | Flange | | Ø250mm | 01650424 | 1 |
| 207 | Flange | Backstop | Ø120mm | 01651935 | 1 |
| 207 | Flange | Backstop | Ø160mm | 01651943 | 1 |
| 207 | Flange | Backstop | Ø200mm | 01651951 | 1 |
| 207 | Flange | Backstop | Ø250mm | 0165196X | 1 |
| 212 | Adapter Shaft | AM143 pinion shaft end Ø12 | | 01657100 | 1 |
| 212 | Adapter Shaft | AM145 pinion shaft end Ø14 | | 01657119 | 1 |
| 212 | Adapter Shaft | AM143 Backstop; pinion shaft end Ø12 | | 01657356 | 1 |
| 212 | Adapter Shaft | AM145 Backstop; pinion shaft end Ø14 | | 01657364 | 1 |
| 216 | Sealing compound | | | 09102558 | X) |
| 217 | Deep groove ball bearing | | 6007-2Z-K01 | 00104825 | 1 |
| 217 | Deep groove ball bearing | ATEX model according to category II2GD | 6007-2Z-K24 | 13224026 | 1 |
| 220 | Screw plug | for flange Ø120-Ø160 | W4085 B-M10x1-St-ADC3K- | 0011426X | 1 |
| 220 | Breather valve | for flange Ø120-Ø160 | W4087 M10x1-CuZn-HEI | 00130303 | 1 |
| 220 | Screw plug | for flange Ø200-Ø250 | W4085 B-M12x1,5-St- | 00114308 | 1 |
| 220 | Breather valve | for flange Ø200-Ø250 | W4087 M12x1,5-CuZn-HEI | 00130311 | 1 |
| 223 | Deep groove ball bearing | | 6205-Z | 00104957 | 1 |
| 223 | Cylindrical roller bearing | Backstop | NJ205E | 00170909 | 1 |
| 224 | Oil flinger | | W4291 22-A2F | 00116734 | 1 |
| 226 | Backstop | | W4943 RS7-55-25,1 | 01653687 | 1 |
| 227 | Key | Backstop | DIN6885-1 A5x5x18 +C | 00100064 | 1 |
| 228 | Retaining ring | Backstop | DIN471 25x1,2-FS | 00102741 | 1 |
| 247 | Equalizing ring | Backstop | W4253 44x51x0,4 | 00115835 | 1 |
| 276 | Shield ring | Backstop | W4585 6205-ZAV-OV | 0010714X | 1 |
| 402 | Retaining ring | | DIN471 35x1,5-FS | 00102806 | 1 |
| 442 | Adapter flange | | | 01651862 | 1 |
| 470 | Machine screw | | ISO4762 M8x30-8.8-A2F | 0012303X | 4 |
| 478 | Cam Ring | | | 01657305 | 1 |
| 479 | Coupling half A | Ø0,875" | | 01657453 | 1 |
| 481 | Setscrew | | ISO4027 M4x6-45H | 00104574 | 1 |
| 484 | Key (inch) | | W4190 B3/16x3/16x9/16 +C | 0806993X | 1 |
| 491 | Spacer tube | | | 01655469 | 1 |

X) if required

When ordering spare parts always quote nameplate data with serial number and designation with part number!

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Motor

TOSHIBA
Leading Innovation >>>



Efficiency, Quality, & Performance (EQP) — The EQP Global® SD is Toshiba's next-generation NEMA Premium® efficiency motor series.

This cutting-edge motor product line is designed to meet or exceed the competitive demands of the global market, as well as the requirements of the Energy Independence & Security Act of 2007 (EISA), while maintaining the high reliability and quality expected from Toshiba.

The EQP Global SD motor series is designed for severe duty applications. Building on over 20 years of success with our EQPIII motor series, the EQP Global SD features multiple new design enhancements that make it one of the lowest cost-of-ownership products in the industry.

Our EQP philosophy extends beyond great products. We provide solutions and Global Supply Chain Management Systems (GSCMS) to meet the evolving needs of our global customers.

- NEMA Premium® Efficiency (1 through 500 HP)
- Meets or Exceeds Energy Independence & Security Act of 2007 (EISA)
- Addresses Global Motor Specifications Including CE, NEMA, & IEC
- Dual-Frequency 50/60 Hz Design (50/60 Hz Listed on Nameplate on 1 through 75 HP)
- Inverter-Duty Rated
- Multi-Mount on 140 through 445 & N449 Frames
- Cast Iron Conduit Box as Standard



3 THREE YEAR WARRANTY

| | |
|-----------------------------|--|
| Horsepower | ¼ to 700 HP |
| Speed (60 Hz) (50 Hz)* | 3600, 1800, or 1200 RPM 3000, 1500, or 1000 RPM |
| Voltage (60 Hz) (50 Hz)* | 230/460, 460, or 575 V 190/380 or 380 V |
| Enclosure | Totally Enclosed Fan Cooled |
| Frame Size | 143T through 5810U |
| Protection | IP54 |
| Construction | Cast Iron (Frame, Brackets, & Conduit Box) |
| Insulation | Class F, Exceeds NEMA MG1 Part 31 (Inverter Duty) |
| Vibration | Typically 0.08 Inches/Second or Less (Unfiltered) |
| Mounting | Motors Suitable for Horizontal & Vertical Mounting; Motors also Available with C-Face Mounting |
| Environment | Severe Duty, Suitable for Use in Division 2 Hazardous Locations |

*50/60 Hz Listed on Nameplate on 1 through 75 HP



EQP Global SD

**LOW VOLTAGE MOTOR
SEVERE DUTY**





BUILT FOR SEVERE DUTY APPLICATIONS



Nameplate

- Stainless Steel
- NEMA Premium® Design
- Etched Lettering
- Dual-Frequency 50/60 Hz on Nameplate
- Inverter Duty Rating on Nameplate (1 to 200 HP, 4- & 6-Pole)



Construction

- Cast Iron Frame & Bearing Brackets
- Shaft Slinger Protection
- Multi-Mount on 140 Through 445 & N449 Frames
- Gasket Provided Between Motor Frame & Conduit Box
- Typical Unfiltered Vibration Levels of 0.08 Inches/Second or Less
- IP54 Protection
- Multiple Drain Provisions for Horizontal & Vertical Mounting



Conduit Box

- Gasketed Cast Iron Construction
- Provision for Grounding
- Terminal Lugs on 280 Frame & Larger
- Rotatable (90°)
- NPT Drill & Tap Conduit Opening



Bearing System

- Oversized 300 Series Bearings on All Frames (DE & ODE)
- Regreasable 280 Frame & Larger
- Locked Drive-End Bearing 210 Frame & Larger
- Low Temperature-Rise for Extended Life
- L-10 Life of 150,000 Hours for Direct-Coupled Applications
- L-10 Life of 40,000 Hours for Belted Applications



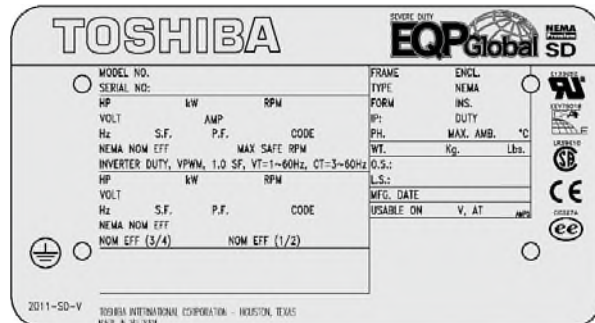
Insulation System

- Major Components Made from Class H Rated Materials
- Low-Loss Electrical Steel
- Exceeds NEMA MG1 Part 31
- 20:1 Constant Torque & 60:1 Variable Torque (1 to 200 HP, 4- & 6-Pole)
- Voltage Withstand Capability of 2000 V in 0.1 μs
- Large Thermal Margins for Extended Life & Reliability
- Phase Paper & Coil Bracing on Both Ends on All Motor Ratings



Testing

- 100% No-Load Commercial Test per IEEE 112 on All Motors
- On 440 Frame & Larger:
 - » Commercial Test & Vibration Test
 - » 100% of Bearings are Ball-Pass Frequency Tested



TYPICAL MOTOR PERFORMANCE DATA

Model: Y154SDSR42A-P

| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
|-----------|-----|------------|--------|-------|----------------|-------------|----------|--------------|
| 1.50 | 1.1 | 4 | 1755 | 145TC | 230/460 | 60 | 3 | 4.5/2.2 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.15 | CONT | 86.5 | B | | 40 C |

| Load | HP | kW | Amperes | Efficiency (%) | Power Factor (%) |
|--------------|------|-----|---------|----------------|------------------|
| Full Load | 1.50 | 1.1 | 2.2 | 85.8 | 73.1 |
| ¾ Load | 1.12 | 0.8 | 1.9 | 84.7 | 65.3 |
| ½ Load | 0.75 | 0.6 | 1.6 | 81.0 | 52.7 |
| ¼ Load | 0.37 | 0.3 | 1.5 | 69.1 | 33.8 |
| No Load | | | 1.3 | | 8.2 |
| Locked Rotor | | | 17.1 | | 54.3 |

| Torque | | | | Rotor wk ² Inertia (lb-ft ²) |
|----------------------|-------------------------|--------------------|-----------------------|---|
| Full Load (lb-ft) | Locked Rotor (% FLT) | Pull Up (% FLT) | Break Down (% FLT) | |
| 4.49 | 260 | 325 | 365 | 0.12 |

| Safe Stall Time(s) | | Sound Pressure dB(A) @ 1M | Bearings* | | Approx. Motor Weight (lbs) |
|--------------------|-----|------------------------------|-----------|----------|-------------------------------|
| Cold | Hot | | DE | NDE | |
| 35 | 15 | - | 6305ZZC3 | 6305ZZC3 | 64 |

*Bearings are the only recommended spare part(s).

Motor Options:
Product Family:EQP Global SD CFace Footed
Mounting:C-Face Footed,Shaft:T Shaft

| | |
|-------------|--|
| Customer | |
| Customer PO | |
| Sales Order | |
| Project # | |

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|-------------|------------------|-------------|-------------|---------------|
| Engineering | aguerrretaz | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1119 / 0 |
| Engr. Date | 4/28/2021 | Doc. Approved By | M. Campbell | Doc. Issued | 6/8/2011 |

TYPICAL MOTOR PERFORMANCE DATA

Model: Y154SDSR42A-P

| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
|-----------|-----|------------|--------|-------|----------------|-------------|----------|--------------|
| 1.50 | 1.1 | 4 | 1440 | 145TC | 190/380 | 50 | 3 | 5.2/2.6 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.0 | CONT | 84.0 | B | | 40 C |

| Load | HP | kW | Amperes | Efficiency (%) | Power Factor (%) |
|--------------|------|-----|---------|----------------|------------------|
| Full Load | 1.50 | 1.1 | 2.6 | 86.1 | 69.5 |
| ¾ Load | 1.13 | 0.8 | 2.0 | 85.7 | 62.2 |
| ½ Load | 0.75 | 0.6 | 1.7 | 83.1 | 50.1 |
| ¼ Load | 0.38 | 0.3 | 1.4 | 71.5 | 40.4 |
| No Load | | | 1.3 | | 8.4 |
| Locked Rotor | | | 25 | | 72.9 |

| Torque | | | | Rotor wk ² Inertia (lb-ft ²) |
|----------------------|-------------------------|--------------------|-----------------------|---|
| Full Load (lb-ft) | Locked Rotor (% FLT) | Pull Up (% FLT) | Break Down (% FLT) | |
| 5.47 | 250 | 195 | 280 | 0.12 |

| Safe Stall Time(s) | | Sound Pressure dB(A) @ 1M | Bearings* | | Approx. Motor Weight (lbs) |
|--------------------|-----|------------------------------|-----------|----------|-------------------------------|
| Cold | Hot | | DE | NDE | |
| 17 | 12 | - | 6305ZZC3 | 6305ZZC3 | 64 |

*Bearings are the only recommended spare part(s).

Motor Options:
Product Family:EQP Global SD CFace Footed
Mounting:C-Face Footed,Shaft:T Shaft

| | |
|-------------|--|
| Customer | |
| Customer PO | |
| Sales Order | |
| Project # | |

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|----------|------------------|-------------|-------------|---------------|
| Engineering | jhock | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1119 / 0 |
| Engr. Date | 4/3/2014 | Doc. Approved By | M. Campbell | Doc. Issued | 6/8/2011 |

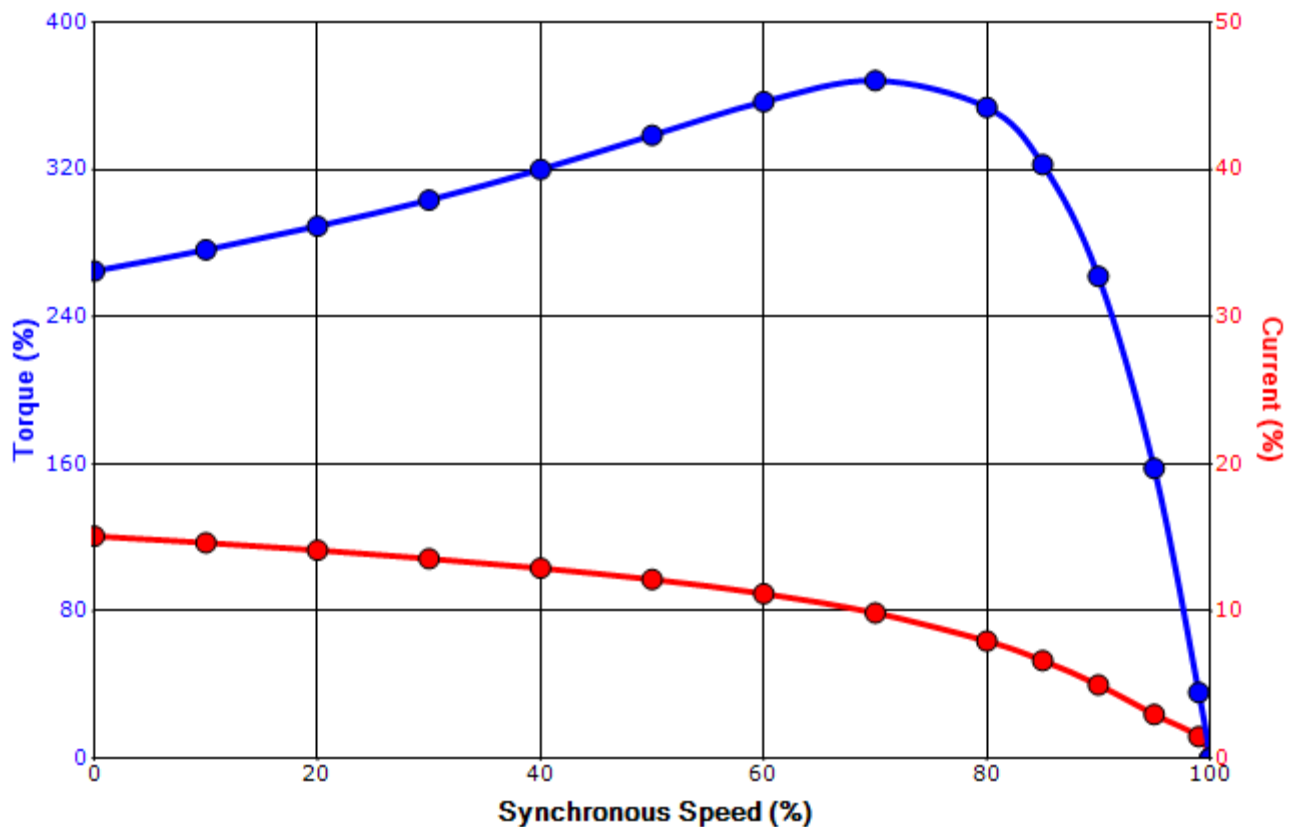
| | | | |
|-------------|-----------|------------|--|
| Issued Date | 7/19/2021 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

SPEED TORQUE/CURRENT CURVE

Model: Y154SDSR42A-P

| | | | | | | | | |
|-------------------|---|-------------------|------------------|-------------|----------------|-------------|----------|----------------|
| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
| 1.50 | 1.1 | 4 | 1755 | 145TC | 230/460 | 60 | 3 | 4.5/2.2 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.15 | CONT | 86.5 | B | | 40 C |
| Locked Rotor Amps | Rotor wk ² Inertia (lb-ft ²) | Torque | | | | | | Break Down (%) |
| | | Full Load (lb-ft) | Locked Rotor (%) | Pull Up (%) | | | | |
| 17.1 | 0.12 | 4.49 | 260 | 325 | | | 365 | |

Design Values



| | | | |
|-------------|--|--|-----|
| Customer | | wk ² Load Inertia (lb-ft ²) | - |
| Customer PO | | Load Type | - |
| Sales Order | | Voltage (%) | 100 |
| Project # | | Accel. Time | - |

Tag:

All characteristics are average expected values.

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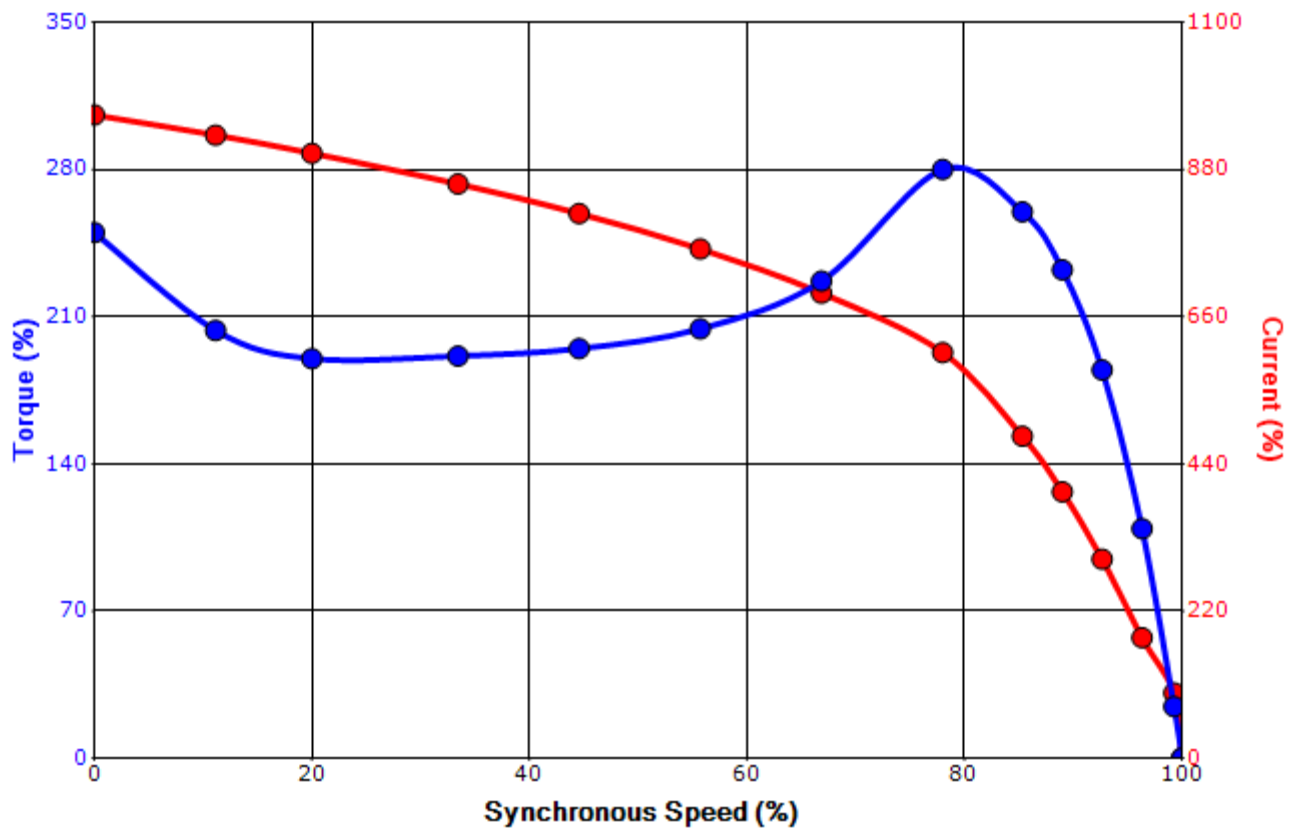
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|-------------|-------------|------------------|-------------|-------------|---------------|
| Engineering | aguerrettaz | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1121 / 0 |
| Engr. Date | 4/28/2021 | Doc. Approved By | M. Campbell | Doc. Issued | 6/8/2011 |

SPEED TORQUE/CURRENT CURVE

Model: Y154SDSR42A-P

| | | | | | | | | |
|-------------------|---|-------------------|------------------|-------------|----------------|-------------|----------|----------------|
| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
| 1.50 | 1.1 | 4 | 1440 | 145TC | 190/380 | 50 | 3 | 5.2/2.6 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.0 | CONT | 84.0 | B | | 40 C |
| Locked Rotor Amps | Rotor wk ² Inertia (lb-ft ²) | Torque | | | | | | Break Down (%) |
| | | Full Load (lb-ft) | Locked Rotor (%) | Pull Up (%) | | | | |
| 25 | 0.12 | 5.47 | 250 | 195 | | | 280 | |

Design Values



| | | | |
|-------------|--|--|-----|
| Customer | | wk ² Load Inertia (lb-ft ²) | - |
| Customer PO | | Load Type | - |
| Sales Order | | Voltage (%) | 100 |
| Project # | | Accel. Time | - |

Tag:

All characteristics are average expected values.

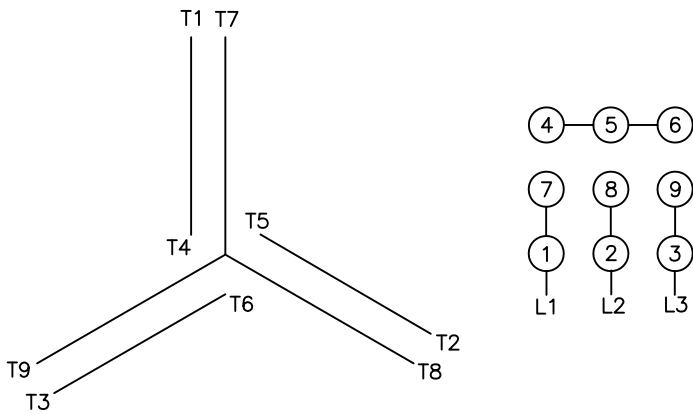
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| | | | | | |
|-------------|----------|------------------|-------------|-------------|---------------|
| Engineering | jhock | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1121 / 0 |
| Engr. Date | 4/3/2014 | Doc. Approved By | M. Campbell | Doc. Issued | 6/8/2011 |

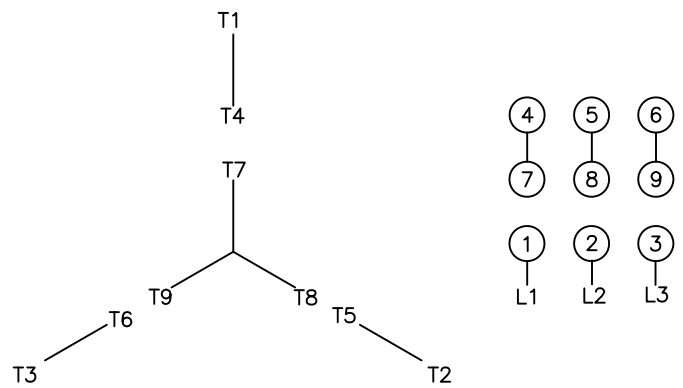
Motor Connection Diagrams
9 Leads

Across-the-Line Starting / Running Connections

Low Voltage Wye



High Voltage Wye

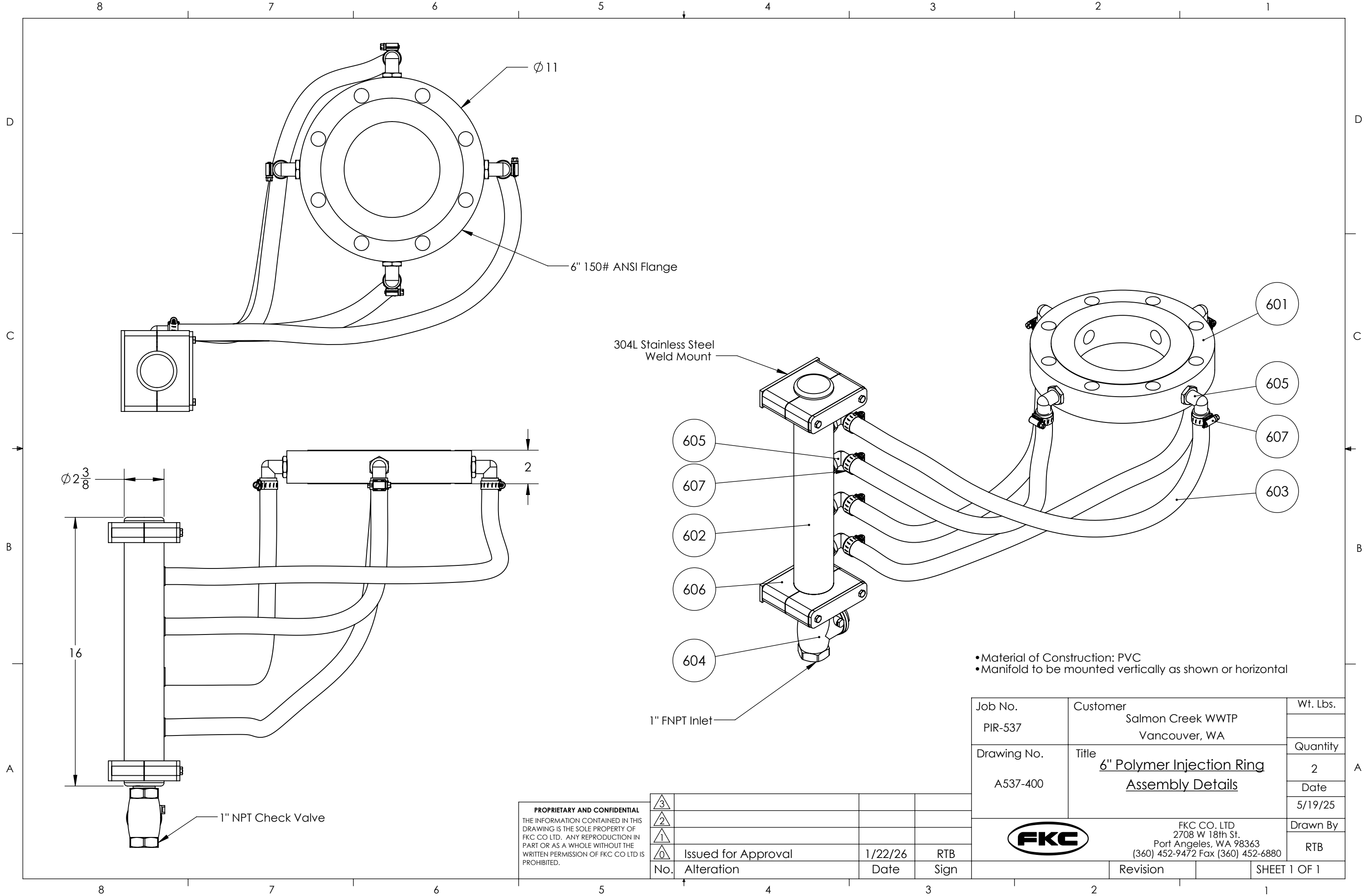


Switch L1 and L2 to reverse rotation

Polymer Injection Ring

Salmon Creek WWTP Vancouver, WA
 BHX-1350x7500L Screw Press
 FKC Bill of Materials


| Item # | 6" Polymer Injection Ring - QTY 2 | Manufacturer | Part Number | Qty | Material of Construction |
|--------|-----------------------------------|--------------|-------------|-----|--------------------------|
| 601 | 6" Injection Ring | FKC | NA | 1 | PVC |
| 602 | Polymer Manifold | FKC | NA | 1 | PVC |
| 603 | 3/4" Reinforced Clear Tubing | USA Sealing | ZUSA-HT-29 | 25' | Polyester Reinforced PVC |
| 604 | 1" Check Valve | Zoro | 4VMU2 | 1 | 316L SS |
| 605 | 3/4" NPT x 3/4" Barb 90° Adapter | Banjo | HB075-90 | 8 | Polypropylene |
| 606 | 2" Pipe Routing Clamp | Behringer | SBX72375-SP | 2 | Polypropylene/316 SS |
| 607 | Worm-Drive Hose Clamp SAE 10 | Zoro Select | 6710170 | 8 | 316L SS |



- Material of Construction: PVC
- Manifold to be mounted vertically as shown or horizontal

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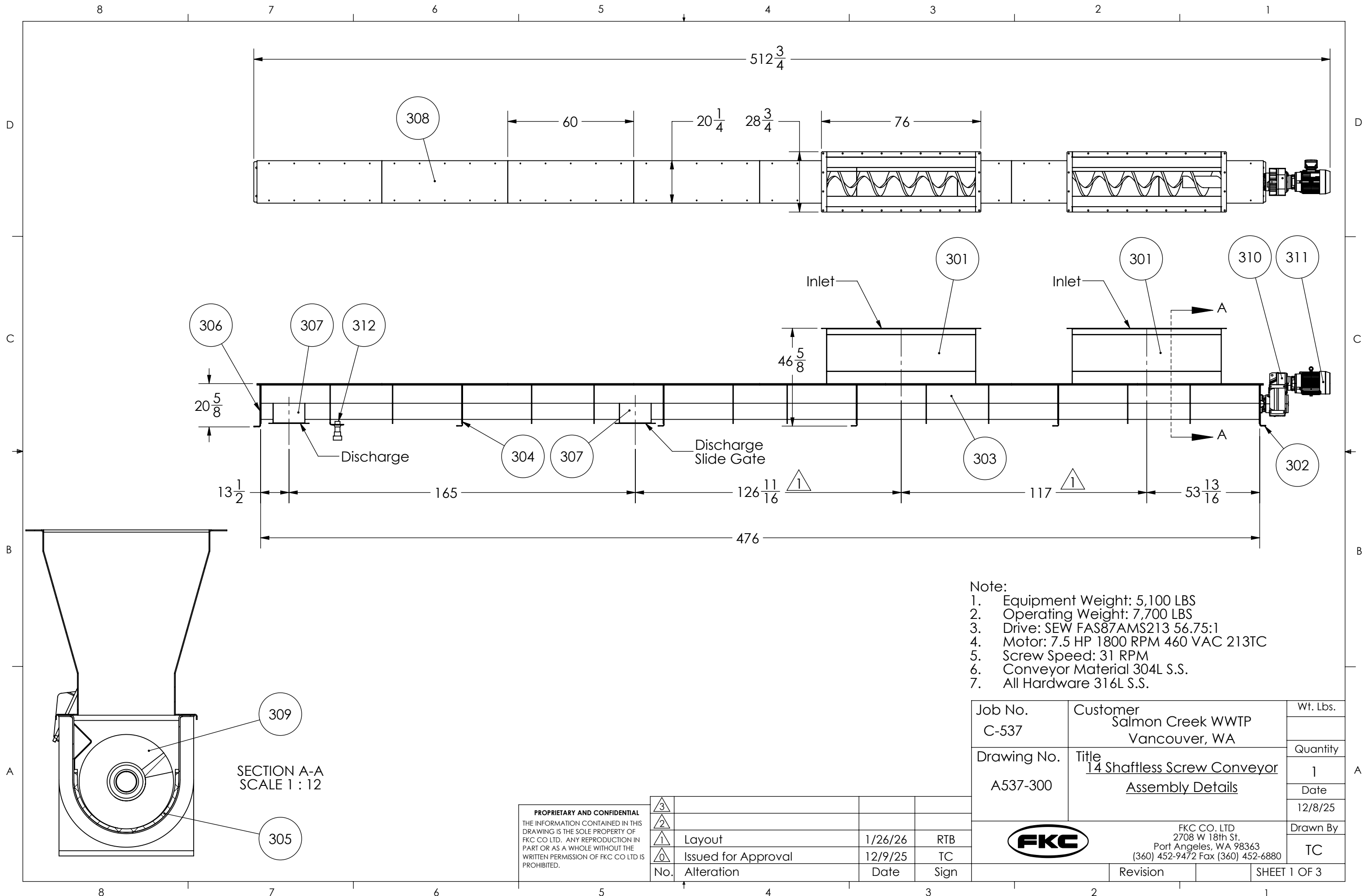
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| 3 | | | |
| 2 | | | |
| 1 | | | |
| 0 | Issued for Approval | 1/22/26 | RTB |
| No. | Alteration | Date | Sign |

| | | |
|---|--|-----------------|
| Job No. PIR-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. A537-400 | Title <u>6" Polymer Injection Ring</u> <u>Assembly Details</u> | Quantity 2 |
| | | Date 5/19/25 |
|  FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Drawn By RTB |
| Revision | | SHEET 1 OF 1 |

Conveyor Assembly

Salmon Creek WWTP Vancouver, WA
 BHX-1350x7500L Screw Press
 FKC Bill of Materials

| Item # | 14" Conveyor - Horizontal | Manufacturer | Part Number | Qty | Material of Construction |
|--------|----------------------------|------------------|----------------|-----|--------------------------|
| 301 | Inlet Chute | FKC | -- | 2 | 10 ga. 304L SS |
| 302 | Inlet End plate | FKC | -- | 1 | 3/8" plate, 304L SS |
| 303 | Trough sections (8' Max) | FKC | -- | 5 | 7 ga. 304L SS |
| 304 | U shaped, trough flanges | FKC | -- | 10 | 1/4" plate, 304L SS |
| 305 | UHMW trough liner (4' Max) | FKC | -- | 11 | 1/2" thick UHMW |
| 306 | Discharge end plate | FKC | -- | 1 | 3/8" plate, 304L SS |
| 307 | Discharge Chute | FKC | -- | 2 | 12 ga. 304L SS |
| 308 | Trough Covers (5' Max) | FKC | -- | 8 | 10 ga. 304L SS |
| 309 | 14" Screw 9" Pitch | FKC | -- | 1 | 1" x 4" 8620 |
| 310 | Gear Box 56.75:1 | SEW | FAS87AM213 | 1 | CS - Painted |
| 311 | Motor 7.5 HP 1800 RPM | Toshiba | Y754SDSR44A-P | 1 | CS - Painted |
| 312 | Zero Speed Switch | Siemens Industry | 7MH7158-0AA-00 | 1 | Aluminum |

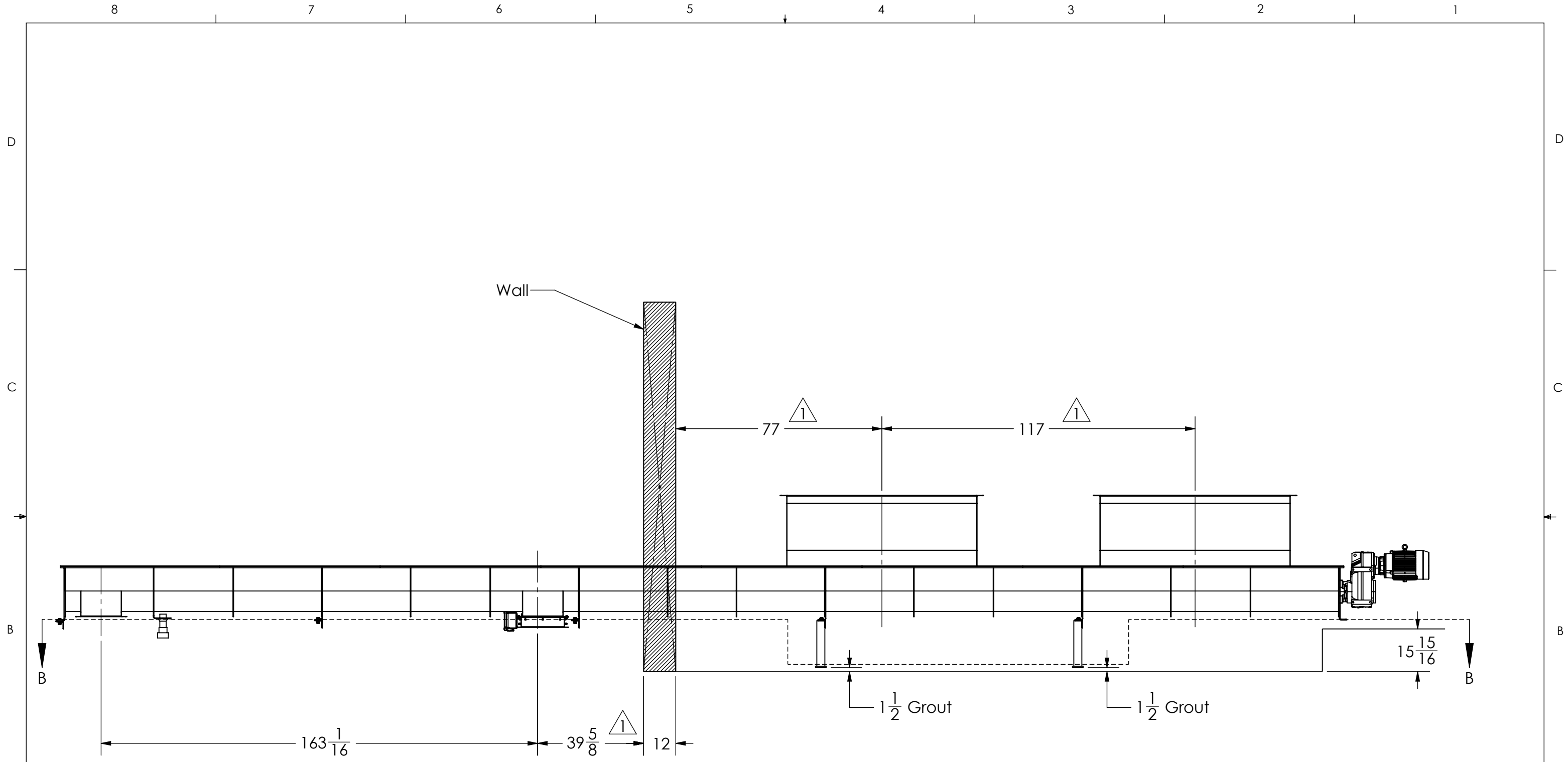


- Note:
1. Equipment Weight: 5,100 LBS
 2. Operating Weight: 7,700 LBS
 3. Drive: SEW FAS87AMS213 56.75:1
 4. Motor: 7.5 HP 1800 RPM 460 VAC 213TC
 5. Screw Speed: 31 RPM
 6. Conveyor Material 304L S.S.
 7. All Hardware 316L S.S.

| | | |
|---|---|-----------------|
| Job No. C-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. A537-300 | Title <u>14 Shaftless Screw Conveyor</u> Assembly Details | Quantity 1 |
| FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Date 12/8/25 |
|  | | Drawn By TC |
| Revision | | SHEET 1 OF 3 |

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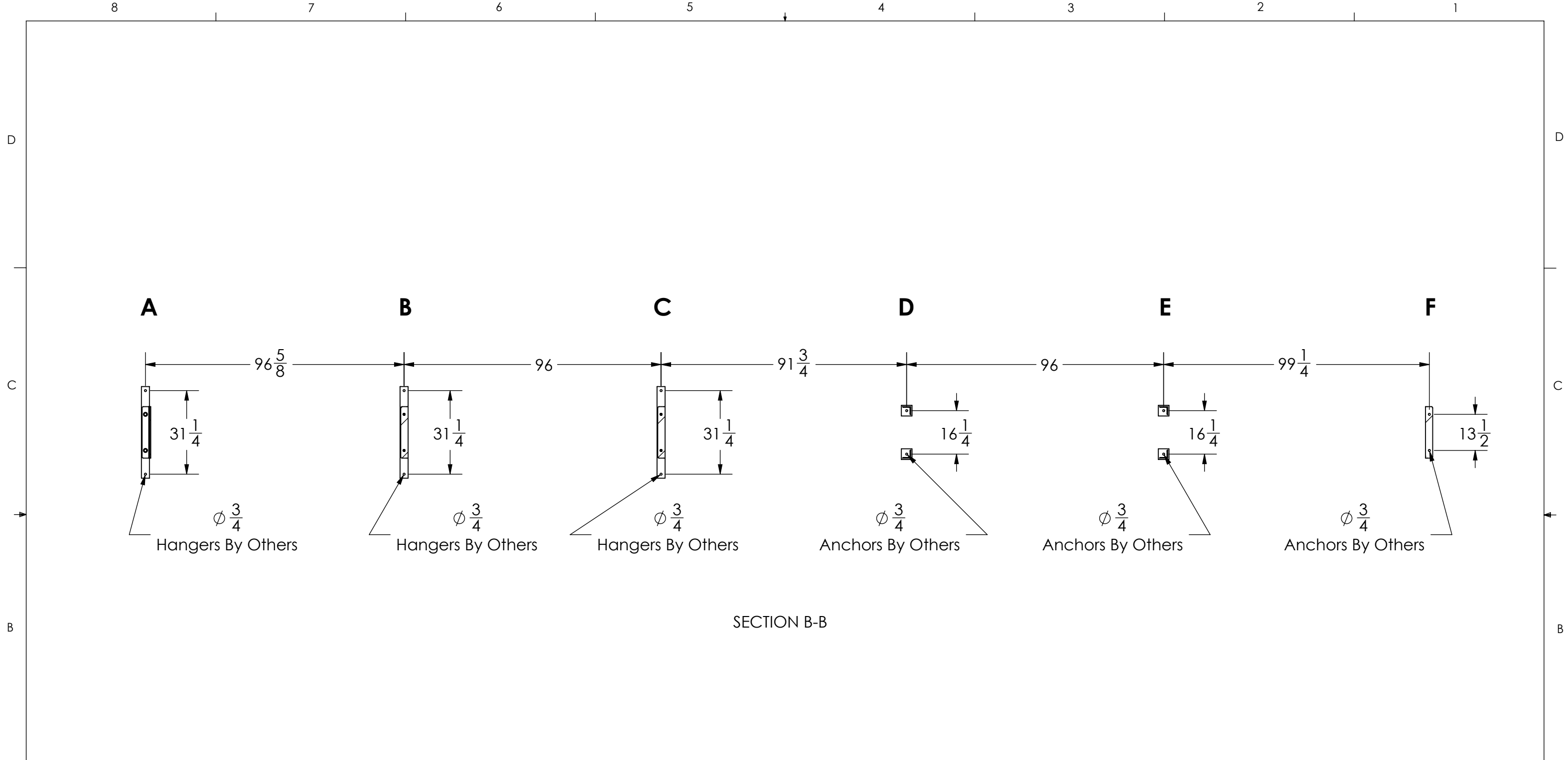
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| 3 | | | |
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| 1 | Layout | 1/26/26 | RTB |
| 0 | Issued for Approval | 12/9/25 | TC |
| No. | Alteration | Date | Sign |



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| 3 | | | |
|-----|---------------------|---------|------|
| 2 | | | |
| 1 | Layout | 1/26/26 | RTB |
| 0 | Issued for Approval | 12/8/25 | TC |
| No. | Alteration | Date | Sign |

| | | |
|---|---|-----------------|
| Job No. C-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. L537-301 | Title <u>14 Shaftless Screw Conveyor</u> Layout Details | Quantity 1 |
|  FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Date 12/8/25 |
| | | Drawn By TC |
| Revision | | SHEET 2 OF 3 |



SECTION B-B

| Static Loads LBS | |
|------------------|------|
| A | 750 |
| B | 1496 |
| C | 1458 |
| D | 1458 |
| E | 1516 |
| F | 1021 |

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| | | | |
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| 3 | | | |
| 2 | | | |
| 1 | | | |
| 0 | Issued for Approval | 12/8/25 | TC |
| No. | Alteration | Date | Sign |

| | | |
|---|--|-----------------|
| Job No. C-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. S537-302 | Title 14 Shaftless Screw Conveyor Leg/Hanger Layout Section B-B | Quantity 1 |
| FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Date 12/8/25 |
|  | | Drawn By TC |
| Revision | | SHEET 3 OF 3 |

Gearbox

F-Series (the Snuggler®) Parallel Helical Gearmotors

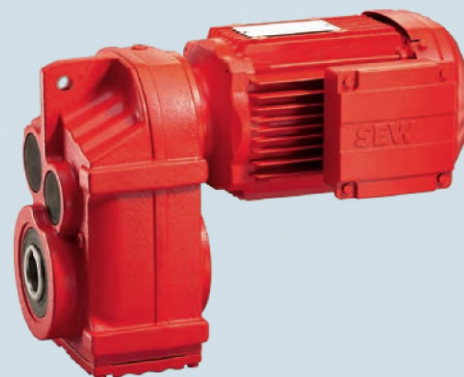
SEW-EURODRIVE's F-Series parallel helical gearmotor is the ideal drive for tight spaces. This compact drive, with its multiple mounting configurations and shaft designs, is a rugged alternative to right-angle gearmotors.

Product Range

- Power ratings from 0.05 to 336 HP
- Ratios from 3.77 to 29,211
- Output torques to 159,300 lb-in

Reducer

- Efficiency = 97% (2-stage) or 95.5% (3-stage)
- Gears manufactured from certified steel, heat treated to a case hardness of 58-62 Rockwell C for infinite fatigue strength
- Finished ground or shaved gear teeth to assure minimum noise, minimum heat, and maximum mechanical efficiency (approximately 1.5% loss/stage)
- Anti-friction bearings for optimum load capacity and long life
- Captured keys on input and output shafts
- F37-F157 gear housing contains high strength cast iron, SAE Class 30 or equivalent (GG20)
- F27 housing contains high strength pressure-cast aluminum
- O-ring on flange to prevent oil leakage when mounted on a surface that is not totally flat
- High cross-section modulus design, rugged monobloc design for maximum rigidity
- Center tapped holes on output shafts to aid the installation of shaft components
- Exclusive interlocking 2-piece seal design consisting of a patented bi-helix FKM inner seal and a double-lip Nitrile (Buna N) outer seal – provides three sealing surfaces against contaminants
- Metric or Inch dimension output shafts
- Removable inspection cover
- Shock capacity meets or exceeds AGMA 6009-A00



Motor

- Inverter duty
- Connection terminals
- Low rotor inertia for high cycling and tight control
- EISA (IE3) "Premium" available
- 50Hz, 60Hz, or 50/60Hz global motor
- **CE** for shipment into Europe

Mounting

- Built-in torque arm for shaft mounting
- B14 or B5 flange with centering tenon
- Tapped rail holes for foot mounting
- Can be ordered for any mounting orientation

Optional Features

- C-Face or IEC motor adapter
- TorqLOC® taper hollow shaft
- Heavy duty taper roller bearings (FA67-FA127)
- FKM seals instead of NBR
- Corrosion and/or long term storage protection
- High cycling fail-safe brake
- Forced cooling fan for low frequency operation
- Thermostat or thermistor protection
- Plug connectors for quick motor replacement
- Two-speed motor
- Motor encoder - built-in or externally mounted
- CSA hazardous location and ATEX rated motors

PRODUCT FOCUS



About SEW-EURODRIVE

As a world leader in drive technology and a pioneer in drive-based automation, SEW-EURODRIVE has established a reputation for quickly solving the most difficult power transmission and motion control challenges. We introduced the gearmotor in 1931. In the 82 years since then, we have been bringing the best in drive technology to our customers. That commitment has led to a history of innovations - the first variable speed gearmotor, early development of electronic drives, some of the first successful efforts to decentralize control, and the first motor with energy-efficient copper rotors.

Of course none of that matters without satisfied customers. Quickly solving problems so that our customers can be more productive and profitable continues to be our priority. We offer the broadest product line in the industry - from gear- motors and heavy industrial gear units to electronic drives, software and complete drive-based automation systems. Our products are based on a unique system of modular components that can be assembled in literally millions of different configurations so every drive solution is custom built to our customer's

exact specifications. Our regional assembly centers stock millions of dollars of our modular inventory for quick delivery of drive solutions and spare parts anywhere in the U.S.

At SEW-EURODRIVE our expertise doesn't stop with the sale of our products. We offer one of the most accessible customer support systems in the industry. Our trained product specialists are readily available for on-site start up assistance and applications support. In addition, our PT Pilot® drive selection quickly selects the drive for your specific needs. Our customer service personnel, engineers, product specialists, and service technicians are available to answer questions and troubleshoot problems. SEW-EURODRIVE offers on-call emergency technical support around the clock.

SEW-EURODRIVE brings together everything you need to drive performance for your systems: superior products, unsurpassed engineering, technical support, and innovative new technologies. We invite you to experience the SEW-EURODRIVE difference.

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P: (937) 335-0036
F: (937) 332-0038
cstroy@seweurodrive.com

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Bridgeport, NJ 08014
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csbridgeport@seweurodrive.com

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1295 Old Spartanburg Hwy.
Lyman, SC 29365
P: (864) 439-7537
F: (864) 439-7830
cslyman@seweurodrive.com

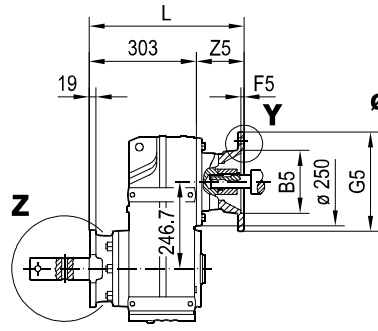
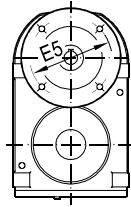
Southwest Region
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3950 Platinum Way
Dallas, TX 75237
P: (214) 330-4824
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csdallas@seweurodrive.com

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30599 San Antonio St.
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P: (510) 487-3560
F: (510) 487-6433
cshayward@seweurodrive.com

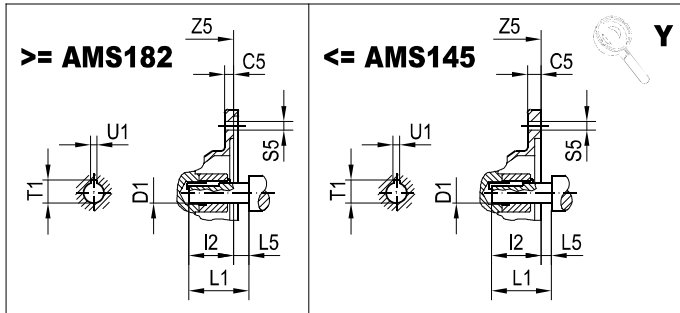
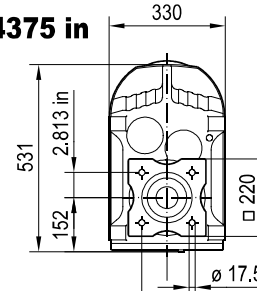
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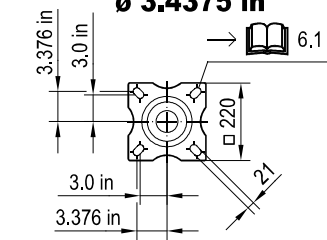
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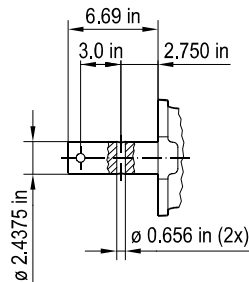
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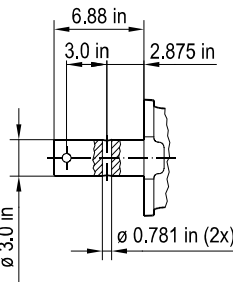
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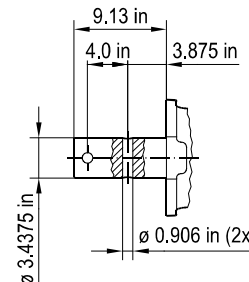
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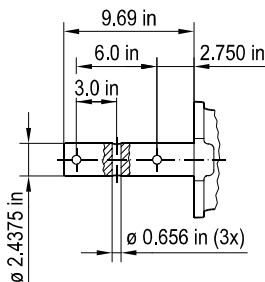
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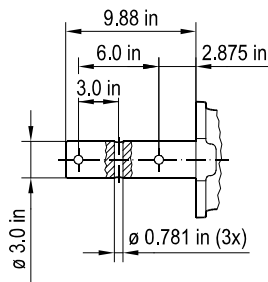
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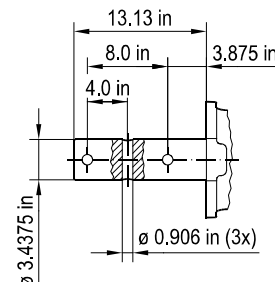
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| (- -) | B5 | C5 | E5 | F5 | G5 | L | I2 | L5 | S5 | Z5 | D1 | L1 | T1 | U1 |
|------------|---------|----|----------|-----|-----|-----|---------|---------|------|-------|----------|---------|---------|----------|
| AMS143 | 4.5 in | 12 | 5.875 in | 4.5 | 170 | 378 | 2.12 in | 0.13 in | 10.5 | 75 | 0.875 in | 2.25 in | 0.97 in | 0.188 in |
| AMS145 | 4.5 in | 12 | 5.875 in | 4.5 | 170 | 378 | 2.12 in | 0.13 in | 10.5 | 75 | 0.875 in | 2.25 in | 0.97 in | 0.188 in |
| AMS182 | 8.5 in | 10 | 7.25 in | 5 | 228 | 404 | 2.62 in | 0.13 in | 15 | 101 | 1.125 in | 2.75 in | 1.25 in | 0.25 in |
| AMS184 | 8.5 in | 10 | 7.25 in | 5 | 228 | 404 | 2.62 in | 0.13 in | 15 | 101 | 1.125 in | 2.75 in | 1.25 in | 0.25 in |
| AMS213/215 | 8.5 in | 11 | 7.25 in | 5 | 228 | 429 | 3.12 in | 0.26 in | 15 | 125.5 | 1.375 in | 3.38 in | 1.52 in | 0.313 in |
| AMS254/256 | 8.5 in | 12 | 7.25 in | 5 | 228 | 488 | 3.75 in | 0.25 in | 15 | 185 | 1.625 in | 4 in | 1.8 in | 0.375 in |
| AMS284/286 | 10.5 in | 15 | 9 in | 5 | 286 | 495 | 4.38 in | 0.24 in | 15 | 191.5 | 1.875 in | 4.62 in | 2.1 in | 0.5 in |

30585716/EN-US - 05/2023

Motor

TOSHIBA
Leading Innovation >>>



Efficiency, Quality, & Performance (EQP) — The EQP Global® SD is Toshiba's next-generation NEMA Premium® efficiency motor series.

This cutting-edge motor product line is designed to meet or exceed the competitive demands of the global market, as well as the requirements of the Energy Independence & Security Act of 2007 (EISA), while maintaining the high reliability and quality expected from Toshiba.

The EQP Global SD motor series is designed for severe duty applications. Building on over 20 years of success with our EQPIII motor series, the EQP Global SD features multiple new design enhancements that make it one of the lowest cost-of-ownership products in the industry.

Our EQP philosophy extends beyond great products. We provide solutions and Global Supply Chain Management Systems (GSCMS) to meet the evolving needs of our global customers.

- NEMA Premium® Efficiency (1 through 500 HP)
- Meets or Exceeds Energy Independence & Security Act of 2007 (EISA)
- Addresses Global Motor Specifications Including CE, NEMA, & IEC
- Dual-Frequency 50/60 Hz Design (50/60 Hz Listed on Nameplate on 1 through 75 HP)
- Inverter-Duty Rated
- Multi-Mount on 140 through 445 & N449 Frames
- Cast Iron Conduit Box as Standard



3 THREE YEAR WARRANTY

| | |
|-----------------------------|--|
| Horsepower | ¼ to 700 HP |
| Speed (60 Hz) (50 Hz)* | 3600, 1800, or 1200 RPM 3000, 1500, or 1000 RPM |
| Voltage (60 Hz) (50 Hz)* | 230/460, 460, or 575 V 190/380 or 380 V |
| Enclosure | Totally Enclosed Fan Cooled |
| Frame Size | 143T through 5810U |
| Protection | IP54 |
| Construction | Cast Iron (Frame, Brackets, & Conduit Box) |
| Insulation | Class F, Exceeds NEMA MG1 Part 31 (Inverter Duty) |
| Vibration | Typically 0.08 Inches/Second or Less (Unfiltered) |
| Mounting | Motors Suitable for Horizontal & Vertical Mounting; Motors also Available with C-Face Mounting |
| Environment | Severe Duty, Suitable for Use in Division 2 Hazardous Locations |

*50/60 Hz Listed on Nameplate on 1 through 75 HP



EQP Global SD

**LOW VOLTAGE MOTOR
SEVERE DUTY**



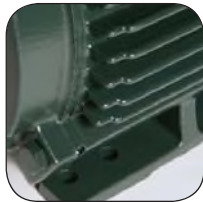


BUILT FOR SEVERE DUTY APPLICATIONS



Nameplate

- Stainless Steel
- NEMA Premium® Design
- Etched Lettering
- Dual-Frequency 50/60 Hz on Nameplate
- Inverter Duty Rating on Nameplate (1 to 200 HP, 4- & 6-Pole)



Construction

- Cast Iron Frame & Bearing Brackets
- Shaft Slinger Protection
- Multi-Mount on 140 Through 445 & N449 Frames
- Gasket Provided Between Motor Frame & Conduit Box
- Typical Unfiltered Vibration Levels of 0.08 Inches/Second or Less
- IP54 Protection
- Multiple Drain Provisions for Horizontal & Vertical Mounting



Conduit Box

- Gasketed Cast Iron Construction
- Provision for Grounding
- Terminal Lugs on 280 Frame & Larger
- Rotatable (90°)
- NPT Drill & Tap Conduit Opening



Bearing System

- Oversized 300 Series Bearings on All Frames (DE & ODE)
- Regreasable 280 Frame & Larger
- Locked Drive-End Bearing 210 Frame & Larger
- Low Temperature-Rise for Extended Life
- L-10 Life of 150,000 Hours for Direct-Coupled Applications
- L-10 Life of 40,000 Hours for Belted Applications



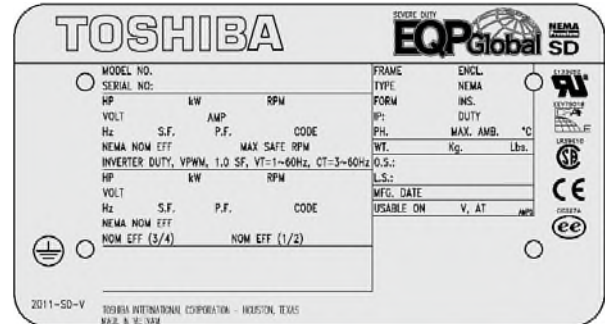
Insulation System

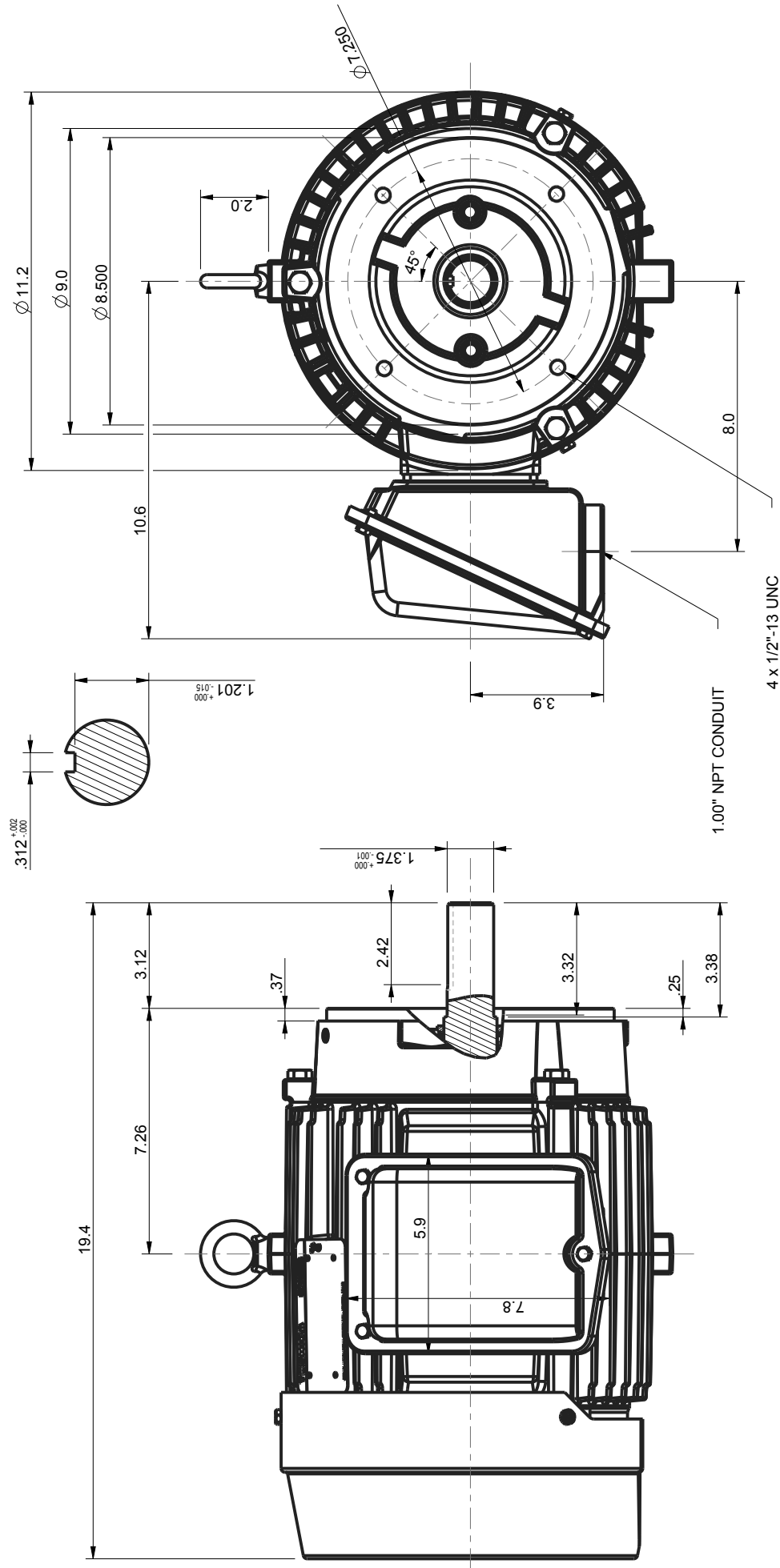
- Major Components Made from Class H Rated Materials
- Low-Loss Electrical Steel
- Exceeds NEMA MG1 Part 31
- 20:1 Constant Torque & 60:1 Variable Torque (1 to 200 HP, 4- & 6-Pole)
- Voltage Withstand Capability of 2000 V in 0.1 μs
- Large Thermal Margins for Extended Life & Reliability
- Phase Paper & Coil Bracing on Both Ends on All Motor Ratings



Testing

- 100% No-Load Commercial Test per IEEE 112 on All Motors
- On 440 Frame & Larger:
 - » Commercial Test & Vibration Test
 - » 100% of Bearings are Ball-Pass Frequency Tested





UNITS: INCHES
 ROTATION FROM NDE
 CCW CW

NOTES:
 1. MAIN CONDUIT BOX MAY BE ROTATED IN 90° INCREMENTS
 2. STANDARD PRODUCT USES BI-DIRECTIONAL FAN. OPPOSITE ROTATION AVAILABLE ONLY BY CONNECTION CHANGE.
 3. KEY DIMENSIONS EQUAL 0.312x0.312x2.38" (MOTOR SUPPLIED WITH KEY)

TOSHIBA RESERVES THE RIGHT TO MAKE CHANGES OF TECHNICAL IMPROVEMENT AND THE DATA MAY CHANGE WITHOUT NOTICE

DO NOT USE FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS THE DRAWING IS MARKED AS CERTIFIED

DRAWING #: MDSL205-03

REV. DATE: 06/27/18 REV. #: 3 PER.: M. O'DOWD

REV. DESCRIP.: _____

PRELIMINARY

CERTIFIED

TOTALLY ENCLOSED FAN COOLED

ROUND BODY C-FACED

3 PHASE INDUCTION MOTOR

213TC-215TC F1 ASSEMBLY



TOSHIBA

www.toshiba.com/tic

TOSHIBA INTERNATIONAL CORPORATION



| | | | |
|-------------|------------|------------|--|
| Issued Date | 12/18/2019 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

TYPICAL MOTOR PERFORMANCE DATA

Model: Y754SDSR44A-P

| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
|-----------|-----|------------|--------|-------|----------------|-------------|----------|--------------|
| 7.50 | 5.5 | 4 | 1760 | 213TC | 230/460 | 60 | 3 | 19.6/9.8 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.15 | CONT | 91.7 | B | H | 40 C |

| Load | HP | kW | Amperes | Efficiency (%) | Power Factor (%) |
|--------------|------|-----|---------|----------------|------------------|
| Full Load | 7.50 | 5.6 | 9.8 | 91.8 | 79.9 |
| ¾ Load | 5.63 | 4.2 | 7.8 | 90.9 | 75.3 |
| ½ Load | 3.75 | 2.8 | 6.3 | 88.5 | 65.8 |
| ¼ Load | 1.88 | 1.4 | 4.5 | 80.8 | 48.0 |
| No Load | | | 4.4 | | 6.3 |
| Locked Rotor | | | 63 | | 45.7 |

| Torque | | | | Rotor wk ² Inertia (lb-ft ²) |
|----------------------|-------------------------|--------------------|-----------------------|---|
| Full Load (lb-ft) | Locked Rotor (% FLT) | Pull Up (% FLT) | Break Down (% FLT) | |
| 22.4 | 270 | 215 | 340 | 1.15 |

| Safe Stall Time(s) | | Sound Pressure dB(A) @ 1M | Bearings* | | Approx. Motor Weight (lbs) |
|--------------------|-----|------------------------------|-----------|----------|-------------------------------|
| Cold | Hot | | DE | NDE | |
| 35 | 15 | - | 6308ZZC3 | 6308ZZC3 | 190 |

*Bearings are the only recommended spare part(s).

Motor Options:
 Product Family:EQP Global SD
 Mounting:C-Face Round,Shaft:T Shaft

| | |
|-------------|--|
| Customer | |
| Customer PO | |
| Sales Order | |
| Project # | |

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|-----------|------------------|-------------|-------------|---------------|
| Engineering | mcampbell | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1119 / 1 |
| Engr. Date | 2/9/2012 | Doc. Approved By | M. Campbell | Doc. Issued | 9/20/2019 |



| | | | |
|-------------|------------|------------|--|
| Issued Date | 12/18/2019 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

TYPICAL MOTOR PERFORMANCE DATA

Model: Y754SDSR44A-P

| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
|-----------|-----|------------|--------|-------|----------------|-------------|----------|--------------|
| 7.50 | 5.5 | 4 | 1450 | 213TC | 190/380 | 50 | 3 | 24/12.0 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.0 | CONT | 90.2 | B | H | 40 C |

| Load | HP | kW | Amperes | Efficiency (%) | Power Factor (%) |
|--------------|------|-----|---------|----------------|------------------|
| Full Load | 7.50 | 5.6 | 12.0 | 91.8 | 77.0 |
| ¾ Load | 5.63 | 4.2 | 8.9 | 91.8 | 72.8 |
| ½ Load | 3.75 | 2.8 | 6.9 | 90.5 | 63.7 |
| ¼ Load | 1.88 | 1.4 | 5.4 | 82.2 | 47.2 |
| No Load | | | 4.3 | | 6.1 |
| Locked Rotor | | | 75 | | 46.7 |

| Torque | | | | Rotor wk ² Inertia (lb-ft ²) |
|----------------------|-------------------------|--------------------|-----------------------|---|
| Full Load (lb-ft) | Locked Rotor (% FLT) | Pull Up (% FLT) | Break Down (% FLT) | |
| 27.2 | 215 | 175 | 245 | 1.15 |

| Safe Stall Time(s) | | Sound Pressure dB(A) @ 1M | Bearings* | | Approx. Motor Weight (lbs) |
|--------------------|-----|------------------------------|-----------|----------|-------------------------------|
| Cold | Hot | | DE | NDE | |
| 32 | 23 | - | 6308ZZC3 | 6308ZZC3 | 190 |

*Bearings are the only recommended spare part(s).

Motor Options:
 Product Family:EQP Global SD
 Mounting:C-Face Round,Shaft:T Shaft

| | |
|-------------|--|
| Customer | |
| Customer PO | |
| Sales Order | |
| Project # | |

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|----------|------------------|-------------|-------------|---------------|
| Engineering | jhock | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1119 / 1 |
| Engr. Date | 4/8/2014 | Doc. Approved By | M. Campbell | Doc. Issued | 9/20/2019 |



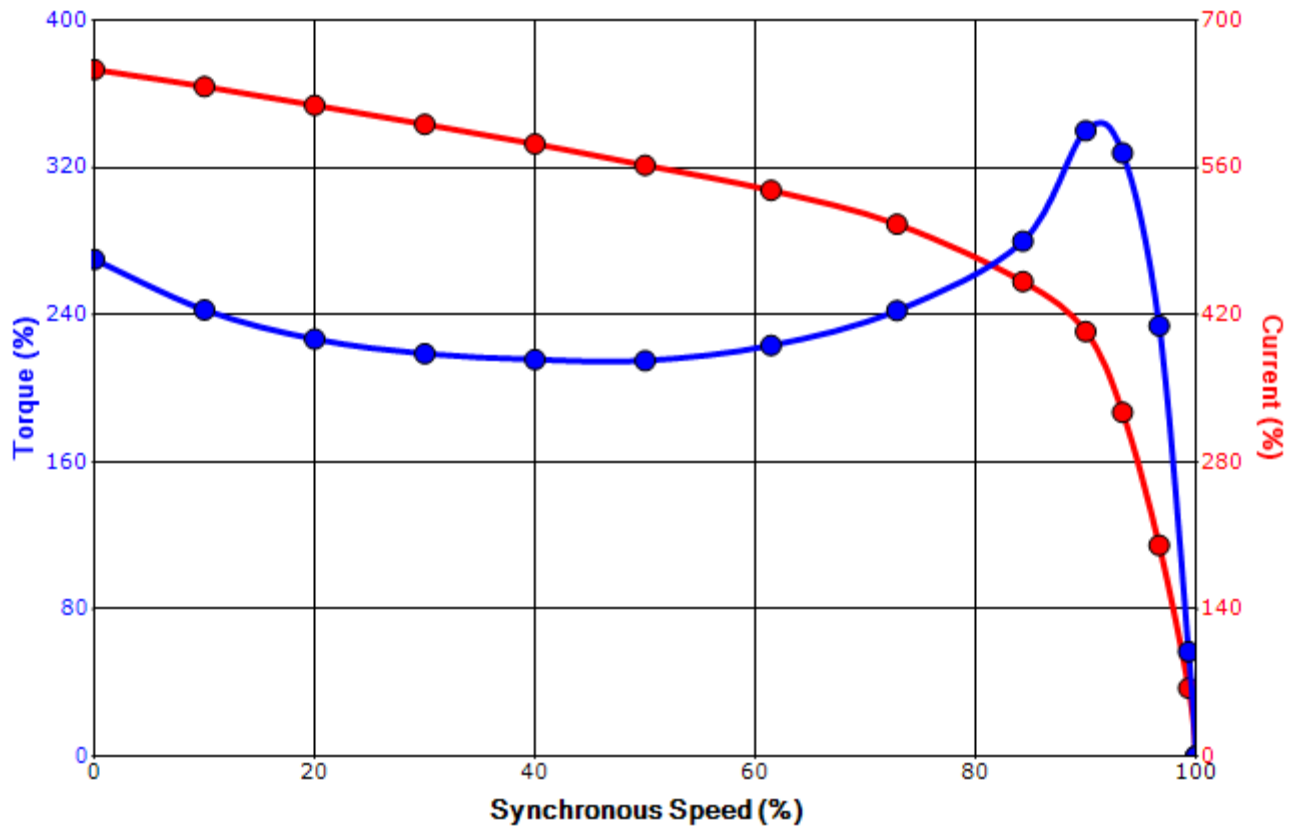
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|-------------|------------|------------|--|
| Issued Date | 12/18/2019 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

SPEED TORQUE/CURRENT CURVE

Model: Y754SDSR44A-P

| | | | | | | | | |
|-------------------|---|-------------------|------------------|-------------|----------------|-------------|----------|--------------|
| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
| 7.50 | 5.5 | 4 | 1760 | 213TC | 230/460 | 60 | 3 | 19.6/9.8 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.15 | CONT | 91.7 | B | H | 40 C |
| Locked Rotor Amps | Rotor wk ² Inertia (lb-ft ²) | Torque | | | | | | |
| | | Full Load (lb-ft) | Locked Rotor (%) | Pull Up (%) | Break Down (%) | | | |
| 63 | 1.15 | 22.4 | 270 | 215 | 340 | | | |

Design Values



| | | | |
|-------------|--|--|-----|
| Customer | | wk ² Load Inertia (lb-ft ²) | - |
| Customer PO | | Load Type | - |
| Sales Order | | Voltage (%) | 100 |
| Project # | | Accel. Time | - |

Tag:

All characteristics are average expected values.

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| | | | | | |
|-------------|-----------|------------------|-------------|-------------|-------------|
| Engineering | mcampbell | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1121/1 |
| Engr. Date | 2/9/2012 | Doc. Approved By | M. Campbell | Doc. Issued | 9/20/2019 |



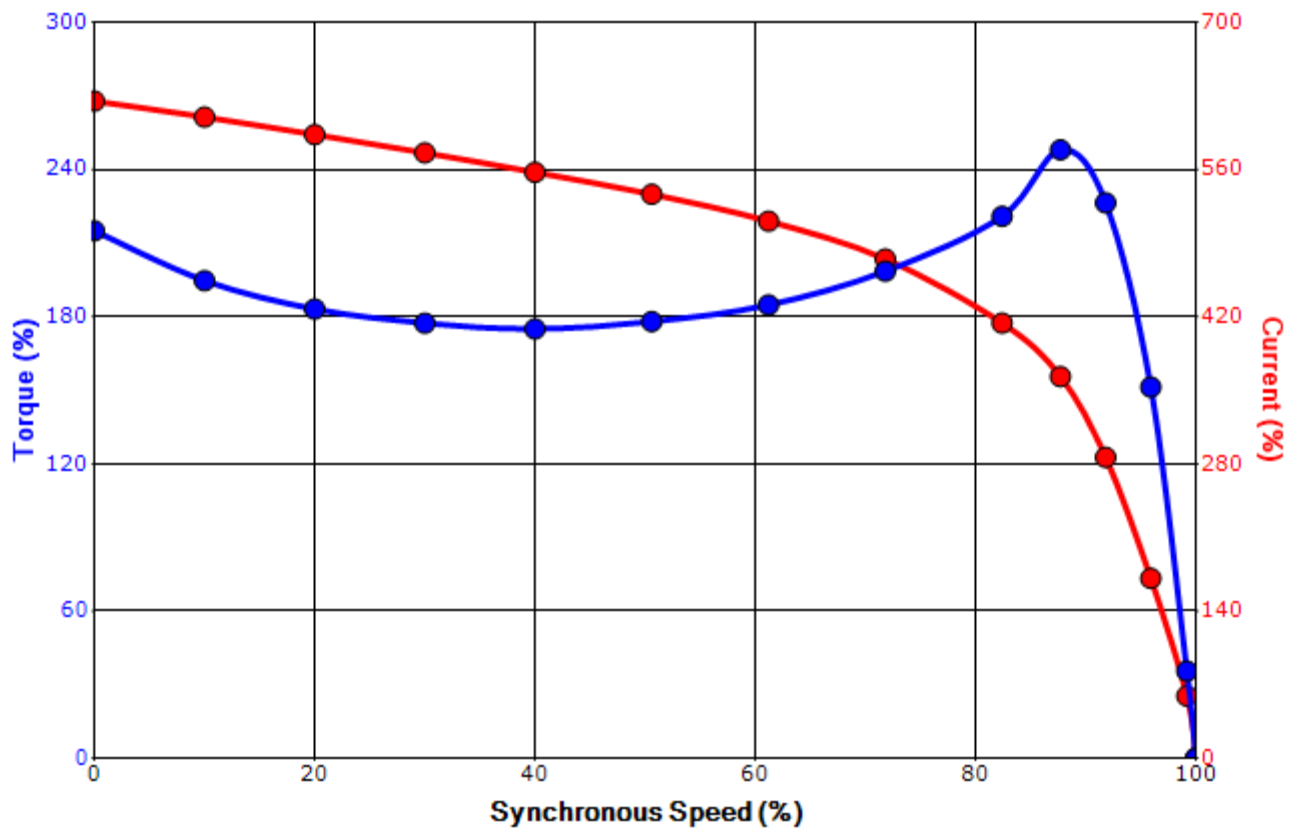
| | | | |
|-------------|------------|------------|--|
| Issued Date | 12/18/2019 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

SPEED TORQUE/CURRENT CURVE

Model: Y754SDSR44A-P

| | | | | | | | | |
|-------------------|---|-------------------|------------------|-------------|----------------|-------------|----------|--------------|
| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
| 7.50 | 5.5 | 4 | 1450 | 213TC | 190/380 | 50 | 3 | 24/12.0 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.0 | CONT | 90.2 | B | H | 40 C |
| Locked Rotor Amps | Rotor wk ² Inertia (lb-ft ²) | Torque | | | | | | |
| | | Full Load (lb-ft) | Locked Rotor (%) | Pull Up (%) | Break Down (%) | | | |
| 75 | 1.15 | 27.2 | 215 | 175 | 245 | | | |

Design Values



| | | | |
|-------------|--|--|-----|
| Customer | | wk ² Load Inertia (lb-ft ²) | - |
| Customer PO | | Load Type | - |
| Sales Order | | Voltage (%) | 100 |
| Project # | | Accel. Time | - |

Tag:

All characteristics are average expected values.

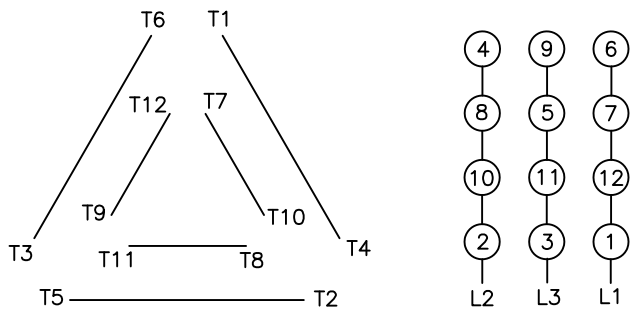
TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|----------|------------------|-------------|-------------|-------------|
| Engineering | jhock | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1121/1 |
| Engr. Date | 4/8/2014 | Doc. Approved By | M. Campbell | Doc. Issued | 9/20/2019 |

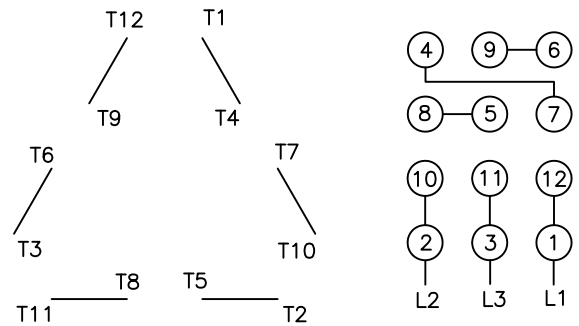
Motor Connection Diagrams
12 Leads

Across-the-Line Starting / Running Connections

Low Voltage Delta



High Voltage Delta



Switch L1 and L2 to reverse rotation

Suitable for Wye-Delta Starting and Limited Part-Winding-Starting.
Please Contact Toshiba International for specific connections.

Zero Speed Switch



Cost-effective equipment protection

SITRANS WM100 motion sensor



Accurate monitoring in harsh conditions

SITRANS WM100 is a heavy-duty zero-speed alarm switch. This non-contacting unit provides cost-effective equipment protection even in the harshest conditions. It is suitable for heavy industries such as mining, aggregates or cement. The WM100 monitors the absence of motion on moving or rotating equipment. Key applications include tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, and bucket elevators.

Design

Lightweight yet rugged, SITRANS WM100 is compact and easy to install. With its rugged cast aluminum housing, it is suitable for outdoor installation.

Mode of operation

Process protection devices act as early warning systems to avoid costly process interruptions and equipment breakdowns. Located outside of the process, Sitrans WM100 accurately detects operating conditions without wear on the sensor. Sitrans WM100 can be mounted up to 100 mm (4") from the ferrous target. The robust motion sensor provides the contacts to shutdown machinery whenever zero speed is detected. On belt, drag, and screw conveyors, or on bucket elevators, fans and pumps, the zero speed alarm option can warn instantly of equipment malfunctions. It alarms to minimize spillage, prevent extensive damage or even fire caused by belt slippage at the head pulley and warn against conveyor malfunction.

Siemens probes work on the principle of Faraday's Law of Electromagnetic Induction. When a ferromagnetic object enters the probe's permanent magnetic field, it distorts the flux, causing its coil windings to generate a voltage. This voltage is proportional to the strength of the magnet and the number of wire turns in the coil (constant in the probes) and the speed at which the ferrous target passes through the flux. The generated voltage is also inversely proportional to the square of the distance between the target and the probe.

Process protection

www.siemens.com/processprotection

Answers for industry.

SIEMENS



SITRANS WM100

Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating and rotating machinery. The sensors are located outside of the process, accurately detecting conditions without wear on the sensor. Motion sensors can warn of equipment malfunction and shut down machinery in case of slowdown or failure. They are rugged and perform even in harsh conditions. On belt, drag, and screw conveyors, or on bucket elevators, fans, and pumps, the speed alarm option can warn instantly of equipment problems.

- Up to 100 mm (4") gap between SITRANS WM100 and targets
- Non-contacting design eliminates the need for lubricating, cleaning, and part replacement
- Visual indication of target triggered pulse
- Rugged, low maintenance suitable for tough environments
- 1 SPDT Form C relay contact
- Provides cost-effective protection

| SITRANS WM100 | |
|--|--|
| Mode of operation | |
| Measuring principle | Disruption of a magnetic field by ferrous target |
| Typical applications | Monitors absence or presence of motion in harsh conditions |
| Output | |
| Contact | 1 SPDT Form C dry relay contact, rated 5A at 250 V AC, fail-safe operation |
| Time delay | Start up: 10 to 14 seconds (5 to 7 seconds with 12 ppm jumper installed) |
| Zero Speed (selected via a common jumper) | <ul style="list-style-type: none"> • 5 seconds ± 1 (minimum speed 10 to 15 ppm) or • 10 seconds ± 2 (minimum speed 5 to 7.5 ppm) |
| Rated operating conditions | |
| Operating temperature | • -40 to 60 °C (-40 to 140 °F) |
| Design | |
| Probe body | Aluminum |
| Process mounting | 2" NPSL |
| Connection box | Aluminum, 3/4" NPT conduit entrance, 5 screw terminals plus grounding terminal for electrical connection, max. 12 AWG (3.30 mm ²) wire size |
| Gasketing | Neoprene |
| Display | Red LED for verification of pulses |
| Enclosure rating | Type NEMA 4X, 6, IP67 |
| Dynamic range | |
| | <ul style="list-style-type: none"> • Minimum 6 or 12 pulses per minute • Maximum 3000 pulses per minute |
| Shipping weight | |
| | 2 kg (4 lbs) |
| Power supply | |
| | <ul style="list-style-type: none"> • 115 V AC/50 to 60 Hz, 7 VA • 230 V AC/50 to 60 Hz, 7 VA • ± 10 % of rated voltages |
| Certificates and approvals | |
| | • CSA _{US/IC} , CE, C-TICK |

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Industry Sector
Sensors and Communication
76181 KARLSRUHE
GERMANY

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Available as pdf only
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Overview



SITRANS WM100 is a heavy-duty zero-speed alarm switch. This non-contacting unit provides cost-effective equipment protection even in the harshest conditions.

Benefits

- Up to 100 mm (4 inch) gap between SITRANS WM100 and targets
- Rugged, low maintenance suitable for tough environments
- 1 SPDT Form C relay contact
- Provides cost-effective protection
- Visual indication of target triggered pulse

Application

This rugged unit is impervious to dust, dirt, build-up and moisture and is ideal for such primary industries as mining, aggregate, and cement. Operating where other systems are prone to failure, the non-contacting design eliminates the need for lubricating, cleaning and part replacement. Downtime and clean-up expenses associated with conveying equipment failure are reduced by the SITRANS WM100. It alarms to minimize spillage, prevent extensive damage or even fire caused by belt slippage at the head pulley, and warns against conveyor malfunction.

The SITRANS WM100 has built-in selectable start delays and 1 Form C relay contact. With an aluminum body, it operates from -40 to +60 °C (-40 to +140 °F).

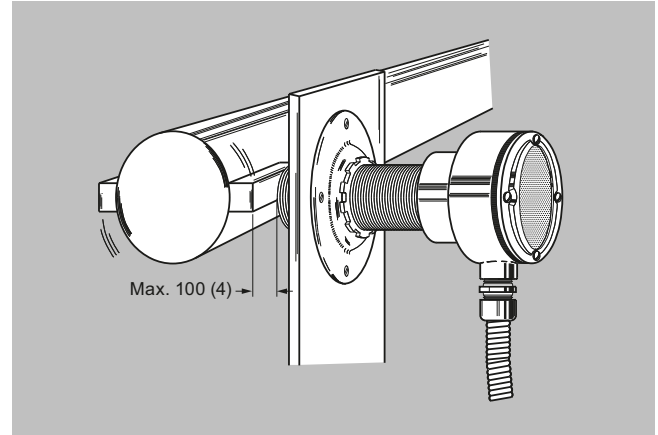
- Key Applications: tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

Mounting

The WM100 probe should be mounted, using the supplied mounting flange, onto a vibration-free structure. The gap between the probe and the target should be sufficient such that there is no danger of the target damaging the probe. The maximum allowable gap is 100 mm (4 inch) from the face of the target to the face of the probe for 4.5 x 4.5 mm (3/16 x 3/16 inch) keyway. The WM100 is sensitive to lateral disturbances to its magnetic field. If the WM100 is responding to motion from an interfering target, move the WM100 or install a ferrous plate (steel) as a shield between the WM100 and the interfering target. Where possible, the probe should be mounted such that the cable inlet is pointing downward to avoid accumulation of condensation in the casing. Connection of the probe should be made via flexible conduit for easier removal or adjustment of the probe.

Design (continued)



SITRANS WM100 mounting, dimensions in mm (inch)

Process Protection

Motion sensors

7MH7158-0AA00

SITRANS WM100 Motion sensor

Selection and ordering data

| SITRANS WM100 Motion sensor Heavy duty speed alarm switch with 100 mm measuring range. | | Article No. | A 0 0 | | |
|---|--|------------------|-------|---|--|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | 7MH71- 0 58 - | ● | | |
| Model | | | | | |
| 115 V AC | | | | A | |
| 230 V AC | | | | B | |

| Selection and Ordering data | Order code |
|--|------------|
| Further designs | |
| Please add "-Z" to Article No. and specify Order code(s). | |
| Manufacturer's Test Certificate: According to EN 10204-2.2 | C11 |
| Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/i-identification (max. 16 characters), specify in plain text | Y17 |

| Accessories | Article No. |
|--|-------------|
| Operating Instructions | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| Accessories | |
| Locknut | 7MH723-1CR |
| Mounting flange | 7MH723-1CS |
| Motion cable gland adaptor kit | 7MH723-1JU |

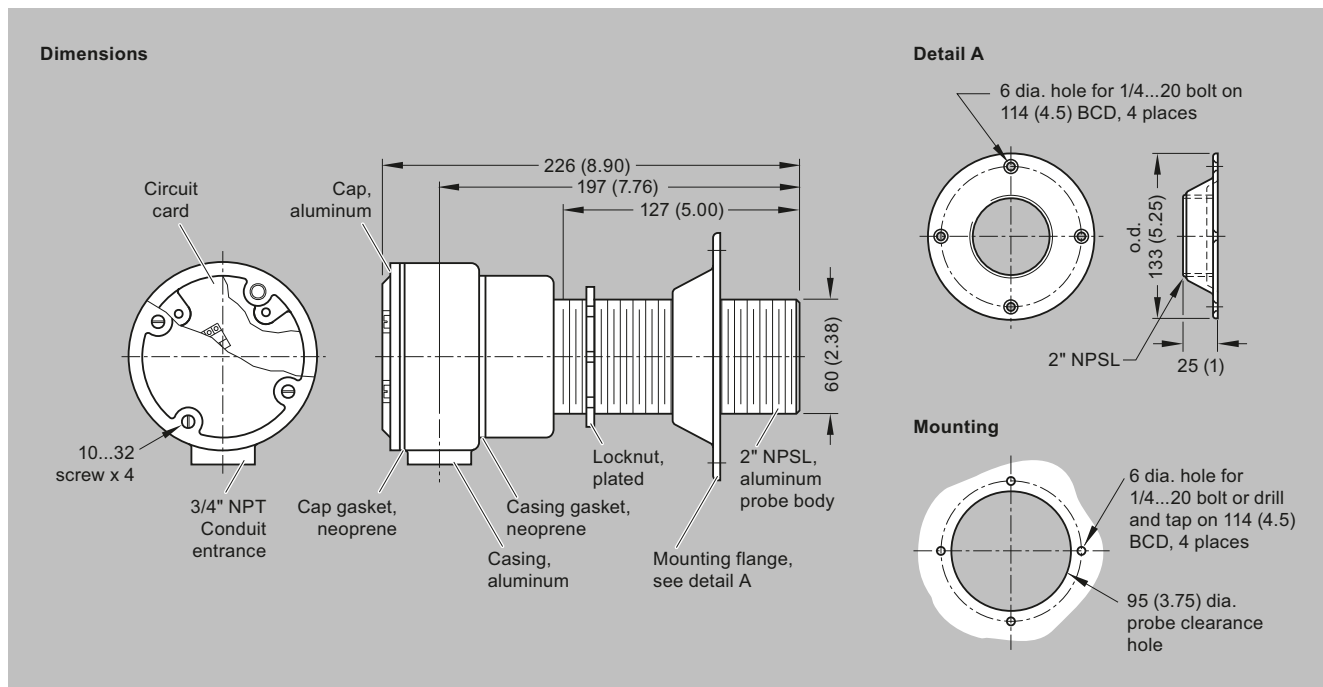
Technical specifications

| | |
|---|---|
| Mode of operation | |
| Measuring principle | Disruption of magnetic field by ferrous target |
| Typical application | Monitors absence or presence of motion in harsh conditions |
| Output | |
| Contact | 1 SPDT Form C dry relay contact, rated 5 A at 250 V AC, fail-safe operation |
| Time delay | Start up: 10 ... 14 seconds (5 ... 7 seconds with 12 ppm jumper installed) |
| Zero Speed (selected via a common jumper) | 5 seconds ± 1 (minimum speed 10 ... 15 ppm) or 10 seconds ± 2 (minimum speed 5 ... 7.5 ppm) |
| Rated operating conditions | |
| Operating temperature | -40 ... +60 °C (-40 ... +140 °F) |
| Storage temperature | -40 ... +60 °C (-40 ... +140 °F) |
| Design | |
| Probe body | Aluminum |
| Process mounting | 2" NPSL |
| Connection box | Aluminum, ¾" NPT conduit entrance, 5 screw terminals plus grounding terminal for electrical connection, max. 12 AWG (3.30 mm ²) wire size |
| Gasketing | Neoprene |
| Display | Red LED for verification of pulses |
| Enclosure rating | Type NEMA 4x, 6, IP67 |
| Dynamic range | |
| | Minimum 6 or 12 pulses per minute Maximum 3 000 pulses per minute |
| Shipping weight | 2 kg (4.4 lb) |

Technical specifications (continued)

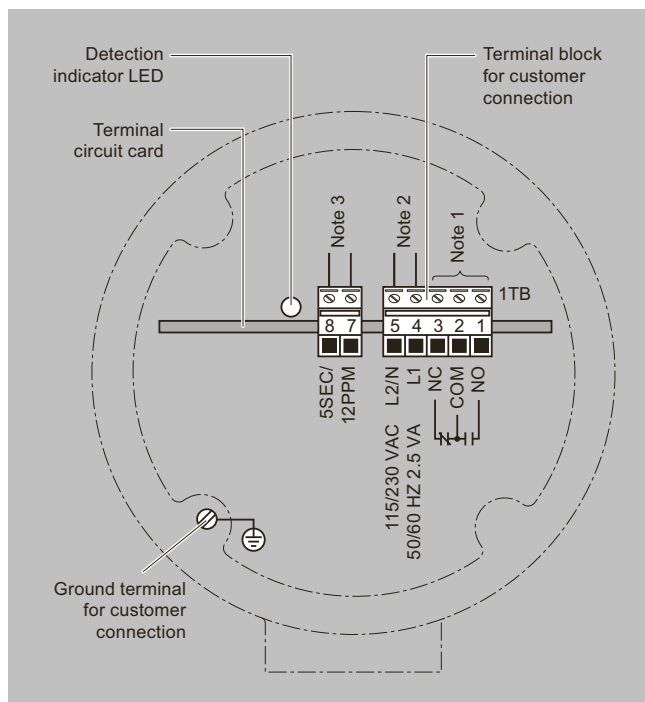
| | |
|-----------------------------------|---|
| Power supply | <ul style="list-style-type: none"> • 115 V AC/50 ... 60 Hz, 7 VA • 230 V AC/50 ... 60 Hz, 7 VA • ± 10 % of rated voltage |
| Certificates and approvals | cCSAus, CE, UKCA RCM, EAC, KC |

Dimensional drawings



SITRANS WM100 mounting, dimensions in mm (inch)

Circuit diagrams



SITRANS WM100 wiring

Notes:

1. Dry contacts shown in de-energized (alarm or shelf) state.
2. SITRANS WM100 is manufactured for either 115 or 230 V AC operation. Check WM100 nameplate for applicable voltage. Correct

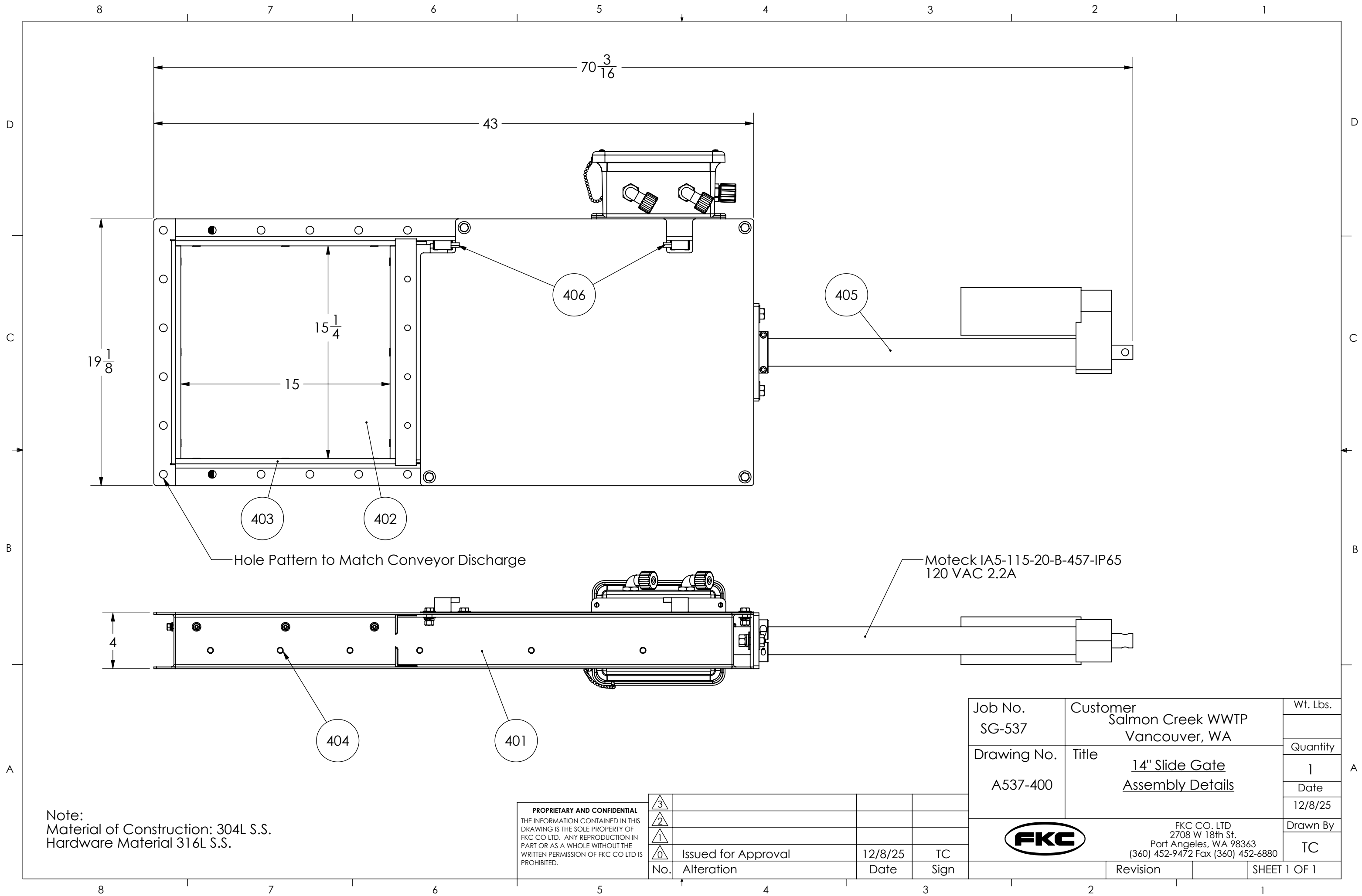
Circuit diagrams (continued)

voltage must be supplied. Voltages lower than specified will result in an inoperative condition. Voltages higher than specified will severely damage unit.
 3. For 5 second time delay and a minimum 12 ppm range, connect jumper across terminals 7 and 8. Without a jumper, the default is a 10 second time delay and a minimum 6 ppm range.

Slide Gate

Salmon Creek WWTP Vancouver, WA
BHX-1350x7500L Screw Press
FKC Bill of Materials

| Item # | 14" Slide Gate | Manufacturer | Part Number | Qty | Material of Construction |
|--------|------------------------|-------------------|-----------------------|-----|--------------------------|
| 401 | Frame | FKC | -- | 1 | 304L SS |
| 402 | Knife Plate | FKC | -- | 1 | 3/8" 304L SS |
| 403 | Seal Strips | FKC | -- | 4 | Delrin |
| 404 | Neverlube Cam Follower | Carter | SFH-32-A | 12 | |
| 405 | Accuator | Moteck | IA5-115-20-B-457-IP65 | 1 | |
| 406 | Limit Switch | Automation Direct | AEM2G1101Z11-3R | 2 | |



Note:
 Material of Construction: 304L S.S.
 Hardware Material 316L S.S.

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| 3 | | | |
| 2 | | | |
| 1 | | | |
| 0 | Issued for Approval | 12/8/25 | TC |
| No. | Alteration | Date | Sign |

| | | |
|---|---|-----------------|
| Job No. SG-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. A537-400 | Title <u>14" Slide Gate</u> <u>Assembly Details</u> | Quantity 1 |
| | | Date 12/8/25 |
|  FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Drawn By TC |
| | | Revision |

Actuator IA5



IA5 is a high speed AC powered linear actuator designed with stainless steel extension tube, which is suitable for various outdoor industrial applications, such as construction machine, air bridge, mining transportation conveyor...etc. It also features its heavy load capability and low current deviation. Ball screw or ACME spindle is available for users to choose.

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| 2. Ball screw type | 5 |
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Features and Options

- Main applications: Industrial / Agriculture
- Input voltage: 115V AC / 60Hz ; 230V AC / 50Hz
- Max. rated load: 3,500N (ACME) / 7,000N (Ball screw)
- Max. static load: 4,500N (ACME) / 13,600N (Ball screw)
- Max. speed at no load: 52.8mm/sec (Typical value)
- Stroke: 102 / 153 / 203 / 254 / 305 / 457 / 610 mm
- IP level: IP54 (Standard) / IP65 (Option) (Static, non-action)
- Overload protection by clutch
- Extension tube material: Iron (for ACME) / Stainless steel (for Ball screw)
- Color: Black
- Power cord length: 600mm (with tinned wires)
- Duty cycle: 25%, max. 4 min. continuous operation in 16 min.
- Operating ambient temperature: -25°C~+65°C
- Storage ambient temperature: -25°C~+65°C
- Certified: UL1004-1. CE Marking, EMC Directive 2014/30/EU.
- Positioning: Optional analog and absolute positioning feedback with Potentiometer (POT)
- Optional preset limit switches (LT)

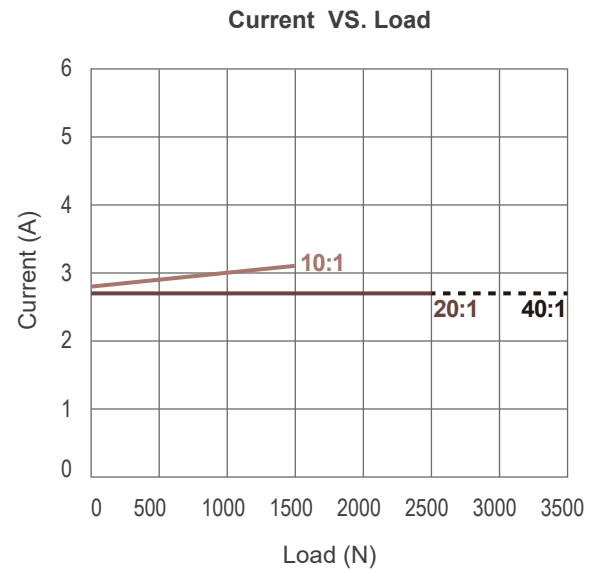
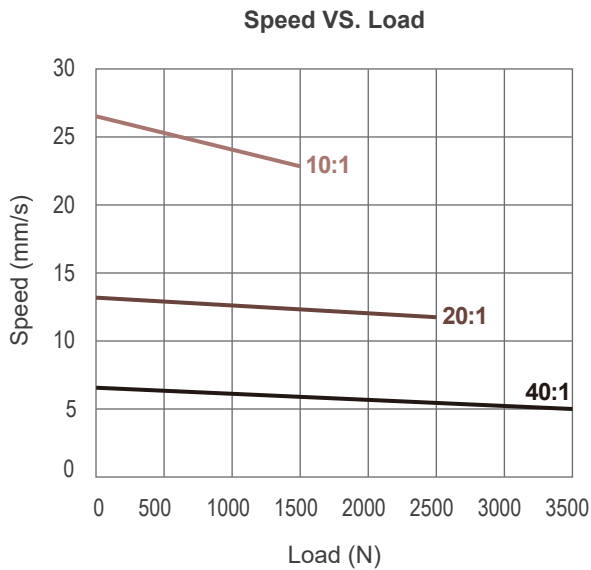


Performance Data

1. ACME type

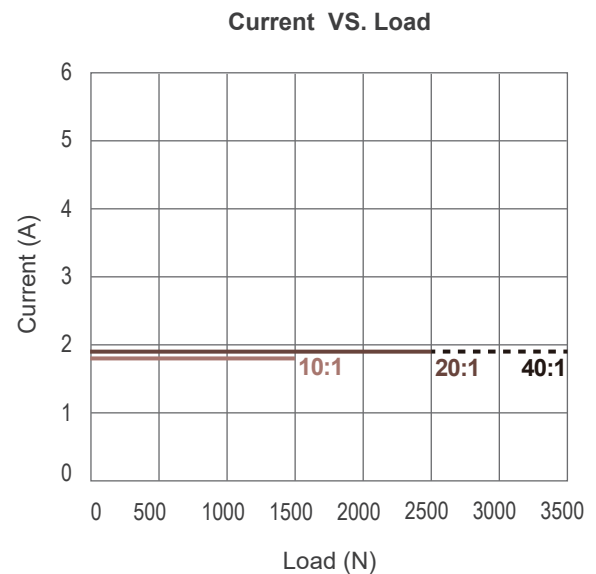
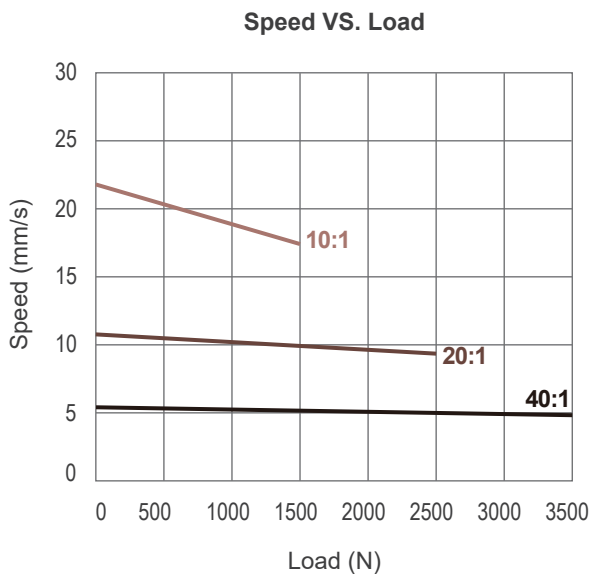
• 115V AC motor

| Model No. | Gear ratio | Push / Pull Max. (N) | * Typical Speed (mm/s) | | * Typical Current (A) | |
|------------------|------------|----------------------|------------------------|-----------|-----------------------|-----------|
| | | | No load | Full load | No load | Full load |
| IA5-115-10-A-XXX | 10:1 | 1500 | 26.5 | 22.9 | 2.8 | 3.1 |
| IA5-115-20-A-XXX | 20:1 | 2500 | 13.1 | 11.8 | 2.7 | 2.7 |
| IA5-115-40-A-XXX | 40:1 | 3500 | 6.6 | 6.0 | 2.7 | 2.7 |



• 230V AC motor

| Model No. | Gear ratio | Push / Pull Max. (N) | * Typical Speed (mm/s) | | * Typical Current (A) | |
|------------------|------------|----------------------|------------------------|-----------|-----------------------|-----------|
| | | | No load | Full load | No load | Full load |
| IA5-230-10-A-XXX | 10:1 | 1500 | 21.8 | 17.5 | 1.8 | 1.8 |
| IA5-230-20-A-XXX | 20:1 | 2500 | 10.8 | 9.3 | 1.9 | 1.9 |
| IA5-230-40-A-XXX | 40:1 | 3500 | 5.4 | 4.9 | 1.9 | 1.9 |



Remarks:

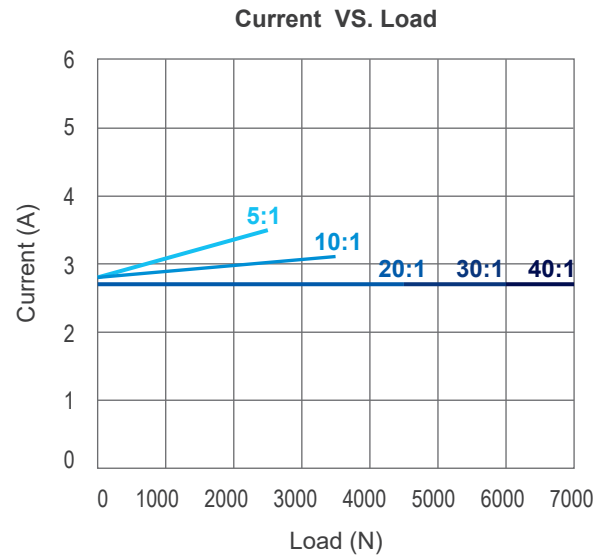
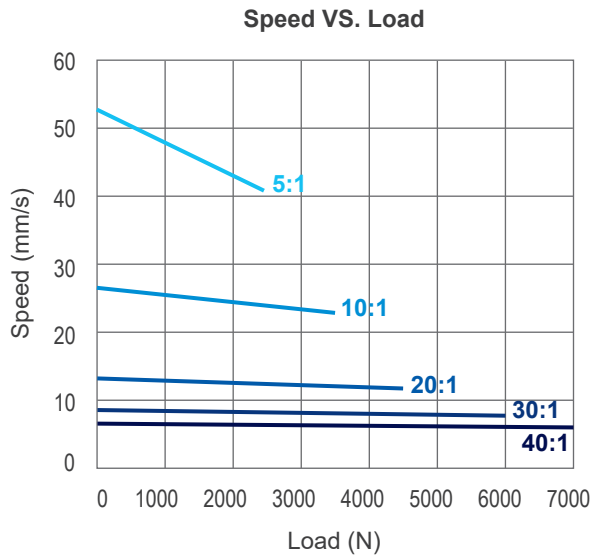
- * The typical speed or typical current means the average value neither upper limit nor lower limit. The performance curves are made with typical values.



2. Ball screw type

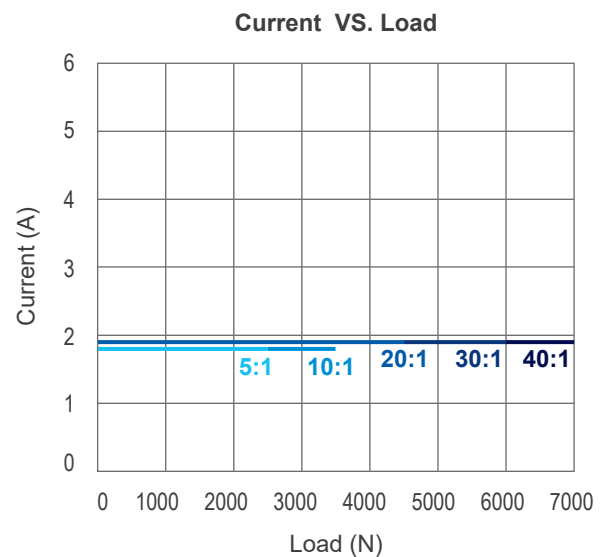
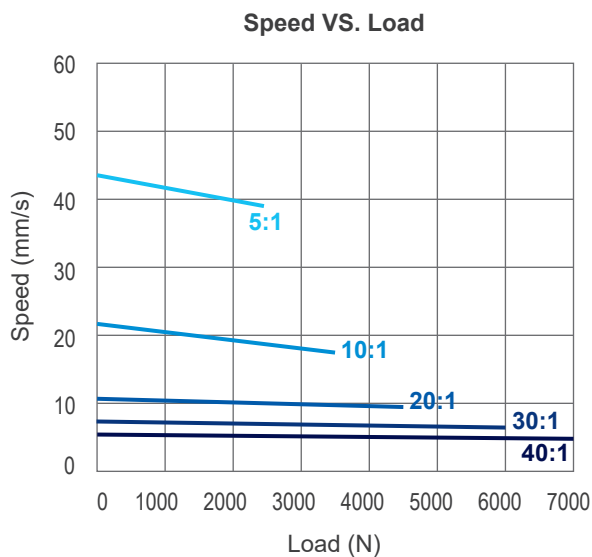
• 115V AC motor

| Model No. | Gear ratio | Push / Pull Max. (N) | * Typical Speed (mm/s) | | * Typical Current (A) | |
|------------------|------------|----------------------|------------------------|-----------|-----------------------|-----------|
| | | | No load | Full load | No load | Full load |
| IA5-115-05-B-XXX | 5:1 | 2500 | 52.8 | 40.8 | 2.8 | 3.5 |
| IA5-115-10-B-XXX | 10:1 | 3500 | 26.5 | 22.9 | 2.8 | 3.1 |
| IA5-115-20-B-XXX | 20:1 | 4500 | 13.1 | 11.8 | 2.7 | 2.7 |
| IA5-115-30-B-XXX | 30:1 | 6000 | 8.7 | 7.9 | 2.7 | 2.7 |
| IA5-115-40-B-XXX | 40:1 | 7000 | 6.6 | 6.0 | 2.7 | 2.7 |



• 230V AC motor

| Model No. | Gear ratio | Push / Pull Max. (N) | * Typical Speed (mm/s) | | * Typical Current (A) | |
|------------------|------------|----------------------|------------------------|-----------|-----------------------|-----------|
| | | | No load | Full load | No load | Full load |
| IA5-230-05-B-XXX | 5:1 | 2500 | 43.5 | 29.0 | 1.8 | 1.8 |
| IA5-230-10-B-XXX | 10:1 | 3500 | 21.8 | 17.5 | 1.8 | 1.8 |
| IA5-230-20-B-XXX | 20:1 | 4500 | 10.8 | 9.3 | 1.9 | 1.9 |
| IA5-230-30-B-XXX | 30:1 | 6000 | 7.2 | 6.3 | 1.9 | 1.9 |
| IA5-230-40-B-XXX | 40:1 | 7000 | 5.4 | 4.9 | 1.9 | 1.9 |



Remarks:

- * The typical speed or typical current means the average value neither upper limit nor lower limit. The performance curves are made with typical values.



Dimensions

1. Installation dimension

1.1 ACME type

- Retracted length (A)

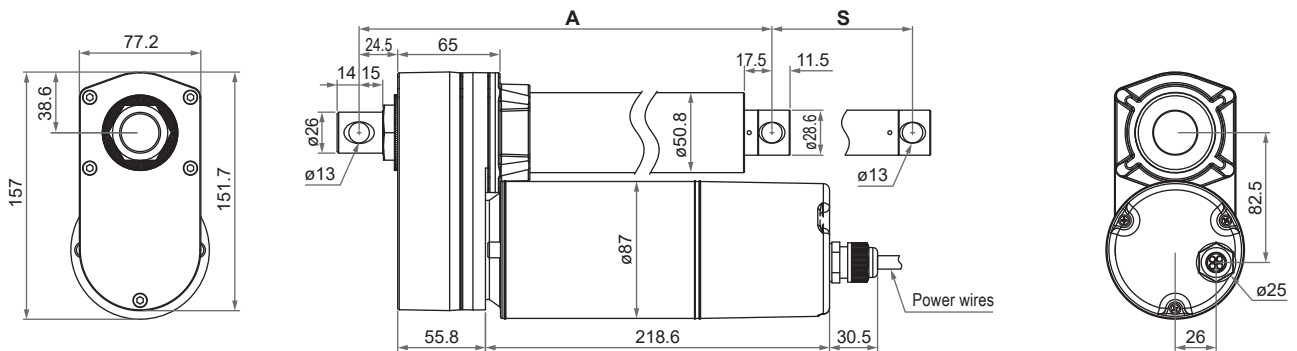
| | Option | Stroke (S) | | | | | | |
|----------------------|--------------|------------|----------|----------|-----------|-----------|-----------|-----------|
| | | 102 (4") | 153 (6") | 203 (8") | 254 (10") | 305 (12") | 457 (18") | 610 (24") |
| Retracted length (A) | Basic | 262 | 313 | 364 | 414 | 465 | 668 | 821 |
| | POT | 302 | 353 | 404 | 454 | 505 | 708 | 861 |
| | LT or LT+POT | 359 | 410 | 460 | 511 | 613 | 765 | 918 |

(Tolerance: $\pm 5\text{mm}$)

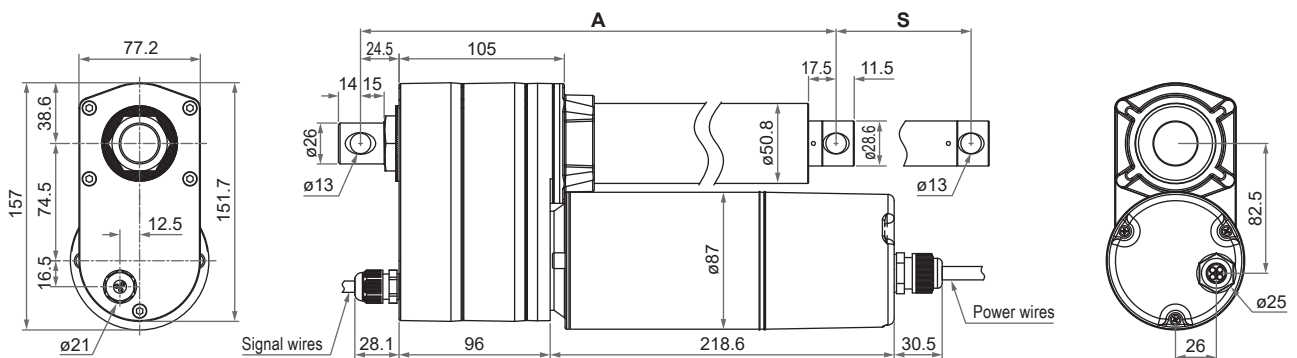
- Extended length = Retracted length (A) + Stroke (S)

- Drawing

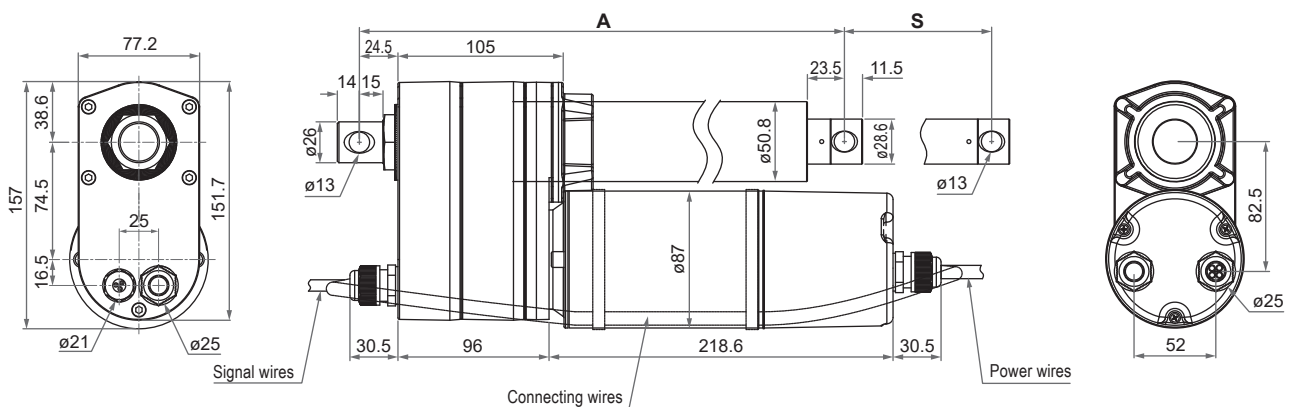
- Basic (Without limit switch nor positioning feedback)



- With Potentiometer (POT)



- With limit switches (LT) or with both limit switches (LT) and Potentiometer (POT)



Unit: mm



1.2 Ball screw type

- Retracted length (A)

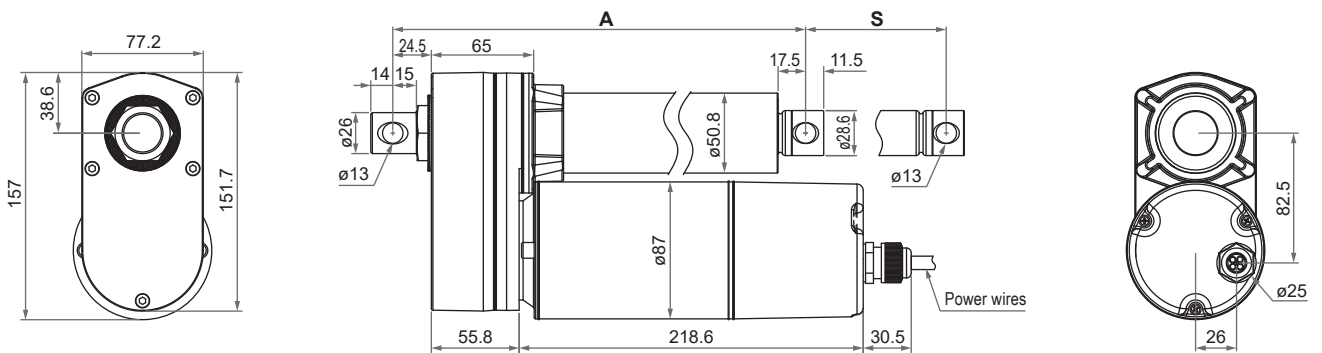
| | Option | Stroke (S) | | | | | | |
|----------------------|--------------|------------|----------|----------|-----------|-----------|-----------|-----------|
| | | 102 (4") | 153 (6") | 203 (8") | 254 (10") | 305 (12") | 457 (18") | 610 (24") |
| Retracted length (A) | Basic | 302 | 353 | 404 | 455 | 506 | 735 | 888 |
| | POT | 342 | 393 | 444 | 495 | 546 | 775 | 928 |
| | LT or LT+POT | 399 | 450 | 501 | 552 | 680 | 832 | 985 |

(Tolerance: ±5mm)

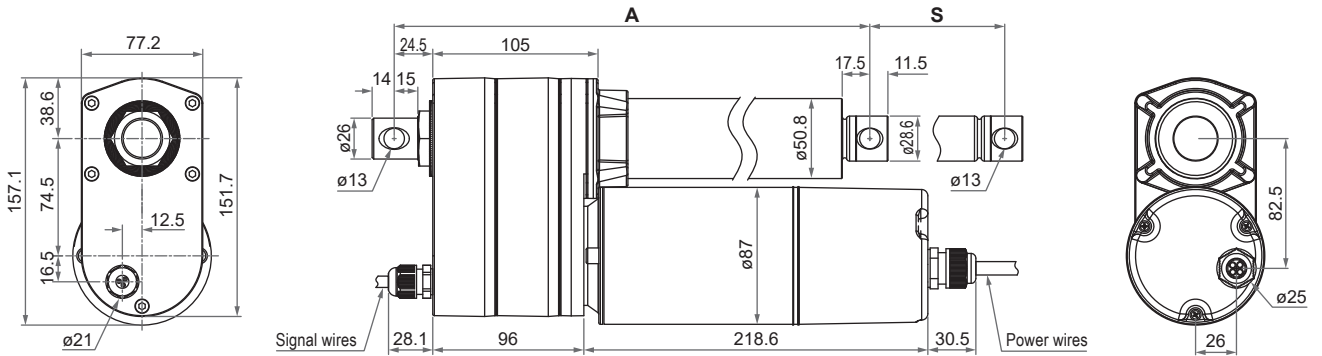
- Extended length = Retracted length (A) + Stroke (S)

- Drawing

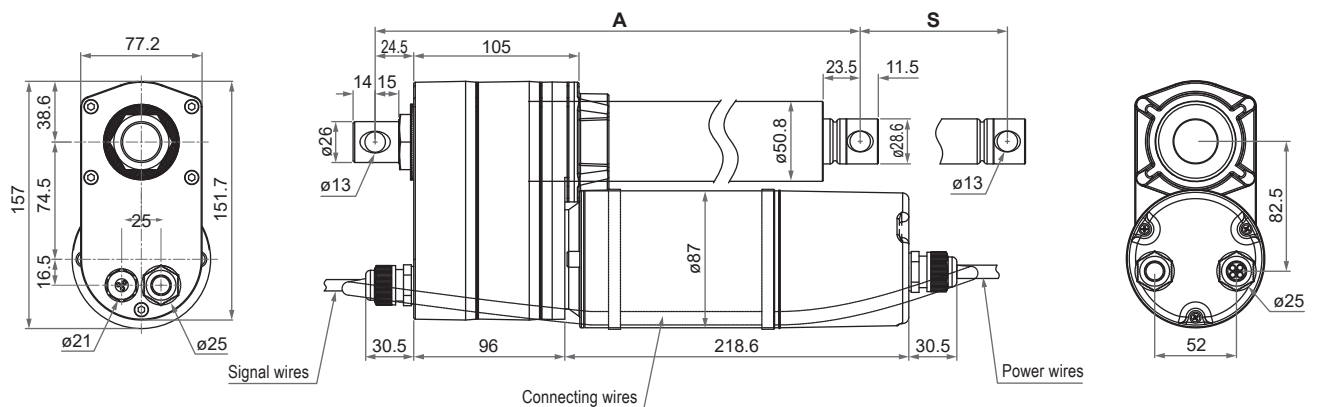
- Basic (Without limit switch nor positioning feedback)



- With Potentiometer (POT)



- With limit switches (LT) or with both limit switches (LT) and Potentiometer (POT)



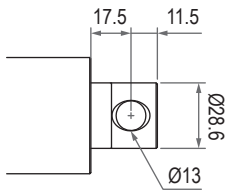
Unit: mm



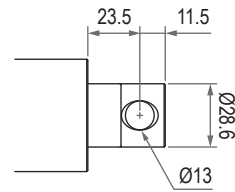
2. Front connector type

2.1 ACME type

- Basic or with Potentiometer (POT)

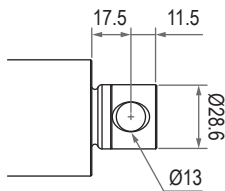


- With limit switches (LT) or with both limit switches (LT) and Potentiometer (POT)

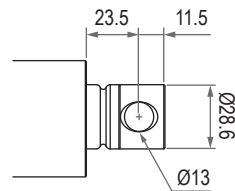


2.2 Ball screw type

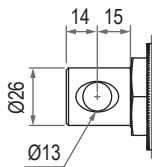
- Basic or with Potentiometer (POT)



- With limit switches (LT) or with both limit switches (LT) and Potentiometer (POT)

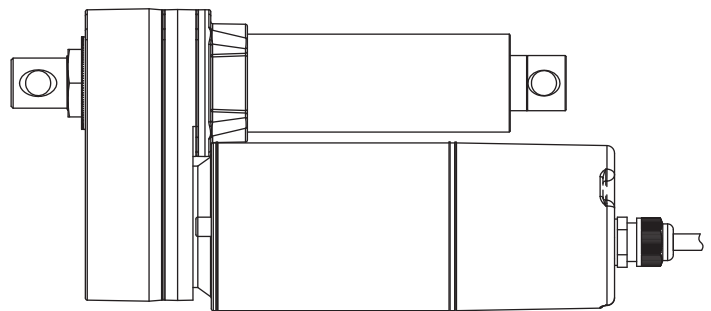
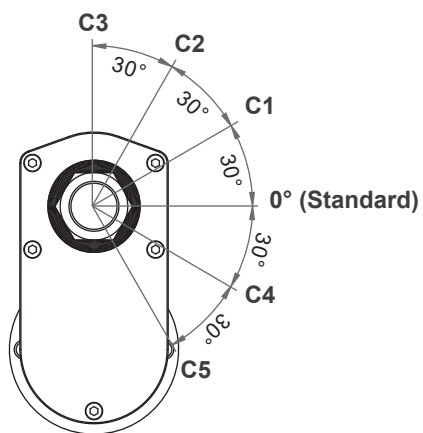


3. Rear connector type



Unit: mm

4. Pivot orientation of rear connector



Note: As an example in 0° orientation.



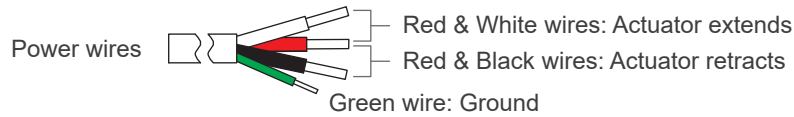
Cable with Flying Leads

1. Power wiring

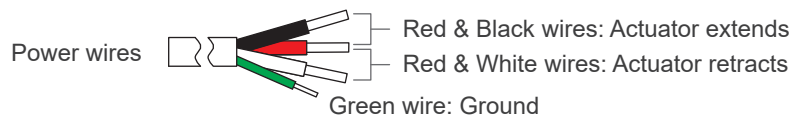
For IA5 actuators, connection rule of power wires varies according to different types and gear ratio(s). Please follow the instructions below.

- Basic or with Potentiometer type

(1) If the gear ratio 5:1 / 10:1 / 20:1, the green wire is ground wire; connect red & white wires to AC power for extension but red & black wires for retraction.

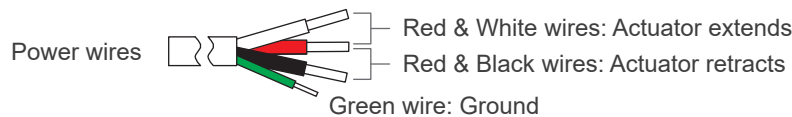


(2) If the gear ratio 30:1 / 40:1, the green wire is ground wire; connect red & black wires to AC power for extension but red & white wires for retraction.



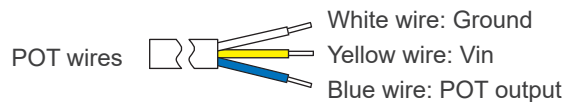
- With limit switches or with both limit switches and Potentiometer type

Regardless of gear ratio, the green wire is ground wire; connect red & white wires to AC power for extension but red & black wires for retraction.

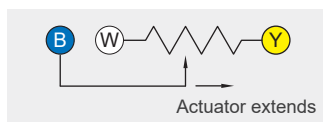


2. POT wiring

White, yellow and blue wires are signal wires.



- Vin: Input voltage 70V max.
- Potentiometer specification: 10K ohm, 10 turns. Tolerance $\pm 5\%$
- Output voltage: The voltage (resistance) between blue and white increases linearly from about 0 when the actuator extends, and decreases when it retracts.



- There are different resolutions according to the stroke length (as table below)

| Stroke (mm) | Resistance (tolerance: $\pm 0.3K\Omega$) |
|-------------|---|
| 102 (4") | 0.3 ~ 8.1K |
| 153 (6") | 0.3 ~ 8.7K |
| 203 (8") | 0.3 ~ 9.2K |
| 254 (10") | 0.3 ~ 7.4K |
| 305 (12") | 0.3 ~ 8.8K |
| 457 (18") | 0.3 ~ 9.4K |
| 610 (24") | 0.1 ~ 9.9K |



Compatibility

| Product | Model | IA5 spec |
|-----------|---|---|
| Accessory | MB30 mounting bracket  | <ul style="list-style-type: none"> • Standard, mounting hole \varnothing13mm. |

Certifications

IA5 actuator is compliant with the following regulations, in terms of the essential conformity requirements of EMC Directive of 2014/30/EU.

| Emission | Immunity |
|---|--|
| EN IEC 61000-6-3:2021 EN IEC 61000-3-2:2019+A1:2021 EN 61000-3-3:2013+A1:2019 | EN IEC 61000-6-1:2019 IEC 61000-4-2:2008 IEC 61000-4-3:2020 IEC 61000-4-4:2012 IEC 61000-4-5:2017 IEC 61000-4-6:2013 IEC 61000-4-8:2009 IEC 61000-4-11:2020 |



Ordering Key

| | | | | | | | | | | | |
|---|---|------------|------------|-----------|----------|------------|------------|-----------|--|----------|--|
| | | IA5 | 230 | 20 | B | 102 | POT | LT | | 2 | |
| Input voltage | 115: 115V AC 230: 230V AC | | | | | | | | | | |
| Gear ratio | 05: 5:1 (Ball screw only) 10: 10:1 20: 20:1 30: 30:1 (Ball screw only) 40: 40:1 | | | | | | | | | | |
| Spindle type | A: ACME B: Ball screw | | | | | | | | | | |
| Stroke | 102: 102 mm (4") 153: 153 mm (6") 203: 203 mm (8") 254: 254 mm (10") 305: 305 mm (12") 457: 457 mm (18") 610: 610 mm (24") | | | | | | | | | | |
| Positioning feedback | Blank: None POT: Potentiometer | | | | | | | | | | |
| Limit switches | Blank: None LT: Limit switches | | | | | | | | | | |
| IP level | Blank: IP54 (Standard) IP65: IP65 | | | | | | | | | | |
| Pivot orientation of Rear connector (Refer to Page 8) | Blank: 0° (Standard) C1: 30° C2: 60° C3: 90° C5: 120° C4: 150° | | | | | | | | | | |
| Cable length | 2: 600mm straight | | | | | | | | | | |



More information about installation and usage is provided in IA5 User Guide, which can be downloaded from Moteck website.

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Control Description

Screw Press Wastewater Treatment System Operation

BLUE = User Setpoint

1.0 System Description

The dewatering system can be started and stopped through the operator interface. Once the Start sequence is activated the Sludge Pump, Polymer System, and Flocculation Tank will start. After the screw press headbox has reached the [Screw Press Start Level](#) the screw press, conveyor and washdown cycle will proceed. If either the Stop button is pressed, or the System Auto Shut-Off is initiated, the shutdown sequence will begin. The shutdown sequence will shut off the sludge pump, polymer system and flocculation tank. The screw press will run for the additional time, [Screw Press Shutdown Delay](#), and then set to off. The sludge conveyor will continue to run until the time has elapsed on the [Conveyor Shutdown Delay](#). The conveyor will be set to off and the shutdown will be complete.

1.1 Sludge Pump

Auto Mode:

In *Constant Flow*, the speed of the pump will remain constant per the user setpoint [Constant Flow GPM](#). The screw speed of the screw press will vary to maintain the [Headbox Desired Level](#) of the screw press. The screw speed will vary between the speeds on the PID Setpoint screen.

In *Variable Flow*, the speed of the screw press will remain constant per the user setpoint [Variable Flow Mode Screw Press Speed](#). The sludge pump speed will vary to maintain the [Headbox Desired Level](#) of the screw press. The sludge pump will vary between the speeds on the PID Setpoint screen.

Hand Mode:

There are no interlocks except equipment / personal protection devices. The speed command will be constant, based on the set-point on the HMI.

1.2 Polymer Feed System

Auto Mode:

The polymer system will start and stop with the sludge pump. The polymer pump speed will be based on the [Polymer Ratio to Feed Pump Flow](#) setpoint. The polymer speed is determined by the equation below:

$$\text{Polymer Pump Speed} = \text{Sludge Pump Speed} \times \text{Ratio}$$

The polymer system will run if there is a number greater than zero entered associated with a polymer Ratio. If the ratio is set to zero, then the polymer system will be set to "OFF".

Polymer is typically made-down to 0.5% concentration. The make-up water should be adjusted using the rotameter on the side of the system. Using the digital display for the neat polymer rate, the operator can adjust the water flow manually using the formula below.

$$\text{Water Flow (GPM)} = \text{Neat Polymer Flowrate (GPH)} / 0.3$$

Screw Press Wastewater Treatment System Operation

The polymer system will alarm and shutdown for either loss of water or loss of polymer. Either alarm will send a Polymer System Alarm back to the dewater control panel system and the system will enter an Auto Shutdown sequence.

Hand Mode:

There are no interlocks except equipment / personal protection devices. Hand controls are on the local panel on the polymer systems. Speed is controlled by the local potentiometer.

1.3 Flocculation Tank

Auto Mode:

The flocculation tank agitator will start and stop with the Sludge Pump. The flocculation tank speed is constant and based on the [Floc Tank Mixer Speed](#) setpoint.

The Flocculation tank is provided with a high-level switch. This switch will shut down the system if activated. If activated, check for a blockage between flocculation tank and the Screw Press. This could also indicate that the screw press headbox level transmitter is not functioning properly.

Hand Mode:

There are no interlocks except equipment / personal protection devices. The speed command will be constant based on the [Floc Tank Mixer Speed](#) setpoint.

1.4 Sludge Conveyor and Slide Gates

Auto Mode:

The conveyor will start and delay to stop with the screw press. The conveyor will run for the [Conveyor Shutdown Delay](#) setpoint time after the screw press stops. The conveyor speed is constant and based on the [Conveyor Speed](#) setpoint.

The conveyor is set-up with a loss of motion alarm. If the control system asks for the conveyor to “run”, but no motion is detected, the system will shut down and alarm.

Slide gates are on timers and will open and close automatically when the conveyor is running. The slide gates will cycle based on the [Conveyor Drop Point 1-2](#) setpoint times so that only one drop point is open at a time.

Hand Mode:

No Interlocking except equipment/personal protection devices. The speed command will be constant based on the [Conveyor Speed](#) setpoint.

Screw Press Wastewater Treatment System Operation

1.5 Screw Press

Auto Mode:

The screw press will delay start and delay to stop with the Sludge Pump, polymer system and flocculation tank. After the start button is pushed the screw press will wait to turn on until the [Screw Press Start Level](#) is reached. The screw press will run for the [Screw Press Shutdown Delay](#) time at the [Screw Press Shutdown Speed](#) after a stop sequence has been initiated.

In Auto Mode, the speed of the screw will vary to maintain the [Headbox Desired Level](#). The level is determined by a pressure type sensor located in the headbox. The control panel PLC will use the operator "Level Setpoint" to determine the best screw speed to process the flowrate sent to the screw press. The flowrate is based on the user flow rate setpoint.

The PLC in the control panel is constantly monitoring the motor load of the screw press. As the material being dewatered gets higher dryness, the percent motor load will increase. If the motor load gets above the [Screw Press High Motor Load](#), the system will alarm and shutdown.

Hand Mode:

There are no interlocks except equipment / personal protection devices. The speed command will be constant, based on the setpoint on the HMI .

1.6 Washdown Valves

Auto Mode:

The washdown valves will open and close with the screw press. Valve 1 will open to start the washdown cycle and start the Valve 1 timer. Valve 2 will remain closed on system start and start the Valve 2 close timer. Once the timer is completed the open and closed conditions change states. i.e. Valve 1 closes before Valve 2 can open. This process continues between Valve 1, 2, 3, 4 and 5 until the screw press stops. Each valve has its own open / close times, but conditions are set so only one valve can be open at a time.

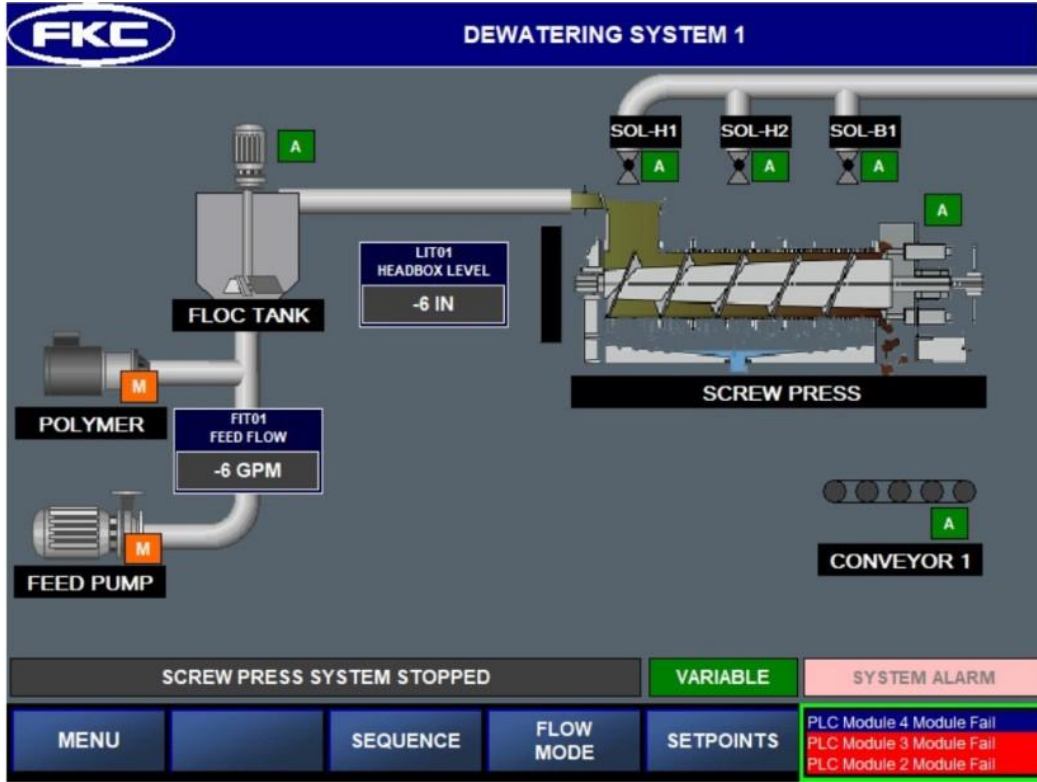
Hand Mode:

There are no interlocks except equipment / personal protection devices. Open / Close can be selected on the HMI. The valves will remain open or closed until the condition is changed.

Screw Press Wastewater Treatment System Operation

2.0 Displays - Overview

System Overview

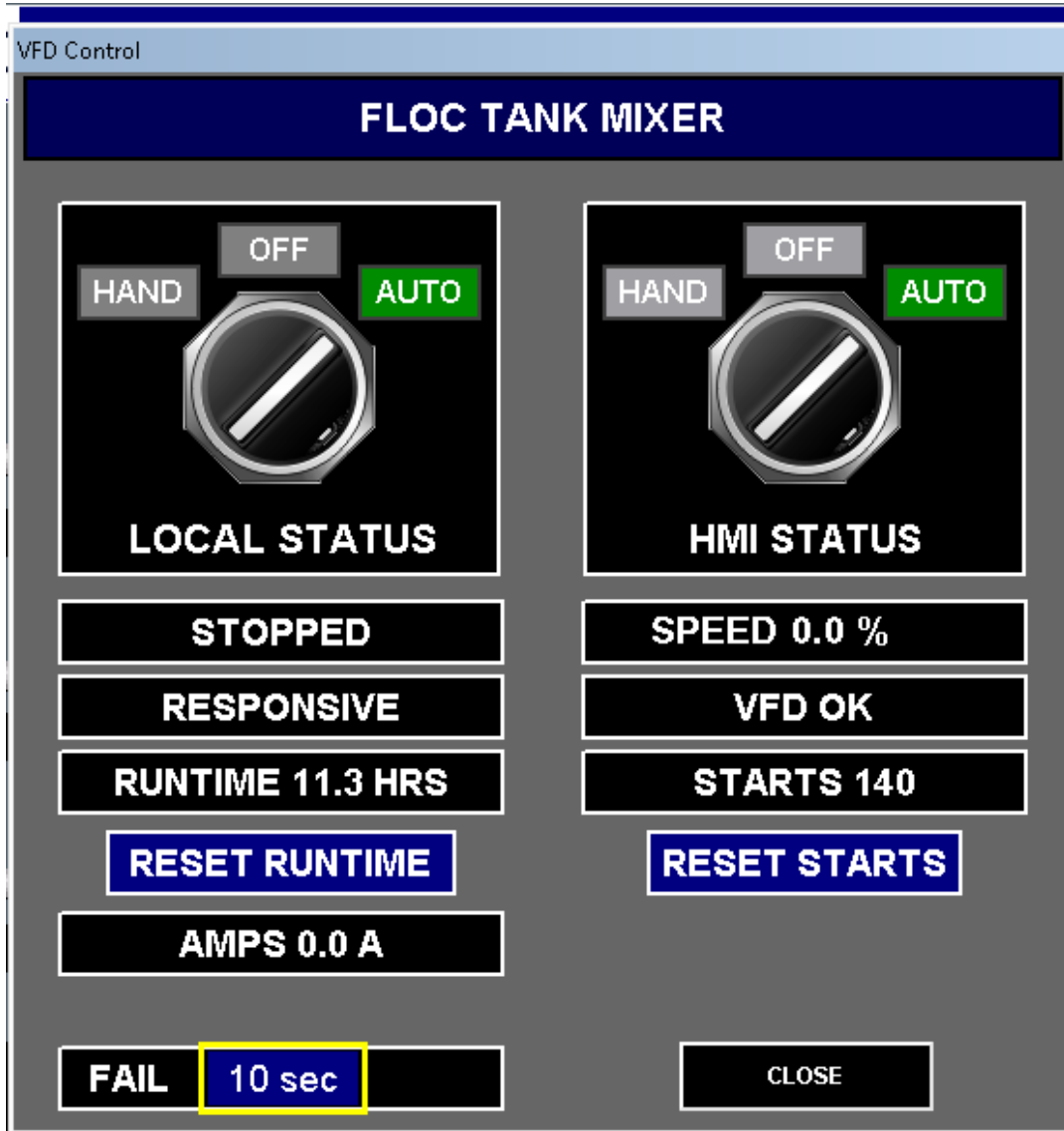


From the system overview screen the operator can navigate through set-point screens including the set-points, and sequence start / stop, system pause and polymer adjustment.

Screw Press Wastewater Treatment System Operation

2.1 Displays – Motor Selection

Motor Selection



If hand mode is desired, the operator can select a given motor by pressing on the screen. When doing so, a pop-up screen will appear with a Hand / Off / Auto selector switch.

Screw Press Wastewater Treatment System Operation

2.2 Displays – Setpoints

Operator Adjustable Running Setpoints

| FKC | | SP1 SYSTEM SETPOINTS | |
|--------------------------------------|----------|----------------------|--|
| Headbox Desired Level | 16.00 IN | | |
| Headbox Hi Hi Level Shutdown | 20.0 IN | SETPOINTS PAGE 2 | |
| Headbox Hi Level Warning (Stop Feed) | 18.0 IN | WASHWATER SETPOINTS | |
| Headbox Level to Resume Feed | 10.0 IN | CONSTANT FLOW PID | |
| Screw Press Start Level | 10.0 IN | VARIABLE FLOW PID | |
| Constant Flow Mode Feed Pump Speed | 50 % | GPM FLOW PID | |
| Variable Flow Mode Screw Press Speed | 40 % | | |
| Polymer System Ratio to Feed Pump | 1.20 :1 | | |
| Floc Tank Mixer Speed | 50 % | | |

MENU SYSTEM OVERVIEW SEQUENCE FLOW MODE SETPOINTS

PLC Module 4 Module Fail
PLC Module 3 Module Fail
PLC Module 2 Module Fail

- Headbox Desired Level – This is the level the control panel is trying to achieve during normal operation. The screw will vary in speed to maintain this level.
- Headbox Hi-Hi Level Shutdown – If the headbox hits this level the system will shut down and alarm.
- Headbox Hi Level Warning – If the level hit this level, the system will pause until the level is at the “Headbox level to Resume Feed” setpoint and then the system will restart.
- Headbox level to resume feed is the restart level for the Headbox Hi Level Warning.
- Screw Press Start Level – This is the level in the headbox that will start the screw press.
- Constant Flow Mode Flow – This is the desired GPM sludge flow rate.
- Variable Flow Mode Screw Press Speed – This is the speed of the screw press in Variable Flow Mode
- Polymer Ratio to Feed Pump Flow – This is the ratio between the sludge pump and the polymer pump. If the setpoint is “1”, the polymer pump and sludge pump will run at the same speed. If set to “0” the polymer system will not run.
- Floc Tank Mixer Speed – This is the speed the mixer will run.

Screw Press Wastewater Treatment System Operation

Operator Adjustable Shutdown Setpoints

FKC SP1 SYSTEM SETPOINTS

| | | |
|----------------------------|----------|---------------------|
| Conveyor Speed | 75 % | SETPOINTS PAGE 1 |
| Conveyor Shutdown Delay | 1 min | |
| Screw Press Shutdown Speed | 40 % | WASHWATER SETPOINTS |
| Screw Press Shutdown Delay | 1.0 min | CONSTANT FLOW PID |
| Maximum Pause Time Allowed | 10.0 min | VARIABLE FLOW PID |
| | | GPM FLOW PID |

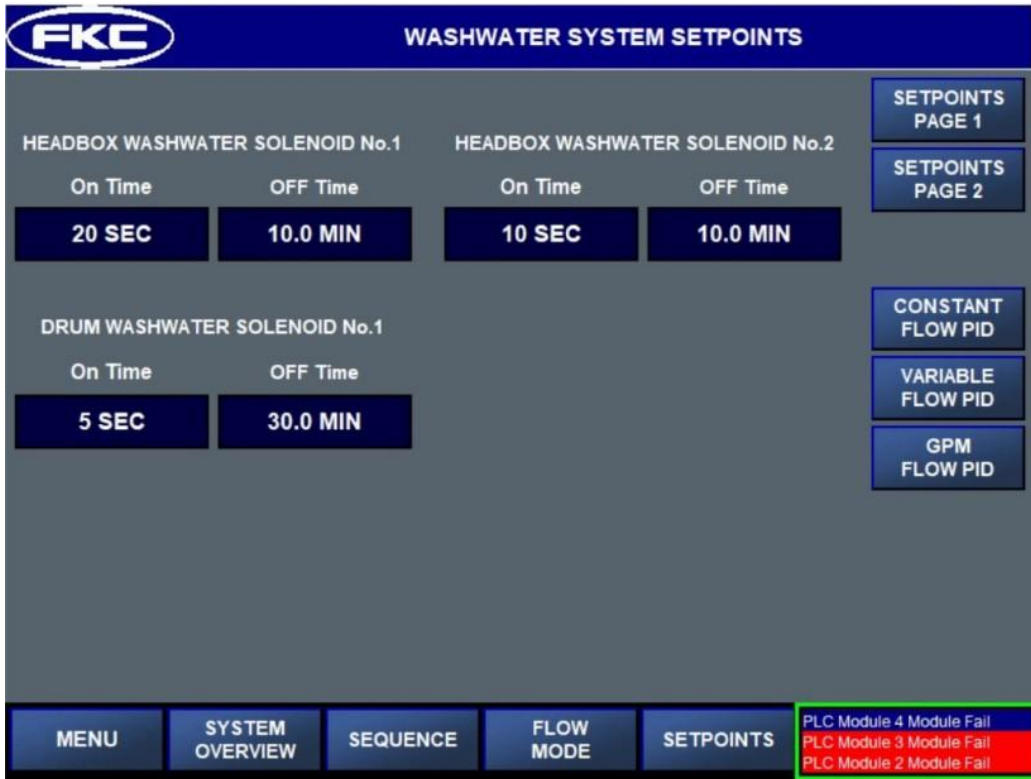
MENU SYSTEM OVERVIEW SEQUENCE FLOW MODE SETPOINTS PLC Module 4 Module Fail
PLC Module 3 Module Fail
PLC Module 2 Module Fail

- Conveyor Speed - Speed that the conveyor will run.
- Conveyor Shutdown Delay – This is the amount of time the conveyor will run after the screw press shuts down.
- Screw Press Shutdown Speed – In an auto shutdown sequence the screw will run at this speed.
- Screw Press Shutdown Delay – This is the amount of time the screw press will run after the auto shut-down sequence is selected.
- Conveyor Shutdown Delay – This is the amount of time the conveyor will run after the screw press shuts down.
- Maximum Pause Time Allowed – This is the max time the system is allowed to be in a pause state.

Screw Press Wastewater Treatment System Operation

2.3 Displays – Washwater

Washwater Setpoints



This pop-up screen adjusts the time the Screw Press wash water is on and off:

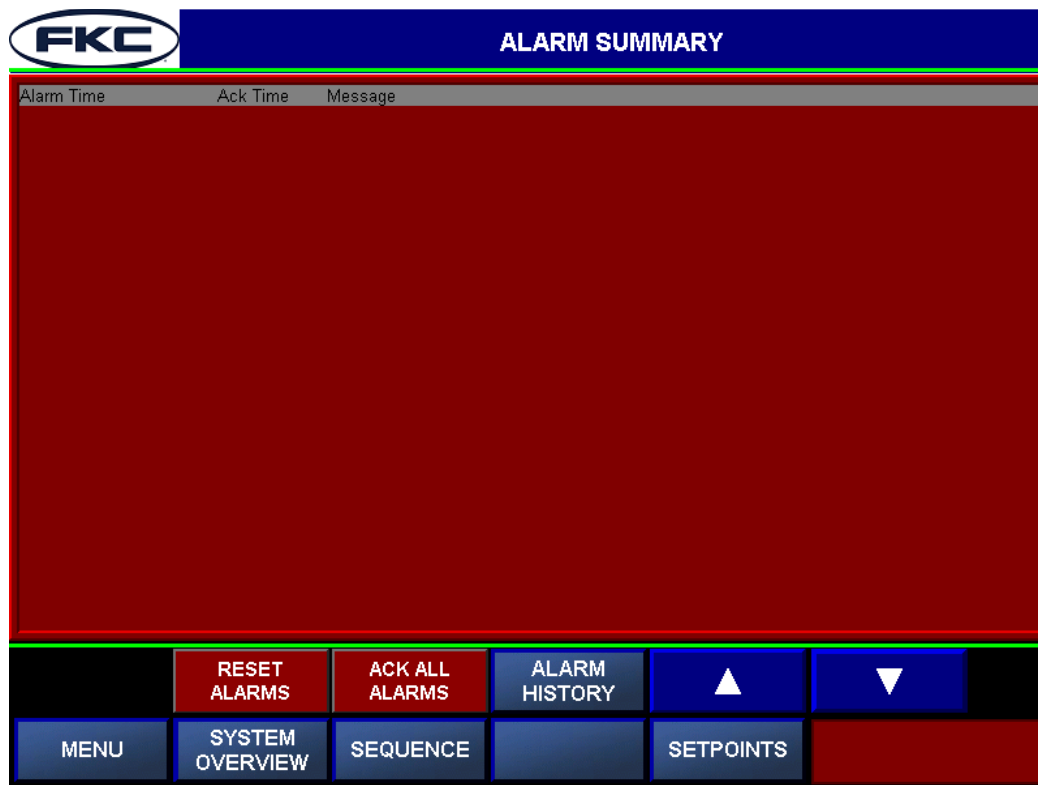
Headbox Solenoid ON Time – The solenoid valve will open for the operator setpoint of time.

Headbox Solenoid OFF Time – After the “ON” time is completed, the valve will close and remain closed for this period of time. After the time expires, the valve will then open.

All water valves have the same logic.

Screw Press Wastewater Treatment System Operation

2.4 Displays – Alarms



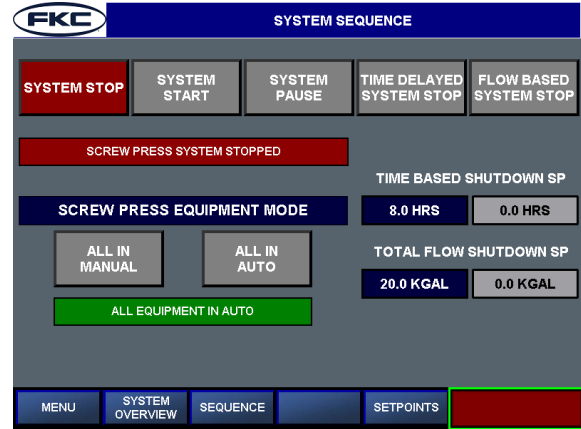
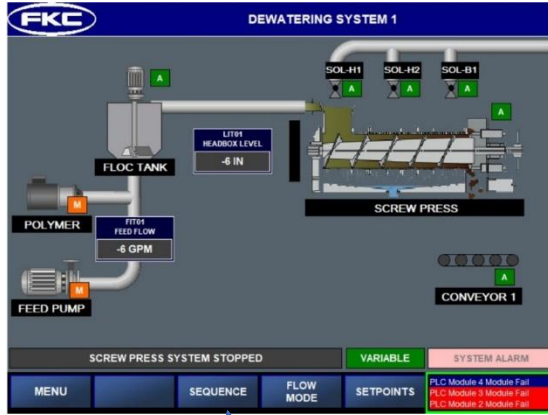
If the system alarms, this screen will indicate which alarm caused the problem. It will be used to trouble shoot the system.

To reset the alarm, clear the alarm in the field first then select "Alarm Reset". The alarm should be reset and the system can run again in Auto.

Screw Press Wastewater Treatment System Operation

3.0 System Operation

To operate the dewatering system, activate the HMI on the main control panel. On the bottom tool bar, select the “System Overview” screen.



1

To begin operation, select the “Sequence” Button shown above as “1”. When selected, the pop-up screen will appear as shown to the right.

- Step 1 - Ensure that all equipment is in “Auto”. This can be achieved by selecting the “All in Auto” push button. When all the equipment is in “Auto” the box below will indicate “All Equipment in Auto” and will be Green in color. If there is equipment in Manual, that will be noted in Yellow.

- Step 2 - With all the equipment in “Auto” the “System Start” button can be selected. Once selected, the sludge pump, polymer system(s), and flocculation tanks will begin. They will run at the flowrates as set on the Setpoint screen. The screw press will start only after the “Screw Press Start Level” is reached. This level is adjustable on the screw press setpoint screen. Once this level is achieved, the screw press and conveyor will run.

- Step 3 - The flocculation process is the most critical component of successful operation of the dewatering system. Flocculation is achieved with polymer added to the material until mechanical dewatering can be achieved. The polymer / material ratio is adjusted by operator observations.

Screw Press Wastewater Treatment System Operation

Polymer System Ratio to Feed Pump SP –

This ratio is used to adjust the polymer dosage in floc tank. By increasing the number, the operator will effectively increase the amount of polymer. Lowering the number will lower the overall polymer use.

We need to achieve a flocculated material which can hold up to the mechanical forces that the screw press can squeeze.

Typically, FKC will test this material by attempting to squeeze the flocculated material in our hand. If you can make a small ball and squeeze water out, then the screw press can also process that material. If not, then more polymer is likely needed.

Step #4 - System Pause – If the system needs to be paused for any reason the operator can select the “System Pause” button on the sequencing page. This will pause the system for the amount of time shown on the “Setpoint” screen. Once the time has expired, the system will automatically start-up and continue to run.

Step #5 - System Stop or Delayed Stop

Time Based Shutdown -

If the Time Based Shutdown is selected the system will run for the period shown on the set-point screen and then go into the “Auto Shutdown” sequence.

Flow Based Shutdown -

If the Flow Based Shutdown is selected the system will run for the set number of gallons on the set-point screen and then go into the “Auto Shutdown” sequence.

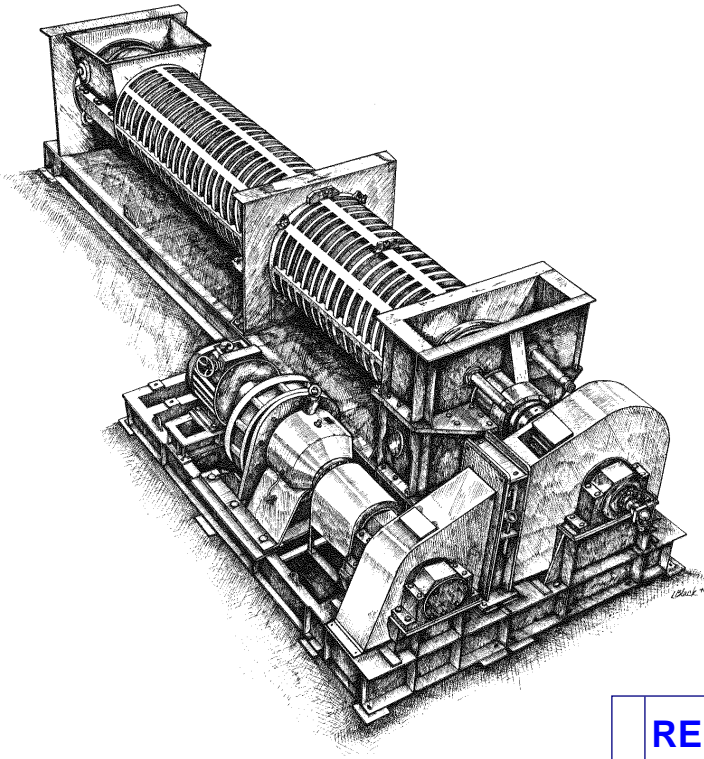
System Stop - When the “System Stop” is selected, the feed pump, polymer system(s), and flocculation tanks will shutdown. The screw press and conveyor will continue to run based on the shutdown delay timers. The screw press will continue to run until the “screw Press Shutdown Delay time” has expired. The conveyor will continue to run until its shutdown delay time has expired. The system will then be Off.

Step #6 - Clean-up. If the system is going to be off for any significant amount of time, the flocculation tanks should be drained. The covers on the screw press should be removed and the screw press should be cleaned off.



SCREW PRESS

**Submittals:
Screw Press
Salmon Creek WWTP
Vancouver, WA**



✘ Temp Conveyor

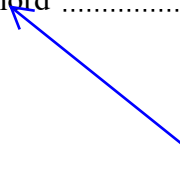
SUBMITTAL 467101-001.0

| |
|--|
| RELEASED to FKC for review |
| 20260205 FKC Temp Conveyor Submittal_BC Review.pdf |
| Clark Regional Wastewater District / Bob Sanguinetti |
| 02/05/2026 5:57:16 PM |

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| Zero Speed Switch | 25 |
| Pull Chord | 31 |

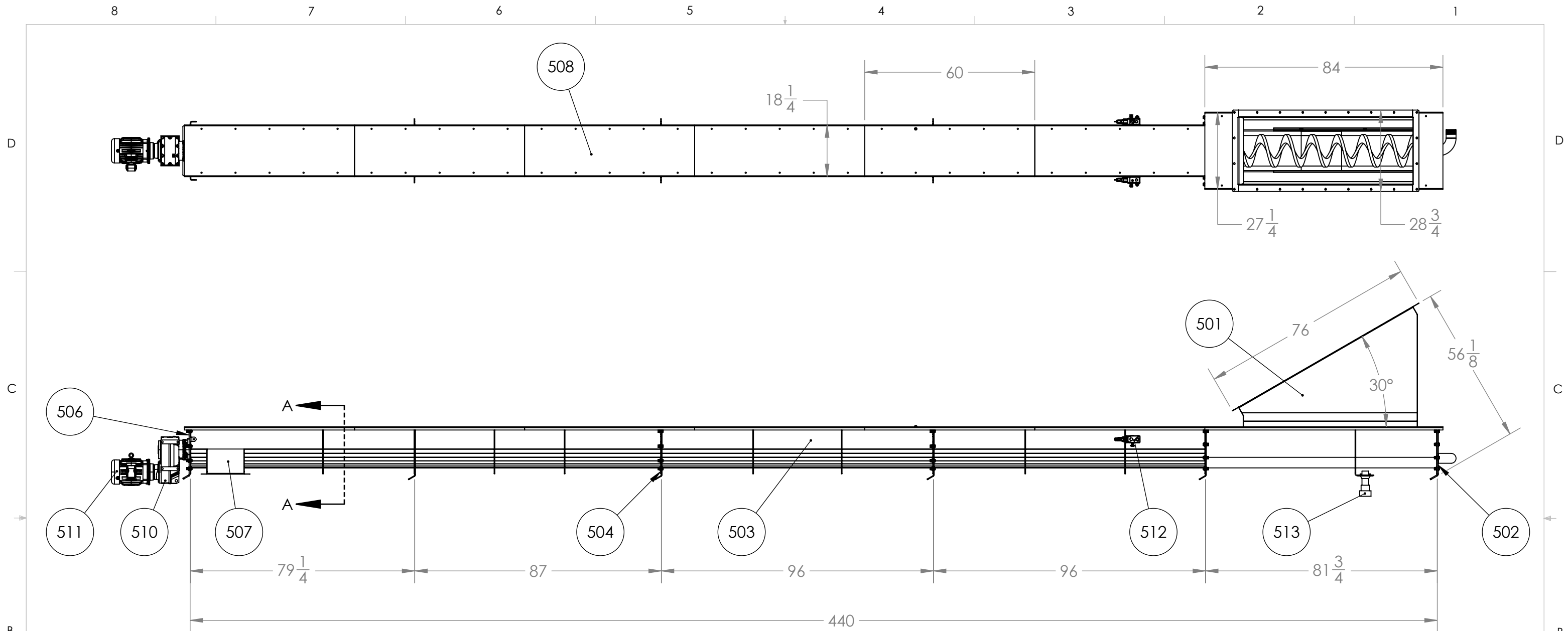
Spelling: "CORD"



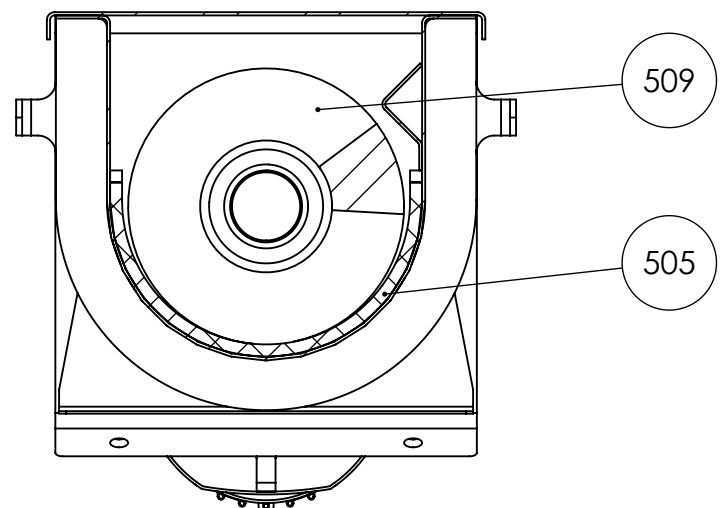
Conveyor Assembly

Salmon Creek WWTP Vancouver, WA
 BHX-1350x7500L Screw Press
 FKC Bill of Materials

| Item # | 12" Conveyor - Temporary Inclined | Manufacturer | Part Number | Qty | Material of Construction |
|--------------------|-----------------------------------|------------------|----------------|-----|--------------------------|
| 501 | Inlet Chute | FKC | -- | 1 | 12 ga. 304L SS |
| 502 | Inlet End plate | FKC | -- | 1 | 3/8" plate, 304L SS |
| 503 | Trough sections (8' Max) | FKC | -- | 5 | 7 ga. 304L SS |
| 504 | U shaped, trough flanges | FKC | -- | 10 | 1/4" plate, 304L SS |
| 505 | UHMW trough liner (4' Max) | FKC | -- | 10 | 1/2" thick UHMW |
| 506 | Discharge end plate | FKC | -- | 1 | 3/8" plate, 304L SS |
| 507 | Discharge Chute | FKC | -- | 1 | 12 ga. 304L SS |
| 508 | Trough Covers (5' Max) | FKC | -- | 7 | 10 ga. 304L SS |
| 509 | 12" Screw 9" Pitch | FKC | -- | 1 | 1" x 4" 8620 |
| ✓ ✓ ✓ 510 | Gear Box 29 RPM 58.32:1 Ratio | SEW | FAS77AMS184 | 1 | CS - Painted |
| 511 | Motor 5 HP 1800 RPM | Toshiba | 0054SDSR44A-P | 1 | CS - Painted |
| 512 | E Stops | OMRON | ER6022 | 2 | NEMA 6, Cast AL |
| 513 | Zero Speed Switch | Siemens Industry | 7MH7158-0AA-00 | 1 | Aluminum |



SECTION A-A
SCALE 1 : 8



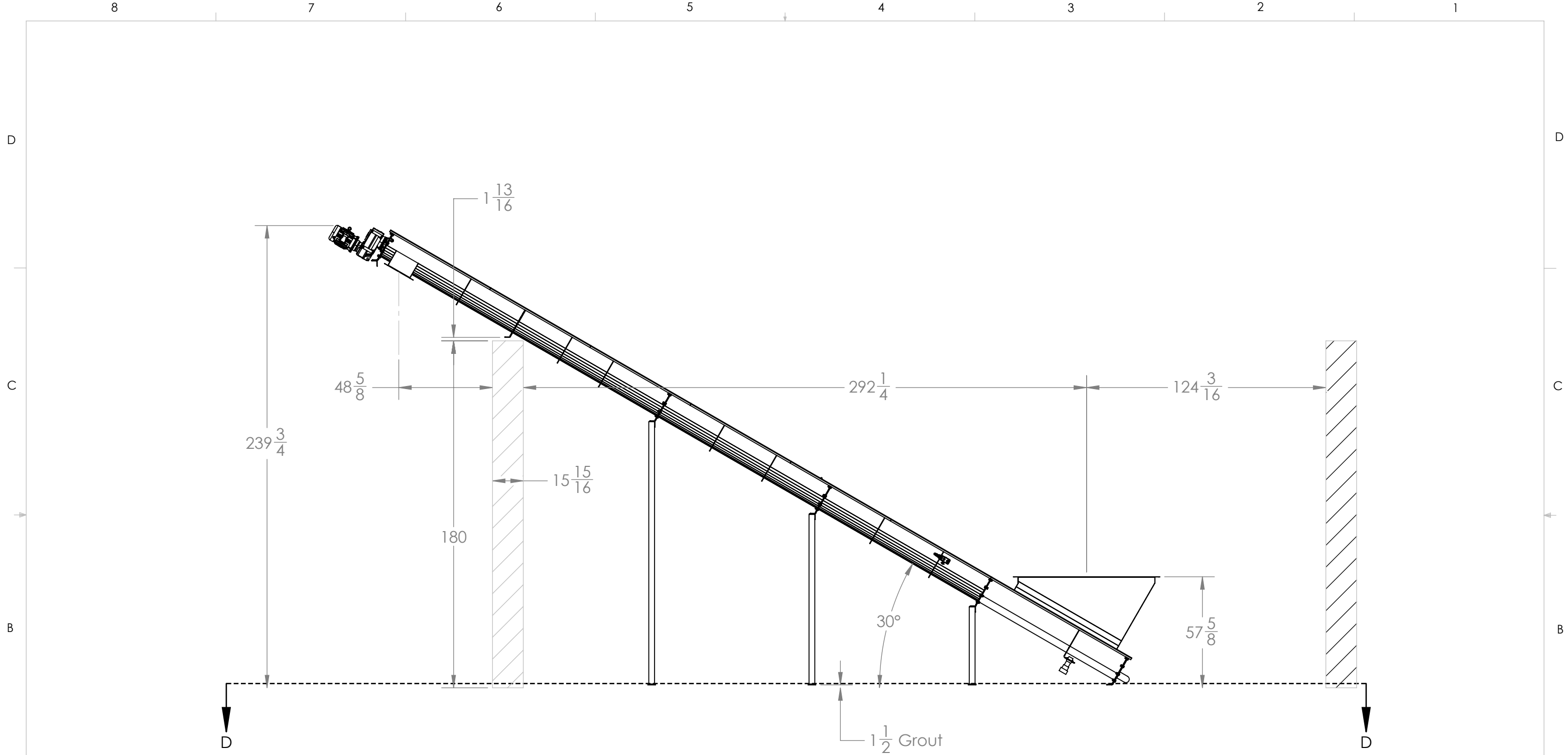
- Note:
1. Equipment Weight: 4450 lbs.
 2. Operating Weight: 5900 lbs.
 3. Drive SEW FAS77AMS184 58.32:1 Ratio
 4. Motor 5 HP 1800 RPM 460 VAC 184TC
 5. Screw Speed: 29 RPM
 6. Conveyor Material 304L S.S.
 7. All Hardware 316L S.S.
 8. FKC Recommends 1-1/2" Grout under all equipment

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| | | | |
|-----|---------------------|--------|------|
| 3 | | | |
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| 1 | | | |
| 0 | Issued for Approval | 1/6/26 | TC |
| No. | Alteration | Date | Sign |

| | | |
|-------------------------|---|----------------|
| Job No. C-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. A537-500 | Title <u>12 Shaftless Screw Conveyor</u> Assembly Details Temporary Conveyor | Quantity 1 |
| | | Date 1/6/26 |
| | | Drawn By TC |
| | FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | Revision |
| | | SHEET 1 OF 5 |



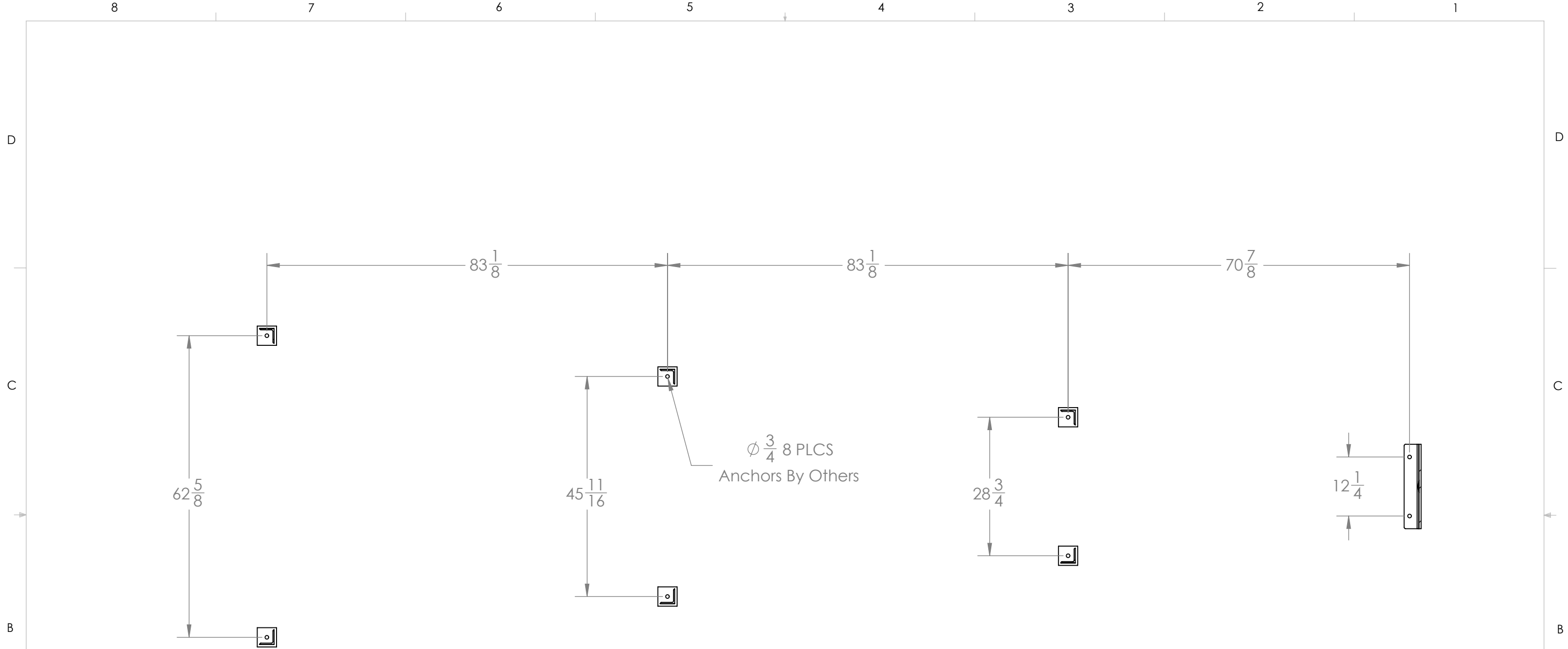


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| No. | Alteration | Date | Sign |

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|---|---|----------------|
| Job No. C-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. A537-501 | Title <u>12 Shaftless Screw Conveyor</u> <u>Temporary Layout</u> <u>Assembly Details</u> | Quantity 1 |
| FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Date 1/6/26 |
| Revision | | Drawn By TC |
| SHEET 2 OF 5 | | |






SECTION D-D

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| No. | Alteration | Date | Sign |

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|--|--|----------------|
| Job No. C-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. F537-502 | Title <u>12 Shaftless Screw Conveyor</u> <u>Anchor Layout</u> <u>Assembly Details</u> | Quantity 1 |
|  FKCO LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Date 1/6/26 |
| | | Drawn By TC |
| Revision | | SHEET 3 OF 5 |

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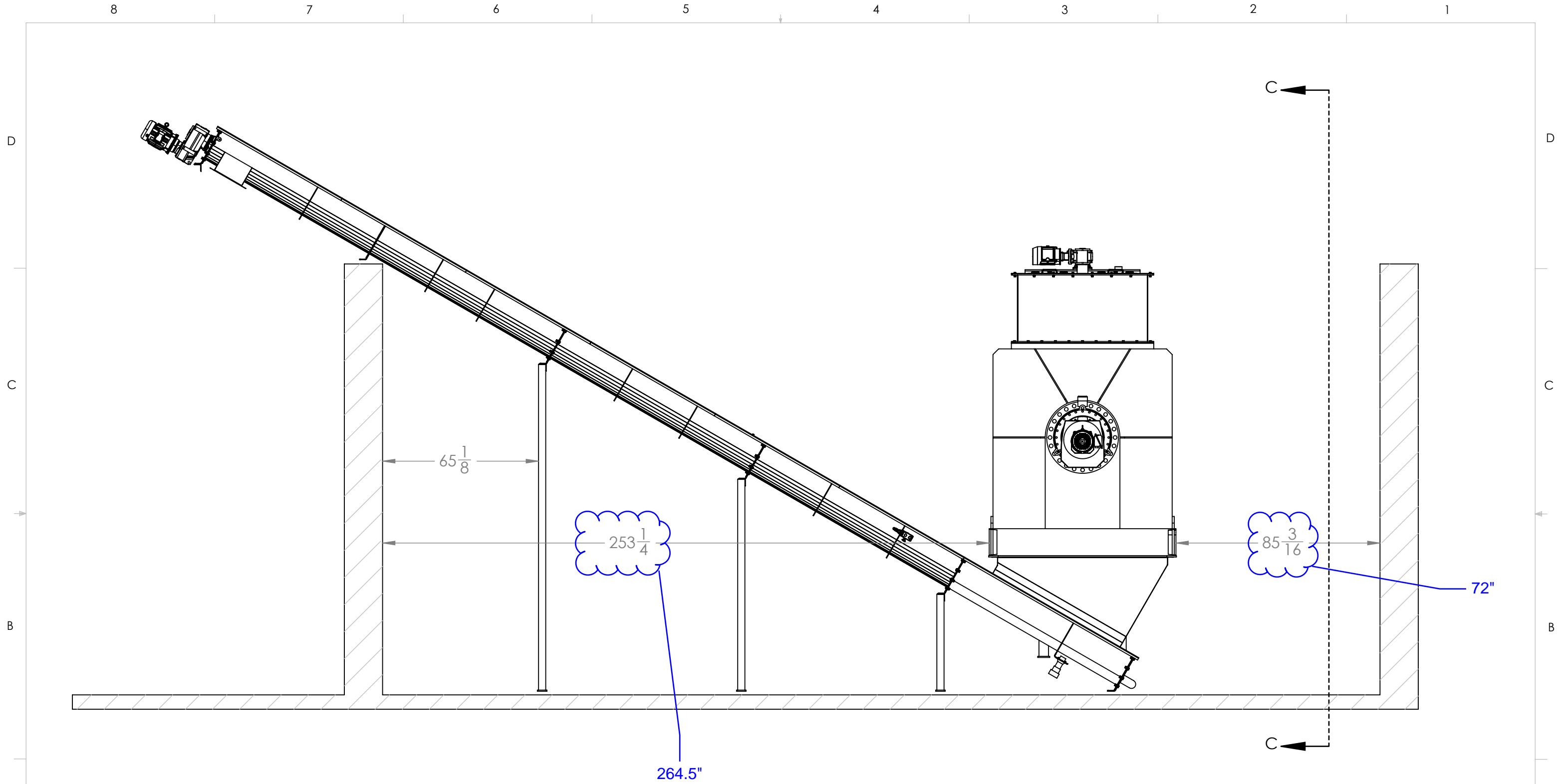
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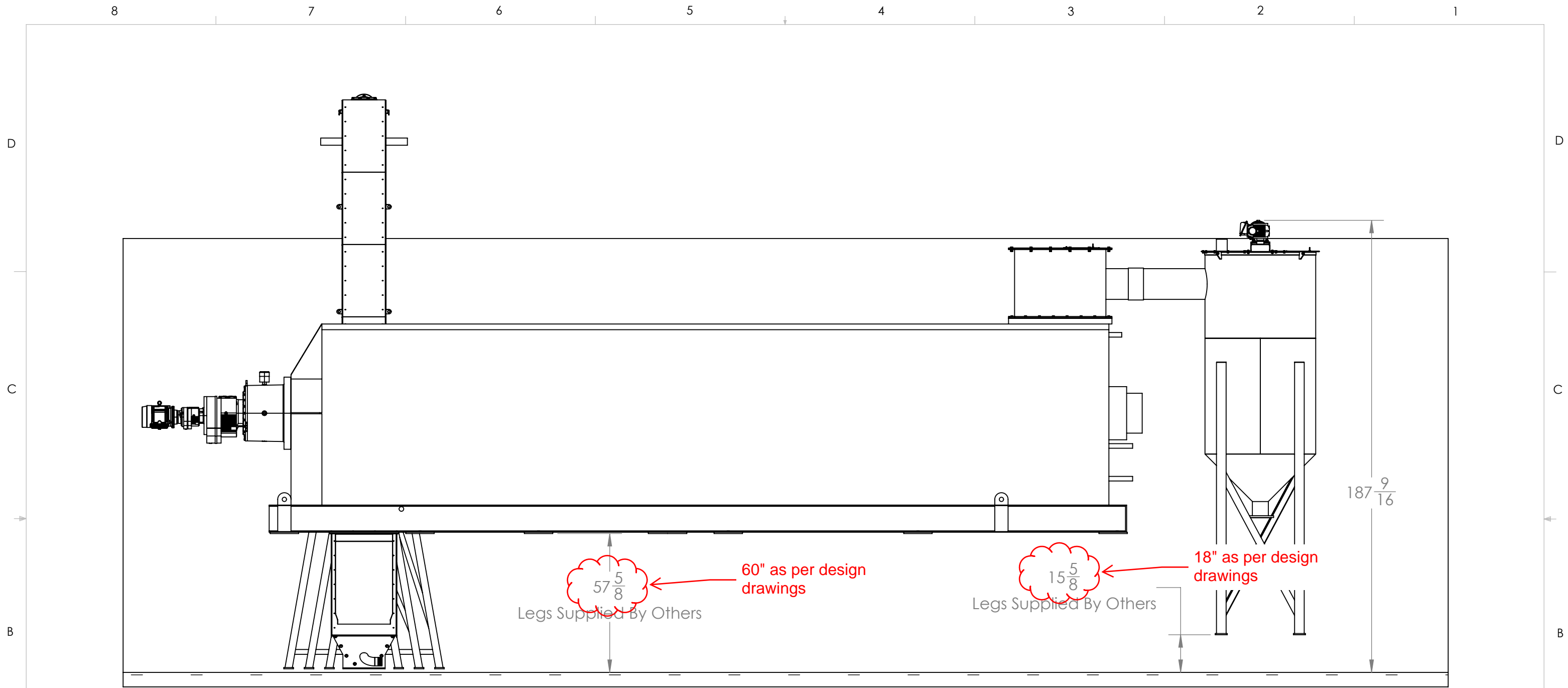


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| No. | Alteration | Date | Sign |

| | | |
|---|---|----------------|
| Job No. C-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. A537-503 | Title <u>12 Shaftless Screw Conveyor</u> <u>Temporary Installation</u> <u>Assembly Details</u> | Quantity 1 |
| FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Date 1/6/26 |
| Revision | | Drawn By TC |
| | | SHEET 4 OF 5 |





SECTION C-C

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| 2 | | | |
| 1 | | | |
| 0 | Issued for Approval | 1/6/26 | TC |
| No. | Alteration | Date | Sign |

| | | |
|---|--|----------------|
| Job No. C-537 | Customer Salmon Creek WWTP Vancouver, WA | Wt. Lbs. |
| Drawing No. L537-504 | Title <u>12 Shaftless Screw Conveyor</u> Section C-C Temporary Layout | Quantity 1 |
|  FKC CO. LTD 2708 W 18th St. Port Angeles, WA 98363 (360) 452-9472 Fax (360) 452-6880 | | Date 1/6/26 |
| | | Drawn By TC |
| Revision | | SHEET 5 OF 5 |

Gearbox

F-Series (the Snuggler®) Parallel Helical Gearmotors

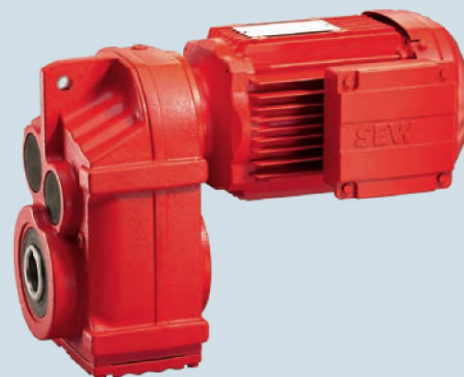
SEW-EURODRIVE's F-Series parallel helical gearmotor is the ideal drive for tight spaces. This compact drive, with its multiple mounting configurations and shaft designs, is a rugged alternative to right-angle gearmotors.

Product Range

- Power ratings from 0.05 to 336 HP
- Ratios from 3.77 to 29,211
- Output torques to 159,300 lb-in

Reducer

- Efficiency = 97% (2-stage) or 95.5% (3-stage)
- Gears manufactured from certified steel, heat treated to a case hardness of 58-62 Rockwell C for infinite fatigue strength
- Finished ground or shaved gear teeth to assure minimum noise, minimum heat, and maximum mechanical efficiency (approximately 1.5% loss/stage)
- Anti-friction bearings for optimum load capacity and long life
- Captured keys on input and output shafts
- F37-F157 gear housing contains high strength cast iron, SAE Class 30 or equivalent (GG20)
- F27 housing contains high strength pressure-cast aluminum
- O-ring on flange to prevent oil leakage when mounted on a surface that is not totally flat
- High cross-section modulus design, rugged monobloc design for maximum rigidity
- Center tapped holes on output shafts to aid the installation of shaft components
- Exclusive interlocking 2-piece seal design consisting of a patented bi-helix FKM inner seal and a double-lip Nitrile (Buna N) outer seal – provides three sealing surfaces against contaminants
- Metric or Inch dimension output shafts
- Removable inspection cover
- Shock capacity meets or exceeds AGMA 6009-A00



Motor

- Inverter duty
- Connection terminals
- Low rotor inertia for high cycling and tight control
- EISA (IE3) "Premium" available
- 50Hz, 60Hz, or 50/60Hz global motor
- **CE** for shipment into Europe

Mounting

- Built-in torque arm for shaft mounting
- B14 or B5 flange with centering tenon
- Tapped rail holes for foot mounting
- Can be ordered for any mounting orientation

Optional Features

- C-Face or IEC motor adapter
- TorqLOC® taper hollow shaft
- Heavy duty taper roller bearings (FA67-FA127)
- FKM seals instead of NBR
- Corrosion and/or long term storage protection
- High cycling fail-safe brake
- Forced cooling fan for low frequency operation
- Thermostat or thermistor protection
- Plug connectors for quick motor replacement
- Two-speed motor
- Motor encoder - built-in or externally mounted
- CSA hazardous location and ATEX rated motors



About SEW-EURODRIVE

As a world leader in drive technology and a pioneer in drive-based automation, SEW-EURODRIVE has established a reputation for quickly solving the most difficult power transmission and motion control challenges. We introduced the gearmotor in 1931. In the 82 years since then, we have been bringing the best in drive technology to our customers. That commitment has led to a history of innovations - the first variable speed gearmotor, early development of electronic drives, some of the first successful efforts to decentralize control, and the first motor with energy-efficient copper rotors.

Of course none of that matters without satisfied customers. Quickly solving problems so that our customers can be more productive and profitable continues to be our priority. We offer the broadest product line in the industry - from gear- motors and heavy industrial gear units to electronic drives, software and complete drive-based automation systems. Our products are based on a unique system of modular components that can be assembled in literally millions of different configurations so every drive solution is custom built to our customer's

exact specifications. Our regional assembly centers stock millions of dollars of our modular inventory for quick delivery of drive solutions and spare parts anywhere in the U.S.

At SEW-EURODRIVE our expertise doesn't stop with the sale of our products. We offer one of the most accessible customer support systems in the industry. Our trained product specialists are readily available for on-site start up assistance and applications support. In addition, our PT Pilot® drive selection quickly selects the drive for your specific needs. Our customer service personnel, engineers, product specialists, and service technicians are available to answer questions and troubleshoot problems. SEW-EURODRIVE offers on-call emergency technical support around the clock.

SEW-EURODRIVE brings together everything you need to drive performance for your systems: superior products, unsurpassed engineering, technical support, and innovative new technologies. We invite you to experience the SEW-EURODRIVE difference.

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F: (937) 332-0038
cstroy@seweurodrive.com

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F: (856) 845-3179
csbridgeport@seweurodrive.com

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cslyman@seweurodrive.com

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3950 Platinum Way
Dallas, TX 75237
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F: (214) 330-4724
csdallas@seweurodrive.com

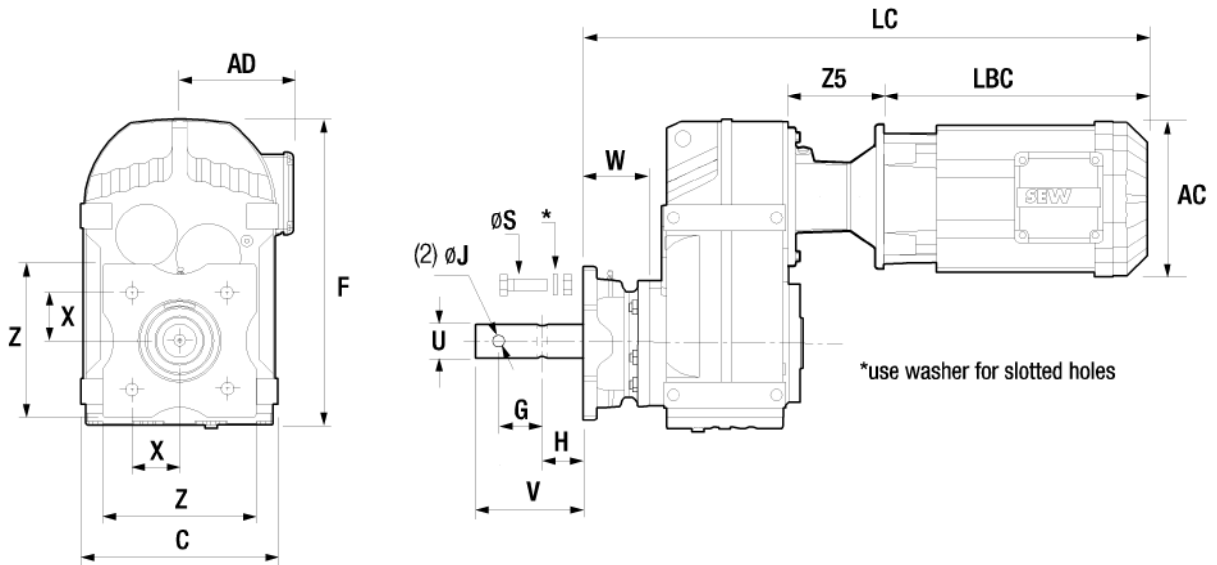
Western Region
SEW-EURODRIVE, Inc.
30599 San Antonio St.
Hayward, CA 94544
P: (510) 487-3560
F: (510) 487-6433
cshayward@seweurodrive.com

6

Dimensions

FAS screw conveyor + C-Face motor

6.2 FAS screw conveyor + C-Face motor



36252185739

| U (∅) | V 2-Hole | V 3-Hole | G | H | J (∅) | X | Z | S bolt |
|---------|----------|----------|------|-------|-------|-------|-------|--------|
| 1.5" | 6.00 | 9.00 | 3.00 | 2.125 | 0.531 | 2.00 | 5.375 | 1/2" |
| 2.0" | 6.00 | 9.00 | 3.00 | 2.125 | 0.656 | 2.563 | 6.500 | 5/8" |
| 2-7/16" | 6.69 | 9.69 | 3.00 | 2.750 | 0.656 | 2.813 | 7.375 | 5/8" |
| 3.0" | 6.88 | 9.88 | 3.00 | 2.875 | 0.781 | 3.000 | 7.750 | 3/4" |
| 3-7/16" | 9.13 | 13.13 | 4.00 | 3.875 | 0.906 | 3.375 | 9.250 | 3/4" |

| | DRN C-Face Motor (/FC) | | | | | | | | | | |
|-----|------------------------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 71MS | 71M | 80MK | 80M | 90S | 90L | 100 | 132S | 132M | 160M | 160L |
| AC | 5.47 | 5.47 | 6.14 | 6.14 | 7.05 | 7.05 | 7.76 | 8.70 | 10.28 | 12.36 | 12.36 |
| AD | 4.65 | 4.65 | 5.04 | 5.04 | 5.51 | 5.51 | 6.18 | 6.69 | 8.98 | 9.96 | 9.96 |
| LBC | 7.71 | 8.51 | 9.61 | 11.43 | 11.19 | 12.45 | 14.29 | 16.87 | 17.59 | 21.19 | 21.19 |

| Gear Unit | C | F | W |
|-----------|-------|-------|-------|
| FAS37 | 6.50 | 9.92 | 2.110 |
| FAS47 | 7.09 | 10.59 | 2.323 |
| FAS57 | 7.87 | 12.48 | 2.520 |
| FAS67 | 8.35 | 13.50 | 2.520 |
| FAS77 | 10.63 | 16.77 | 2.677 |
| FAS87 | 12.99 | 20.90 | 3.270 |
| FAS97 | 15.74 | 24.53 | 3.288 |

| FAS37 | DRN C-Face Motor ¹⁾ | | | | | |
|-------|--------------------------------|-------------|-------------|-------------|-------------|-------------|
| | 71MS (AM48) | 71M (AM56C) | 80MK (AM56) | 80M (AM143) | 90S (AM145) | 90L (AM145) |
| LC | 17.73 | 18.53 | 19.63 | 22.38 | 22.14 | 23.40 |
| Z5 | 3.68 | 3.68 | 3.68 | 4.61 | 4.61 | 4.61 |

| FAS47 | DRN C-Face Motor ¹⁾ | | | | | |
|-------|--------------------------------|-------------|-------------|-------------|-------------|-------------|
| | 71MS (AM48) | 71M (AM56C) | 80MK (AM56) | 80M (AM143) | 90S (AM145) | 90L (AM145) |
| LC | 18.83 | 19.63 | 20.73 | 23.48 | 23.24 | 24.50 |

2777979/EN-US - 07/2022

Parts List

23 269 03 00



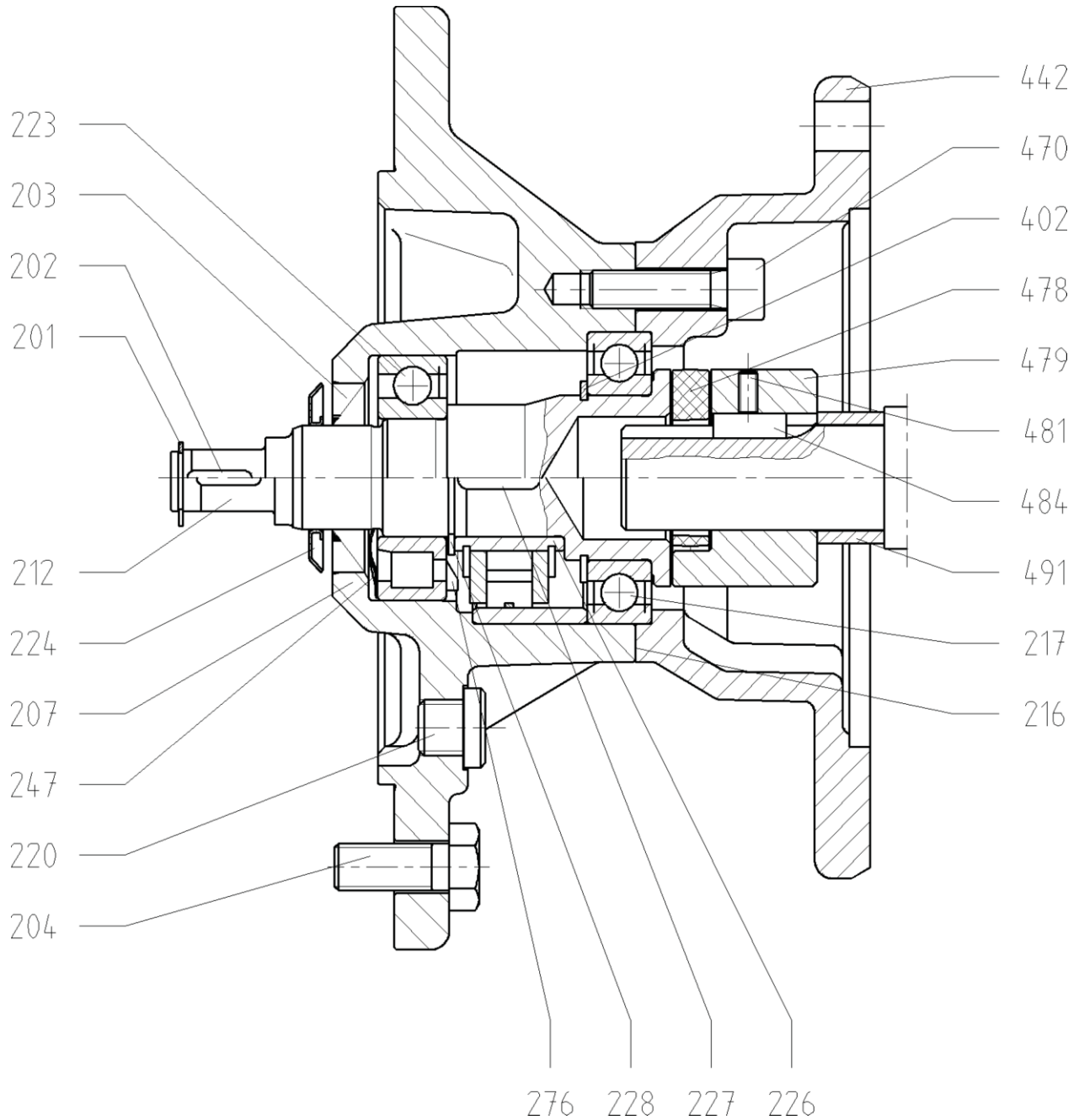
Adapter

EN Page 1 / 2

AM182, AM184

EG 09.11.2012

Backstop for mounting NEMA motors version with dog clutch



When ordering spare parts always quote nameplate data with serial number and designation with part number!

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Parts List

23 269 03 00



Adapter

EN Page 2 / 2

AM182, AM184

EG 09.11.2012

Backstop for mounting NEMA motors version with dog clutch

| No. | Description | Additional specifications | SEW standard label | Part No. | Qty. |
|-----|----------------------------|--|-------------------------|----------|------|
| 201 | Retaining ring | pinion shaft end Ø16 | DIN471 16x1-FS | 00102687 | 1 |
| 201 | Retaining ring | pinion shaft end Ø18 | DIN471 18x1,2-FS | 00102709 | 1 |
| 202 | Key | pinion shaft end Ø16 | DIN6885-1 A4x4x18 +C | 00114383 | 1 |
| 202 | Key | pinion shaft end Ø18 | DIN6885-1 A4x4x20 +C | 0010003X | 1 |
| 203 | Oil seal | | DIN A28x47x7-NBR | 00111481 | 1 |
| 203 | Oil seal | optional oil seal in FKM; ATEX model according to category II2GD | W A28x47x7-FKM | 00175358 | 1 |
| 204 | Hex head screw | for flange Ø160 | ISO4017 M8x20-8,8-A2F | 00110256 | 4 |
| 204 | Hex head screw | for flange Ø200 | ISO4017 M10x25-8,8-A2F | 00101168 | 4 |
| 204 | Hex head screw | for flange Ø250-Ø300 | ISO4017 M12x30-8,8-A2F | 00101222 | 4 |
| 204 | Hex head screw | for flange Ø350 | ISO4017 M16x35-8,8-A2F | 00110299 | 4 |
| 207 | Flange | | Ø160mm | 01650262 | 1 |
| 207 | Flange | | Ø200mm | 01650246 | 1 |
| 207 | Flange | | Ø250mm | 01650343 | 1 |
| 207 | Flange | | Ø300mm | 01650327 | 1 |
| 207 | Flange | | Ø350mm | 01650289 | 1 |
| 207 | Flange | Backstop | Ø160mm | 01651978 | 1 |
| 207 | Flange | Backstop | Ø200mm | 01651986 | 1 |
| 207 | Flange | Backstop | Ø250mm | 01651994 | 1 |
| 207 | Flange | Backstop | Ø300mm | 01652001 | 1 |
| 207 | Flange | Backstop | Ø350mm | 01652893 | 1 |
| 212 | Adapter Shaft | AM182 - pinion shaft end Ø16 | | 01657127 | 1 |
| 212 | Adapter Shaft | AM184 - pinion shaft end Ø18 | | 01657135 | 1 |
| 212 | Adapter Shaft | AM182 - Backstop; pinion shaft end Ø16 | | 01657372 | 1 |
| 212 | Adapter Shaft | AM184 - Backstop; pinion shaft end Ø18 | | 01657380 | 1 |
| 216 | Sealing compound | | | 09102558 | X) |
| 217 | Deep groove ball bearing | | 6208-2Z-K01 | 00105015 | 1 |
| 217 | Deep groove ball bearing | ATEX model according to category II2GD | 6208-2Z-K24 | 13224034 | 1 |
| 220 | Screw plug | for flange Ø160 | W4085 M10x1-St-ADC3K | 0011426X | 1 |
| 220 | Breather valve | for flange Ø160 | W4087 M10x1-CuZn-HEI | 00130303 | 1 |
| 220 | Screw plug | for flange Ø200-Ø250 | W4085 M12x1,5-St-ADC3K | 00114308 | 1 |
| 220 | Breather valve | for flange Ø200-Ø250 | W4087 M12x1,5-CuZn-HEI | 00130311 | 1 |
| 220 | Screw plug | for flange Ø300-Ø350 | W4085 M22x1,5-St-ADC3K | 00114316 | 1 |
| 220 | Breather valve | for flange Ø300-Ø350 | W4087 M22x1,5-CuZn-HEI | 0013032X | 1 |
| 223 | Deep groove ball bearing | | 6306-Z | 00105236 | 1 |
| 223 | Cylindrical roller bearing | Backstop | NJ306E | 00171158 | 1 |
| 224 | Oel finger | | W4291 28-A2F | 00116769 | 1 |
| 226 | Backstop | | W4943 RSAD70-35 | 01653695 | 1 |
| 227 | Key | Backstop | DIN6885-3 A8x5x28 +C | 00116289 | 1 |
| 228 | Retaining ring | Backstop | DIN471 35x1,5-FS | 00102806 | 1 |
| 247 | Equalizing ring | Backstop | W4253 61x71x0,4 | 00115843 | 1 |
| 276 | Shield ring | Backstop | W4585 6306-AV | 00107182 | 1 |
| 402 | Retaining ring | | DIN471 40x1,75-FS | 00102830 | 1 |
| 442 | Adapter flange | | | 01651889 | 1 |
| 470 | Machine screw | | ISO4762 M10x35-8,8-A2F | 0011409X | 4 |
| 478 | Cam Ring | | | 01657313 | 1 |
| 479 | Coupling half A | Ø1,125" | | 01657461 | 1 |
| 481 | Setscrew | | ISO4027 M6x8-45H | 00104590 | 1 |
| 484 | Key (inch) | | W4190 B1/4x1/4x13/16 +C | 08069948 | 1 |
| 491 | Spacer tube | | | 01655477 | 1 |

X) if required

When ordering spare parts always quote nameplate data with serial number and designation with part number!

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Motor

TOSHIBA
Leading Innovation >>>



Efficiency, Quality, & Performance (EQP) — The EQP Global® SD is Toshiba's next-generation NEMA Premium® efficiency motor series.

This cutting-edge motor product line is designed to meet or exceed the competitive demands of the global market, as well as the requirements of the Energy Independence & Security Act of 2007 (EISA), while maintaining the high reliability and quality expected from Toshiba.

The EQP Global SD motor series is designed for severe duty applications. Building on over 20 years of success with our EQPIII motor series, the EQP Global SD features multiple new design enhancements that make it one of the lowest cost-of-ownership products in the industry.

Our EQP philosophy extends beyond great products. We provide solutions and Global Supply Chain Management Systems (GSCMS) to meet the evolving needs of our global customers.

- NEMA Premium® Efficiency (1 through 500 HP)
- Meets or Exceeds Energy Independence & Security Act of 2007 (EISA)
- Addresses Global Motor Specifications Including CE, NEMA, & IEC
- Dual-Frequency 50/60 Hz Design (50/60 Hz Listed on Nameplate on 1 through 75 HP)
- Inverter-Duty Rated
- Multi-Mount on 140 through 445 & N449 Frames
- Cast Iron Conduit Box as Standard



3 THREE YEAR WARRANTY

| | |
|-----------------------------|--|
| Horsepower | ¼ to 700 HP |
| Speed (60 Hz) (50 Hz)* | 3600, 1800, or 1200 RPM 3000, 1500, or 1000 RPM |
| Voltage (60 Hz) (50 Hz)* | 230/460, 460, or 575 V 190/380 or 380 V |
| Enclosure | Totally Enclosed Fan Cooled |
| Frame Size | 143T through 5810U |
| Protection | IP54 |
| Construction | Cast Iron (Frame, Brackets, & Conduit Box) |
| Insulation | Class F, Exceeds NEMA MG1 Part 31 (Inverter Duty) |
| Vibration | Typically 0.08 Inches/Second or Less (Unfiltered) |
| Mounting | Motors Suitable for Horizontal & Vertical Mounting; Motors also Available with C-Face Mounting |
| Environment | Severe Duty, Suitable for Use in Division 2 Hazardous Locations |

*50/60 Hz Listed on Nameplate on 1 through 75 HP



EQP Global SD

**LOW VOLTAGE MOTOR
SEVERE DUTY**



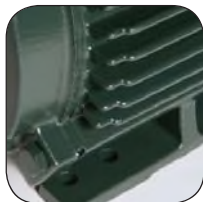


BUILT FOR SEVERE DUTY APPLICATIONS



Nameplate

- Stainless Steel
- NEMA Premium® Design
- Etched Lettering
- Dual-Frequency 50/60 Hz on Nameplate
- Inverter Duty Rating on Nameplate (1 to 200 HP, 4- & 6-Pole)



Construction

- Cast Iron Frame & Bearing Brackets
- Shaft Slinger Protection
- Multi-Mount on 140 Through 445 & N449 Frames
- Gasket Provided Between Motor Frame & Conduit Box
- Typical Unfiltered Vibration Levels of 0.08 Inches/Second or Less
- IP54 Protection
- Multiple Drain Provisions for Horizontal & Vertical Mounting



Conduit Box

- Gasketed Cast Iron Construction
- Provision for Grounding
- Terminal Lugs on 280 Frame & Larger
- Rotatable (90°)
- NPT Drill & Tap Conduit Opening



Bearing System

- Oversized 300 Series Bearings on All Frames (DE & ODE)
- Regreasable 280 Frame & Larger
- Locked Drive-End Bearing 210 Frame & Larger
- Low Temperature-Rise for Extended Life
- L-10 Life of 150,000 Hours for Direct-Coupled Applications
- L-10 Life of 40,000 Hours for Belted Applications



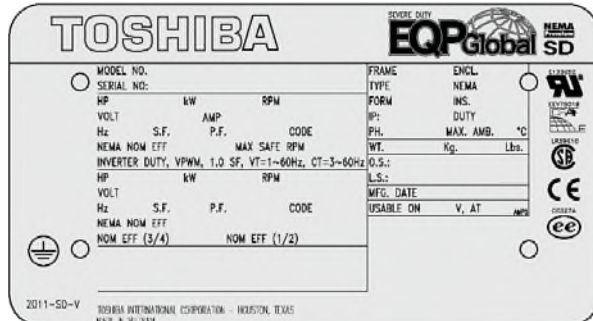
Insulation System

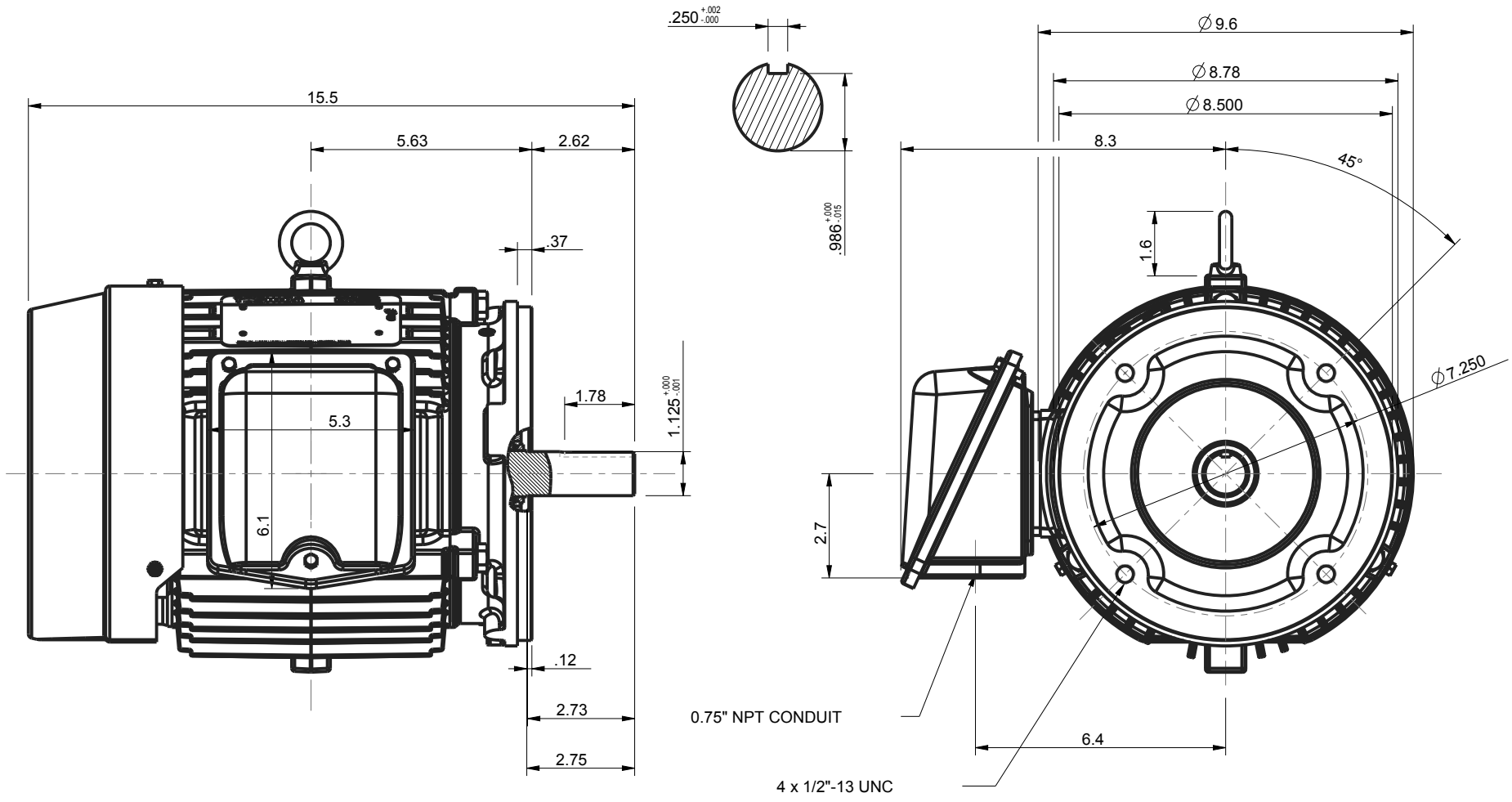
- Major Components Made from Class H Rated Materials
- Low-Loss Electrical Steel
- Exceeds NEMA MG1 Part 31
- 20:1 Constant Torque & 60:1 Variable Torque (1 to 200 HP, 4- & 6-Pole)
- Voltage Withstand Capability of 2000 V in 0.1 μ s
- Large Thermal Margins for Extended Life & Reliability
- Phase Paper & Coil Bracing on Both Ends on All Motor Ratings



Testing

- 100% No-Load Commercial Test per IEEE 112 on All Motors
- On 440 Frame & Larger:
 - » Commercial Test & Vibration Test
 - » 100% of Bearings are Ball-Pass Frequency Tested





UNITS: INCHES

ROTATION FROM NDE

CCW
 CW

- NOTES:
1. MAIN CONDUIT BOX MAY BE ROTATED IN 90° INCREMENTS
 2. STANDARD PRODUCT USES BI-DIRECTIONAL FAN. OPPOSITE ROTATION AVAILABLE ONLY BY CONNECTION CHANGE.
 3. KEY DIMENSIONS EQUAL 0.250"x 0.250"x 1.75" (MOTOR SUPPLIED WITH KEY)

TOSHIBA RESERVES THE RIGHT TO MAKE CHANGES OF TECHNICAL IMPROVEMENT AND THE DATA MAY CHANGE WITHOUT NOTICE PRELIMINARY

DO NOT USE FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS THE DRAWING IS MARKED AS CERTIFIED CERTIFIED

TOSHIBA
 www.toshiba.com/tic
 TOSHIBA INTERNATIONAL CORPORATION

SEVERE DUTY
EQP Global SD

TOTALLY ENCLOSED FAN COOLED
 ROUND BODY C-FACED
 3 PHASE INDUCTION MOTOR
 182TC-184TC F1 ASSEMBLY

DRAWING #: MDSL205-02
 REV. DATE: 06/21/18 REV. #: 2 PER.: M. O'DOWD
 REV. DESCRIP.:



| | | | |
|-------------|------------|------------|--|
| Issued Date | 12/18/2019 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

TYPICAL MOTOR PERFORMANCE DATA

Model: 0054SDSR44A-P

| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
|-----------|-----|------------|--------|-------|----------------|-------------|----------|--------------|
| 5 | 3.7 | 4 | 1750 | 184TC | 230/460 | 60 | 3 | 13.0/6.5 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.15 | CONT | 89.5 | B | J | 40 C |

| Load | HP | kW | Amperes | Efficiency (%) | Power Factor (%) |
|--------------|------|-----|---------|----------------|------------------|
| Full Load | 5 | 3.7 | 6.5 | 89.7 | 81.2 |
| ¾ Load | 3.75 | 2.8 | 5.0 | 89.3 | 77.6 |
| ½ Load | 2.50 | 1.9 | 4.0 | 87.6 | 69.1 |
| ¼ Load | 1.25 | 0.9 | 2.8 | 81.7 | 51.1 |
| No Load | | | 2.7 | | 5.9 |
| Locked Rotor | | | 46 | | 52.8 |

| Torque | | | | Rotor wk ² Inertia (lb-ft ²) |
|-------------------|----------------------|-----------------|--------------------|---|
| Full Load (lb-ft) | Locked Rotor (% FLT) | Pull Up (% FLT) | Break Down (% FLT) | |
| 15 | 255 | 240 | 370 | 0.50 |

| Safe Stall Time(s) | | Sound Pressure dB(A) @ 1M | Bearings* | | Approx. Motor Weight (lbs) |
|--------------------|-----|---------------------------|-----------|----------|----------------------------|
| Cold | Hot | | DE | NDE | |
| 35 | 15 | - | 6306ZZC3 | 6306ZZC3 | 115 |

*Bearings are the only recommended spare part(s).

Motor Options:
 Product Family:EQP Global SD
 Mounting:C-Face Round,Shaft:T Shaft

| | |
|-------------|--|
| Customer | |
| Customer PO | |
| Sales Order | |
| Project # | |

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|-----------|------------------|-------------|-------------|---------------|
| Engineering | zxie | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1119 / 1 |
| Engr. Date | 7/19/2019 | Doc. Approved By | M. Campbell | Doc. Issued | 9/20/2019 |



| | | | |
|-------------|------------|------------|--|
| Issued Date | 12/18/2019 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

TYPICAL MOTOR PERFORMANCE DATA

Model: 0054SDSR44A-P

| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
|-----------|-----|------------|--------|-------|----------------|-------------|----------|--------------|
| 5 | 3.7 | 4 | 1430 | 184TC | 190/380 | 50 | 3 | 16.6/8.3 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.0 | CONT | 86.5 | B | H | 40 C |

| Load | HP | kW | Amperes | Efficiency (%) | Power Factor (%) |
|--------------|------|-----|---------|----------------|------------------|
| Full Load | 5 | 3.7 | 8.3 | 86.4 | 79.0 |
| ¾ Load | 3.75 | 2.8 | 6.5 | 87.7 | 74.6 |
| ½ Load | 2.50 | 1.9 | 5.0 | 87.1 | 64.7 |
| ¼ Load | 1.25 | 0.9 | 4.0 | 81.1 | 43.3 |
| No Load | | | 3.8 | | 6.5 |
| Locked Rotor | | | 52.9 | | 63.2 |

| Torque | | | | Rotor wk ² Inertia (lb-ft ²) |
|-------------------|----------------------|-----------------|--------------------|---|
| Full Load (lb-ft) | Locked Rotor (% FLT) | Pull Up (% FLT) | Break Down (% FLT) | |
| 18.4 | 220 | 200 | 280 | 0.43 |

| Safe Stall Time(s) | | Sound Pressure dB(A) @ 1M | Bearings* | | Approx. Motor Weight (lbs) |
|--------------------|-----|---------------------------|-----------|----------|----------------------------|
| Cold | Hot | | DE | NDE | |
| 35 | 15 | - | 6306ZZC3 | 6306ZZC3 | 115 |

*Bearings are the only recommended spare part(s).

Motor Options:
 Product Family:EQP Global SD
 Mounting:C-Face Round,Shaft:T Shaft

| | |
|-------------|--|
| Customer | |
| Customer PO | |
| Sales Order | |
| Project # | |

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|----------|------------------|-------------|-------------|---------------|
| Engineering | garce | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1119 / 1 |
| Engr. Date | 6/5/2015 | Doc. Approved By | M. Campbell | Doc. Issued | 9/20/2019 |



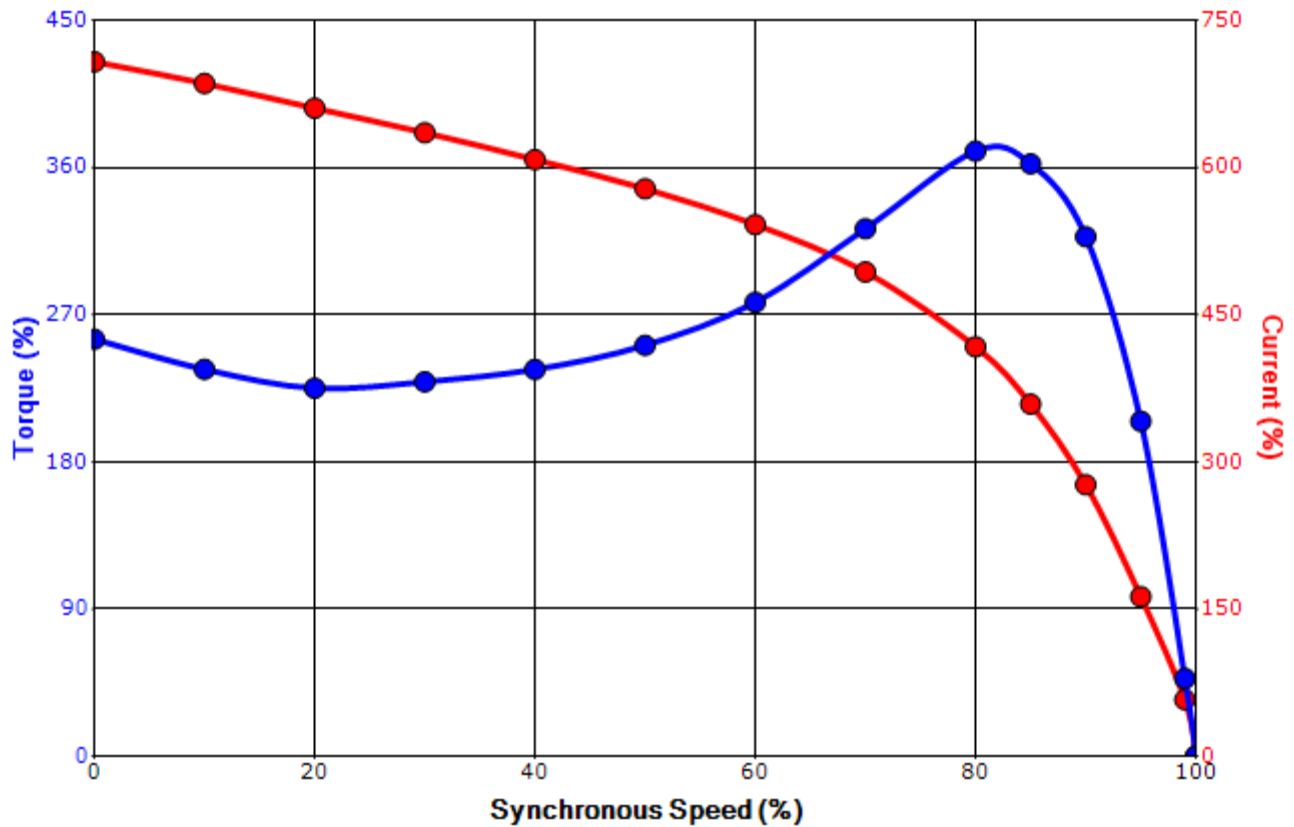
| | | | |
|-------------|------------|------------|--|
| Issued Date | 12/18/2019 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

SPEED TORQUE/CURRENT CURVE

Model: 0054SDSR44A-P

| | | | | | | | | |
|-------------------|---|-------------------|------------------|-------|----------------|-------------|----------------|--------------|
| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
| 5 | 3.7 | 4 | 1750 | 184TC | 230/460 | 60 | 3 | 13.0/6.5 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.15 | CONT | 89.5 | B | J | 40 C |
| Locked Rotor Amps | Rotor wk ² Inertia (lb-ft ²) | Torque | | | | Pull Up (%) | Break Down (%) | |
| | | Full Load (lb-ft) | Locked Rotor (%) | | | | | |
| 46 | 0.50 | 15 | 255 | | 240 | 370 | | |

Design Values



| | | | |
|-------------|--|--|-----|
| Customer | | wk ² Load Inertia (lb-ft ²) | - |
| Customer PO | | Load Type | - |
| Sales Order | | Voltage (%) | 100 |
| Project # | | Accel. Time | - |

Tag:

All characteristics are average expected values.

TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|-----------|------------------|-------------|-------------|-------------|
| Engineering | zxie | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1121/1 |
| Engr. Date | 7/19/2019 | Doc. Approved By | M. Campbell | Doc. Issued | 9/20/2019 |



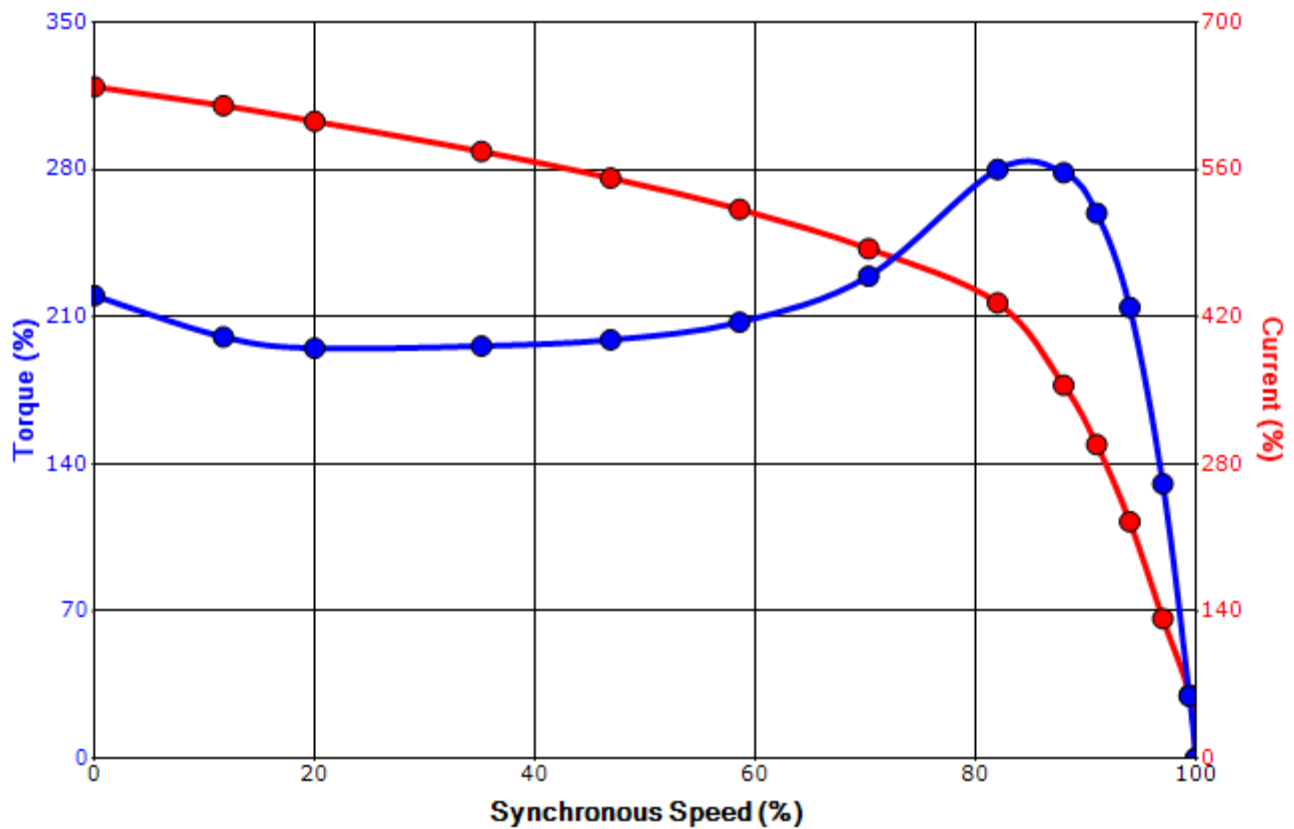
| | | | |
|-------------|------------|------------|--|
| Issued Date | 12/18/2019 | Transmit # | |
| Issued By | dschoeck | Issued Rev | |

SPEED TORQUE/CURRENT CURVE

Model: 0054SDSR44A-P

| | | | | | | | | |
|-------------------|---|-------------------|------------------|-------|----------------|-------------|----------------|--------------|
| HP | kW | Pole | FL RPM | Frame | Voltage | Hz | Phase | FL Amps |
| 5 | 3.7 | 4 | 1430 | 184TC | 190/380 | 50 | 3 | 16.6/8.3 |
| Enclosure | IP | Ins. Class | S.F. | Duty | NEMA Nom. Eff. | NEMA Design | kVA Code | Ambient (°C) |
| TEFC | 55 | F | 1.0 | CONT | 86.5 | B | H | 40 C |
| Locked Rotor Amps | Rotor wk ² Inertia (lb-ft ²) | Torque | | | | Pull Up (%) | Break Down (%) | |
| | | Full Load (lb-ft) | Locked Rotor (%) | | | | | |
| 52.9 | 0.43 | 18.4 | 220 | | 200 | 280 | | |

Design Values



| | | | |
|-------------|--|--|-----|
| Customer | | wk ² Load Inertia (lb-ft ²) | - |
| Customer PO | | Load Type | - |
| Sales Order | | Voltage (%) | 100 |
| Project # | | Accel. Time | - |

Tag:

All characteristics are average expected values.

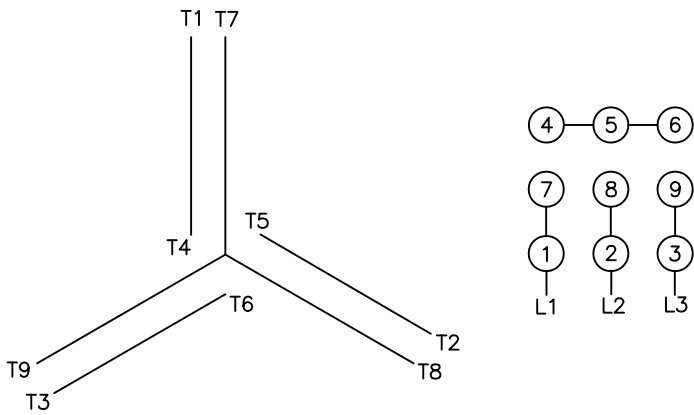
TOSHIBA INTERNATIONAL CORPORATION · HOUSTON, TEXAS U.S.A.

| | | | | | |
|-------------|----------|------------------|-------------|-------------|-------------|
| Engineering | garce | Doc. Written By | D. Suarez | Doc.# / Rev | MPCF-1121/1 |
| Engr. Date | 6/5/2015 | Doc. Approved By | M. Campbell | Doc. Issued | 9/20/2019 |

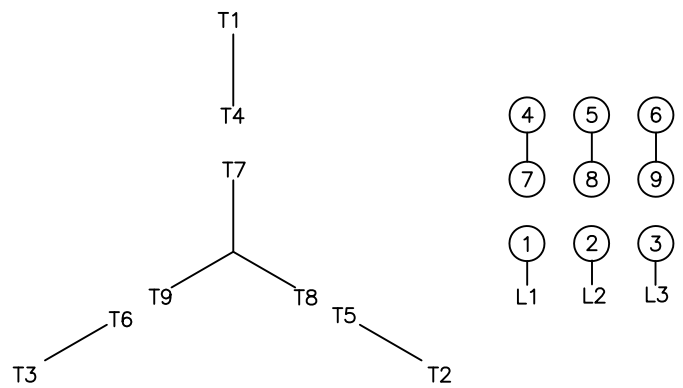
Motor Connection Diagrams
9 Leads

Across-the-Line Starting / Running Connections

Low Voltage Wye



High Voltage Wye



Switch L1 and L2 to reverse rotation

Zero Speed Switch



Cost-effective equipment protection

SITRANS WM100 motion sensor



Accurate monitoring in harsh conditions

SITRANS WM100 is a heavy-duty zero-speed alarm switch. This non-contacting unit provides cost-effective equipment protection even in the harshest conditions. It is suitable for heavy industries such as mining, aggregates or cement. The WM100 monitors the absence of motion on moving or rotating equipment. Key applications include tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, and bucket elevators.

Design

Lightweight yet rugged, SITRANS WM100 is compact and easy to install. With its rugged cast aluminum housing, it is suitable for outdoor installation.

Mode of operation

Process protection devices act as early warning systems to avoid costly process interruptions and equipment breakdowns. Located outside of the process, Sitrans WM100 accurately detects operating conditions without wear on the sensor. Sitrans WM100 can be mounted up to 100 mm (4") from the ferrous target. The robust motion sensor provides the contacts to shutdown machinery whenever zero speed is detected. On belt, drag, and screw conveyors, or on bucket elevators, fans and pumps, the zero speed alarm option can warn instantly of equipment malfunctions. It alarms to minimize spillage, prevent extensive damage or even fire caused by belt slippage at the head pulley and warn against conveyor malfunction.

Siemens probes work on the principle of Faraday's Law of Electromagnetic Induction. When a ferromagnetic object enters the probe's permanent magnetic field, it distorts the flux, causing its coil windings to generate a voltage. This voltage is proportional to the strength of the magnet and the number of wire turns in the coil (constant in the probes) and the speed at which the ferrous target passes through the flux. The generated voltage is also inversely proportional to the square of the distance between the target and the probe.

Process protection
www.siemens.com/processprotection

Answers for industry.

SIEMENS



SITRANS WM100

Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating and rotating machinery. The sensors are located outside of the process, accurately detecting conditions without wear on the sensor. Motion sensors can warn of equipment malfunction and shut down machinery in case of slowdown or failure. They are rugged and perform even in harsh conditions. On belt, drag, and screw conveyors, or on bucket elevators, fans, and pumps, the speed alarm option can warn instantly of equipment problems.

- Up to 100 mm (4") gap between SITRANS WM100 and targets
- Non-contacting design eliminates the need for lubricating, cleaning, and part replacement
- Visual indication of target triggered pulse
- Rugged, low maintenance suitable for tough environments
- 1 SPDT Form C relay contact
- Provides cost-effective protection

| SITRANS WM100 | |
|--|--|
| Mode of operation | |
| Measuring principle | Disruption of a magnetic field by ferrous target |
| Typical applications | Monitors absence or presence of motion in harsh conditions |
| Output | |
| Contact | 1 SPDT Form C dry relay contact, rated 5A at 250 V AC, fail-safe operation |
| Time delay | Start up: 10 to 14 seconds (5 to 7 seconds with 12 ppm jumper installed) |
| Zero Speed (selected via a common jumper) | <ul style="list-style-type: none"> • 5 seconds \pm1 (minimum speed 10 to 15 ppm) or • 10 seconds \pm2 (minimum speed 5 to 7.5 ppm) |
| Rated operating conditions | |
| Operating temperature | • -40 to 60 °C (-40 to 140 °F) |
| Design | |
| Probe body | Aluminum |
| Process mounting | 2" NPSL |
| Connection box | Aluminum, 3/4" NPT conduit entrance, 5 screw terminals plus grounding terminal for electrical connection, max. 12 AWG (3.30 mm ²) wire size |
| Gasketing | Neoprene |
| Display | Red LED for verification of pulses |
| Enclosure rating | Type NEMA 4X, 6, IP67 |
| Dynamic range | |
| | <ul style="list-style-type: none"> • Minimum 6 or 12 pulses per minute • Maximum 3000 pulses per minute |
| Shipping weight | |
| | 2 kg (4 lbs) |
| Power supply | |
| | <ul style="list-style-type: none"> • 115 V AC/50 to 60 Hz, 7 VA • 230 V AC/50 to 60 Hz, 7 VA • \pm10 % of rated voltages |
| Certificates and approvals | |
| | • CSA _{US/IC} , CE, C-TICK |

Siemens AG
Industry Sector
Sensors and Communication
76181 KARLSRUHE
GERMANY

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Overview



SITRANS WM100 is a heavy-duty zero-speed alarm switch. This non-contacting unit provides cost-effective equipment protection even in the harshest conditions.

Benefits

- Up to 100 mm (4 inch) gap between SITRANS WM100 and targets
- Rugged, low maintenance suitable for tough environments
- 1 SPDT Form C relay contact
- Provides cost-effective protection
- Visual indication of target triggered pulse

Application

This rugged unit is impervious to dust, dirt, build-up and moisture and is ideal for such primary industries as mining, aggregate, and cement. Operating where other systems are prone to failure, the non-contacting design eliminates the need for lubricating, cleaning and part replacement. Downtime and clean-up expenses associated with conveying equipment failure are reduced by the SITRANS WM100. It alarms to minimize spillage, prevent extensive damage or even fire caused by belt slippage at the head pulley, and warns against conveyor malfunction.

The SITRANS WM100 has built-in selectable start delays and 1 Form C relay contact. With an aluminum body, it operates from -40 to +60 °C (-40 to +140 °F).

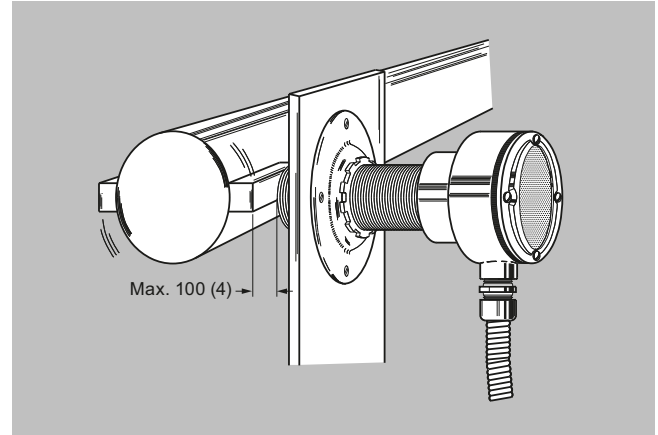
- Key Applications: tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

Mounting

The WM100 probe should be mounted, using the supplied mounting flange, onto a vibration-free structure. The gap between the probe and the target should be sufficient such that there is no danger of the target damaging the probe. The maximum allowable gap is 100 mm (4 inch) from the face of the target to the face of the probe for 4.5 x 4.5 mm (3/16 x 3/16 inch) keyway. The WM100 is sensitive to lateral disturbances to its magnetic field. If the WM100 is responding to motion from an interfering target, move the WM100 or install a ferrous plate (steel) as a shield between the WM100 and the interfering target. Where possible, the probe should be mounted such that the cable inlet is pointing downward to avoid accumulation of condensation in the casing. Connection of the probe should be made via flexible conduit for easier removal or adjustment of the probe.

Design (continued)



SITRANS WM100 mounting, dimensions in mm (inch)

Process Protection

Motion sensors

7MH7158-0AA00

SITRANS WM100 Motion sensor

Selection and ordering data

| SITRANS WM100 Motion sensor Heavy duty speed alarm switch with 100 mm measuring range. | | Article No. | A 0 0 | | |
|---|--|------------------|-------|---|--|
| Click on the Article No. for the online configuration in the PIA Life Cycle Portal. | | 7MH71- 0 58 - | ● | | |
| Model | | | | | |
| 115 V AC | | | | A | |
| 230 V AC | | | | B | |

| Selection and Ordering data | Order code |
|--|------------|
| Further designs | |
| Please add "-Z" to Article No. and specify Order code(s). | |
| Manufacturer's Test Certificate: According to EN 10204-2.2 | C11 |
| Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/i-identification (max. 16 characters), specify in plain text | Y17 |

| Accessories | Article No. |
|--|-------------|
| Operating Instructions | |
| All literature is available to download for free, in a range of languages, at http://www.siemens.com/processinstrumentation/documentation | |
| Accessories | |
| Locknut | 7MH7723-1CR |
| Mounting flange | 7MH7723-1CS |
| Motion cable gland adaptor kit | 7MH7723-1JU |

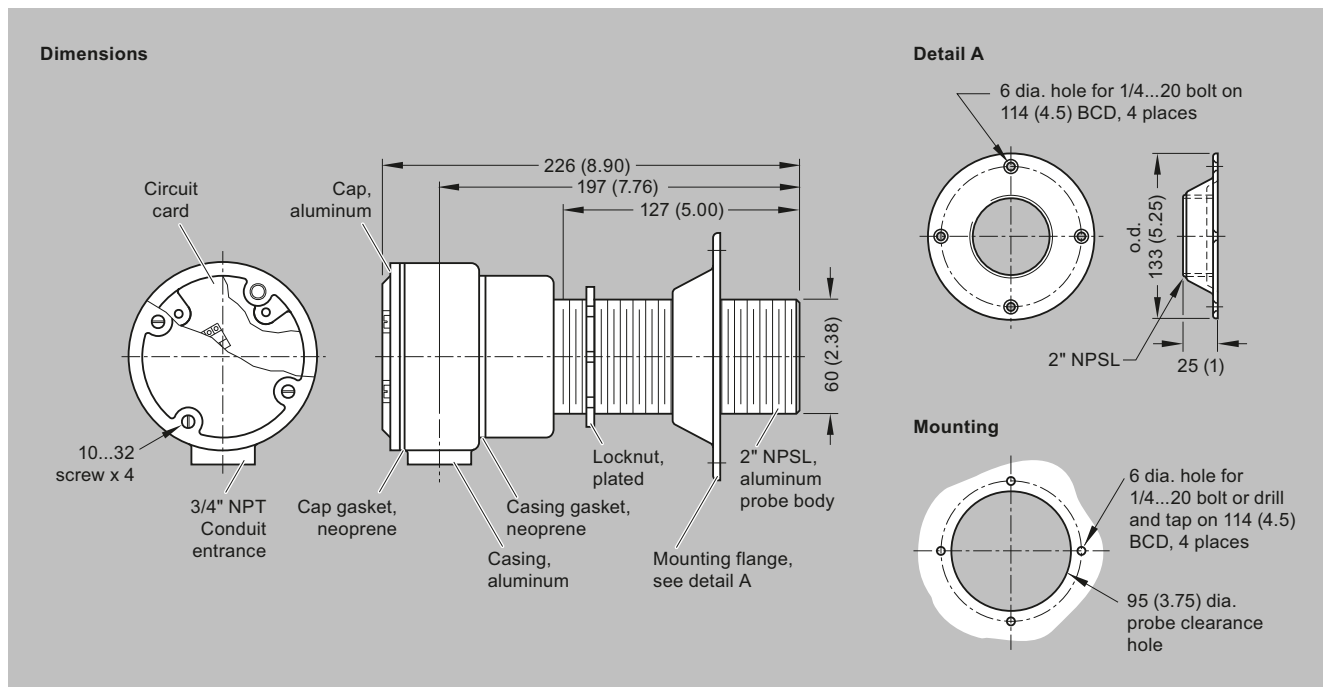
Technical specifications

| | |
|---|---|
| Mode of operation | |
| Measuring principle | Disruption of magnetic field by ferrous target |
| Typical application | Monitors absence or presence of motion in harsh conditions |
| Output | |
| Contact | 1 SPDT Form C dry relay contact, rated 5 A at 250 V AC, fail-safe operation |
| Time delay | Start up: 10 ... 14 seconds (5 ... 7 seconds with 12 ppm jumper installed) |
| Zero Speed (selected via a common jumper) | 5 seconds ± 1 (minimum speed 10 ... 15 ppm) or 10 seconds ± 2 (minimum speed 5 ... 7.5 ppm) |
| Rated operating conditions | |
| Operating temperature | -40 ... +60 °C (-40 ... +140 °F) |
| Storage temperature | -40 ... +60 °C (-40 ... +140 °F) |
| Design | |
| Probe body | Aluminum |
| Process mounting | 2" NPSL |
| Connection box | Aluminum, ¾" NPT conduit entrance, 5 screw terminals plus grounding terminal for electrical connection, max. 12 AWG (3.30 mm ²) wire size |
| Gasketing | Neoprene |
| Display | Red LED for verification of pulses |
| Enclosure rating | Type NEMA 4x, 6, IP67 |
| Dynamic range | |
| | Minimum 6 or 12 pulses per minute Maximum 3 000 pulses per minute |
| Shipping weight | 2 kg (4.4 lb) |

Technical specifications (continued)

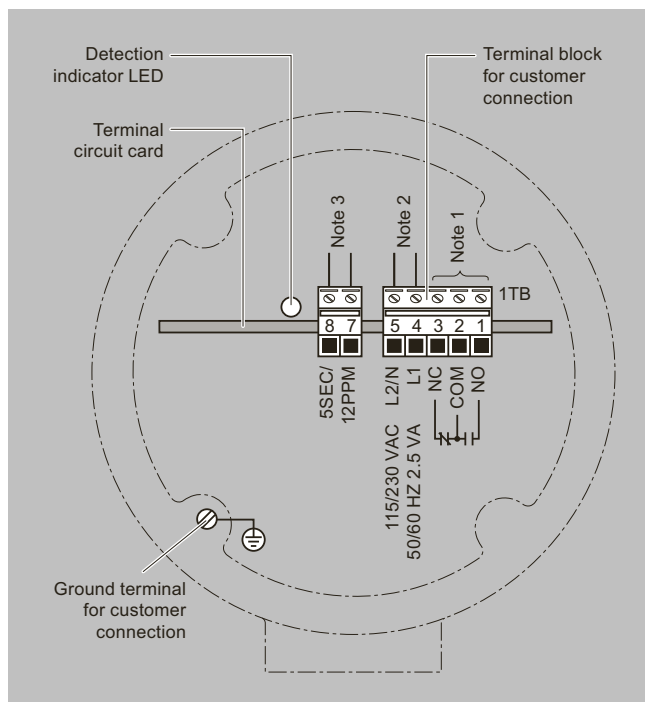
| | |
|-----------------------------------|---|
| Power supply | <ul style="list-style-type: none"> • 115 V AC/50 ... 60 Hz, 7 VA • 230 V AC/50 ... 60 Hz, 7 VA • ± 10 % of rated voltage |
| Certificates and approvals | cCSAus, CE, UKCA RCM, EAC, KC |

Dimensional drawings



SITRANS WM100 mounting, dimensions in mm (inch)

Circuit diagrams



SITRANS WM100 wiring

Notes:


1. Dry contacts shown in de-energized (alarm or shelf) state.
2. SITRANS WM100 is manufactured for either 115 or 230 V AC operation. Check WM100 nameplate for applicable voltage. Correct

Circuit diagrams (continued)

voltage must be supplied. Voltages lower than specified will result in an inoperative condition. Voltages higher than specified will severely damage unit.
 3. For 5 second time delay and a minimum 12 ppm range, connect jumper across terminals 7 and 8. Without a jumper, the default is a 10 second time delay and a minimum 6 ppm range.

E-Stop Pull Chord

Spelling: "CORD"



ER6022

For full product information, visit www.sti.com. Use the SpeedSPEC Code for quick access to the specific web page.

Rope Pull Emergency Stop Switch

- Rope spans up to 80 m (262 ft.) means fewer number of switches required per application
- Tension indicator makes system setup and rope tension maintenance easy
- Contact arrangements of 2 N/C + 1 N/O, 3 N/C + 1 N/O or 2 N/C + 2 N/O
- IP67 (NEMA 6) enclosure enables the ER6022 switch to withstand water washdown cleaning
- Reset button—the blue reset button must be pushed in order to return to “machine run” condition following switch actuation by a pulled or slacked rope
- Indicator beacon—the optional dual indicator beacon, available in 24 VDC or 120 VAC, can be wired to flash red to indicate a tripped switch or glow a constant green to indicate a properly reset switch
- E-stop button—the ER6022 has two mounting positions where the optional E-stop button may be installed; the E-stop button may be added or replaced in the field
- Rubber bellows contain UV inhibitor making the switches suitable for outdoor applications



Conforms to IEC947-5-1, IEC947-5-5, EN418, UL508, BS5304
UL and C-UL listed, TUV certified

Specifications

| Electrical | All Models |
|-----------------------------------|--|
| Contact Configurations: | 2 N/C + 1 N/O, 3 N/C + 1 N/O, 2 N/C + 2 N/O |
| Safety Contacts: | 2 N/C, 3 N/C |
| Switching Ability | AC: 240 V–3 A, 120 V–6 A, Inductive, DC: 24 V–2.5 A, Inductive |
| Auxiliary Contacts: | 1 N/O, 2 N/O |
| Max Switching Current/Volt/Amp: | 240 V/720 VA |
| Minimum Current: | 5 V 5 mA DC |
| Electrical Life: | 1 x 10 ⁶ minimum |
| Mechanical | |
| LED Indicator Beacon: | 24 VDC, 120 VAC |
| Mechanical | 1 million minimum |
| Mounting: | Any position |
| Mounting Hardware: | 4 x M5 screws |
| Max Rope Span: | 80 m (262 ft.) |
| Operation Force: | < 125 N (28 lb.) |
| Tensioning Force to Run Position: | 130 N (23 lb.) typical |
| Case Material: | Die-cast aluminum alloy |
| Eye Nut Material: | Stainless Steel |
| Stainless Accessory Items: | 304 Stainless Steel |
| Wiring Entry: | 3 x M20 or 3 x 0.5 in. NPT |
| Weight: | 880 g (31 oz.) |
| Color: | Yellow |
| Mechanical Life: | 1 x 10 ⁶ minimum |
| Environmental | |
| Protection: | IP67 (NEMA 6) |
| Operating Temperature: | -25 to 80°C (-13 to 176°F) |
| Cleaning: | Water washdown |
| Compliance | |
| Standards: | IEC947-5-1, IEC947-5-5, EN418, UL508, BS5304 |
| Approvals/Listings: | CE marked for all applicable directives, UL and C-UL, TUV |

Specifications are subject to change without notice.

Note: The safety contacts of the STI switches are described as normally closed (N/C)—i.e., with the rope properly tensioned and the machine able to be started.

Operation



Blue Reset Knob

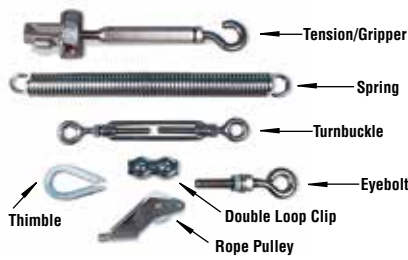
A blue reset button is provided to easily return the unit back to its machine-run position after actuation.



Emergency Push Button

The emergency push button may be installed or repositioned in the field. The ER6022 has two possible mounting positions for the emergency stop button.

Installation Hardware Available



Installation Hardware

Individual hardware items may be purchased for specific installation requirements.



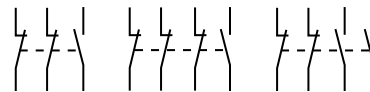
RK Rope Tension Kit

The RK Rope Tension Kit comes with all of the required hardware for most installations. A spring is required as shown in the installation example below.

For up to 50 m rope span, one rope end is terminated with a thimble, permanent clamp, and quick link attached.

For over 50 m rope span, 2 Tension/Gripper assemblies are supplied (no quick link.)

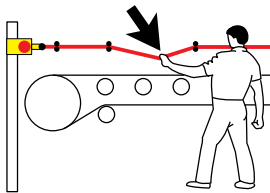
Contact Arrangements



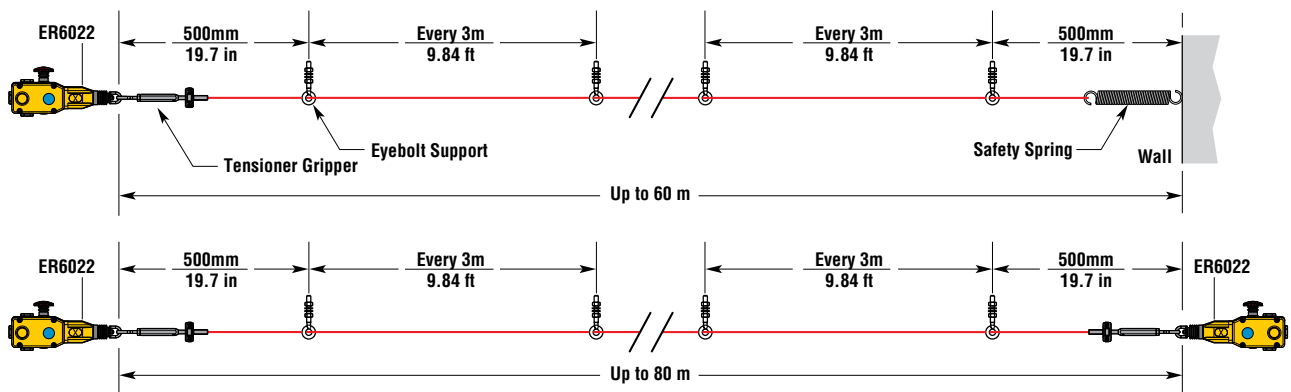
| | 0 mm 0 in | 3.5 0.14 | 14.5 0.57 | 17.0 0.67 |
|---------------------------|-------------------|----------------------|--------------------|--------------|
| 2NC + 1NO Versions | Rope Slack | Tension Range | Rope Pulled | |
| 11/12 | | | | |
| 21/22 | | | | |
| 33/34 | | | | |
| 3NC + 1NO Versions | Rope Slack | Tension Range | Rope Pulled | |
| 11/12 | | | | |
| 21/22 | | | | |
| 33/34 | | | | |
| 43/44 | | | | |
| 2NC + 2NO Versions | Rope Slack | Tension Range | Rope Pulled | |
| 11/12 | | | | |
| 21/22 | | | | |
| 33/34 | | | | |
| 43/44 | | | | |

Contact Open Contact Closed

Mounting Specification



For a guide to installing, see "Proper Installation of Rope or Wire Pull Emergency Stop Devices" in the Expert Area Section of this catalog on page A-78.

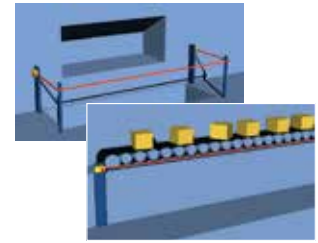
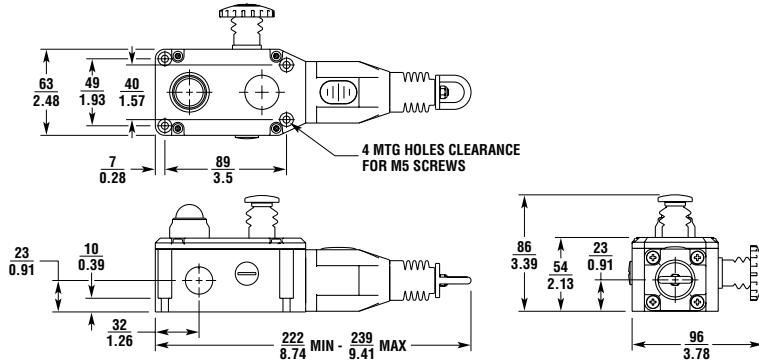


Dimensions

(mm/in.)

Applications

Typical applications are on conveyor systems and across rotating machinery, and around hazardous areas.



Ordering

| Model | E-stop | Indicator Beacon | Contacts | Wiring Entry | Part No. |
|---|--------------|-------------------|---------------|-----------------|------------|
| ER Switches with 3 pole contact blocks | | | | | |
| ER6022-021M | Not included | Not included | 2 N/C + 1 N/O | 3 x M20 | 44506-5010 |
| ER6022-021N | Not included | Not included | 2 N/C + 1 N/O | 3 x 1/2 in. NPT | 44506-5020 |
| ER6022-021ME | Included | Not included | 2 N/C + 1 N/O | 3 x M20 | 44506-5210 |
| ER6022-021NE | Included | Not included | 2 N/C + 1 N/O | 3 x 1/2 in. NPT | 44506-5220 |
| ER6022-021MEL | Included | Included | 2 N/C + 1 N/O | 3 x M20 | 44506-5410 |
| ER6022-021NEL | Included | Included | 2 N/C + 1 N/O | 3 x 1/2 in. NPT | 44506-5420 |
| ER6022-021NELAC | Included | Included, 120 VAC | 2 N/C + 1 N/O | 1/2" NPT | 44506-5423 |
| ER Switches with 4 pole contact blocks | | | | | |
| ER6022-031M | Not included | Not included | 3 N/C + 1 N/O | M20 | 44506-5050 |
| ER6022-031N | Not included | Not included | 3 N/C + 1 N/O | 1/2 in. NPT | 44506-5060 |
| ER6022-022M | Not included | Not included | 2 N/C + 2 N/O | M20 | 44506-5070 |
| ER6022-022N | Not included | Not included | 2 N/C + 2 N/O | 1/2 in. NPT | 44506-5080 |
| ER6022-031ML | Not included | Included, 24 VDC | 3 N/C + 1 N/O | M20 | 44506-5150 |
| ER6022-031NL | Not included | Included, 24 VDC | 3 N/C + 1 N/O | 1/2 in. NPT | 44506-5160 |
| ER6022-022ML | Not included | Included, 24 VDC | 2 N/C + 2 N/O | M20 | 44506-5170 |
| ER6022-022NL | Not included | Included, 24 VDC | 2 N/C + 2 N/O | 1/2 in. NPT | 44506-5180 |
| ER6022-031ME | Included | Not included | 3 N/C + 1 N/O | M20 | 44506-5250 |
| ER6022-031NE | Included | Not included | 3 N/C + 1 N/O | 1/2 in. NPT | 44506-5260 |
| ER6022-022ME | Included | Not included | 2 N/C + 2 N/O | M20 | 44506-5270 |
| ER6022-022NE | Included | Not included | 2 N/C + 2 N/O | 1/2 in. NPT | 44506-5280 |
| ER6022-031MEL | Included | Included, 24 VDC | 3 N/C + 1 N/O | M20 | 44506-5450 |
| ER6022-031NEL | Included | Included, 24 VDC | 3 N/C + 1 N/O | 1/2 in. NPT | 44506-5460 |
| ER6022-022MEL | Included | Included, 24 VDC | 2 N/C + 2 N/O | M20 | 44506-5470 |
| ER6022-022NEL | Included | Included, 24 VDC | 2 N/C + 2 N/O | 1/2 in. NPT | 44506-5480 |
| ER6022-031NELAC | Included | Included, 120 VAC | 3 N/C + 1 N/O | 1/2 in. NPT | 44506-5463 |
| ER6022-022NELAC | Included | Included, 120 VAC | 2 N/C + 2 N/O | 1/2 in. NPT | 44506-5483 |

| Accessories | | | | | Part No. |
|---------------------------|------------|-----------|---------------------------|--------------|------------|
| Stainless Steel Rope Kits | Quick Link | Eye-bolts | Tension/ Gripper Assembly | Allen Wrench | |
| RK5, 5 m Kit | Yes | 3 | 1 | 1 | 44506-2705 |
| RK10, 10 m Kit | Yes | 5 | 1 | 1 | 44506-2710 |
| RK15, 15 m Kit | Yes | 7 | 1 | 1 | 44506-2715 |
| RK20, 20 m Kit | Yes | 9 | 1 | 1 | 44506-2720 |
| RK30, 30 m Kit | Yes | 12 | 1 | 1 | 44506-2730 |
| RK50, 50 m Kit | Yes | 20 | 1 | 1 | 44506-2750 |
| RK80, 80 m Kit | No | 30 | 2 | 2 | 44506-2780 |
| RK100, 100 m Kit | No | 37 | 2 | 2 | 44506-2711 |
| RK126, 126 m Kit | No | 45 | 2 | 2 | 44505-2726 |
| Rope Only | | | | | |
| R5M, 5 m Rope Only | | | | | 44506-3705 |
| R10M, 10 m Rope Only | | | | | 44506-3710 |
| R20M, 20 m Rope Only | | | | | 44506-3720 |
| R30M, 30 m Rope Only | | | | | 44506-3730 |
| R50M, 50 m Rope Only | | | | | 44506-3750 |
| R80M, 80 m Rope Only | | | | | 44506-3780 |
| R100M, 100 m Rope Only | | | | | 44506-3711 |
| R126M, 126 m Rope Only | | | | | 44506-3726 |

| Accessories | Part No. |
|---|------------|
| SM06-SL500, Replacement Lid 24 VDC | 44506-5700 |
| SM06-SL510, Replacement Lid/LED 24 VDC | 44506-5710 |
| SM06-SL510AC, Replacement Lid/LED 120 VAC (consult factory for complete switch with 120 VAC beacon) | 44506-5711 |
| SM06-TK00, Tensioner Kit (Turnbuckle, 8 Rope Grips & 4 Thimbles) | 44506-0700 |
| SM06-TG00, Tensioner Gripper, Stainless Steel | 44506-4700 |
| SM06-EB10, Eye Bolt, Stainless Steel, 8 per pack | 44506-4710 |
| SM06-EB20, Eye Bolt, Galvanized | 44506-0720 |
| SM06-DL20, Double Loop Clip, Stainless Steel, 4 per pack | 44506-4720 |
| SM06-DL21, Double Loop Clip, Galvanized, 4 per pack | 44506-4721 |
| SM06-THS5, Thimble, Stainless Steel, 4 per pack | 44506-4770 |
| SM06-THGV, Thimble, Galvanized, 4 per pack | 44506-4771 |
| SM06-QLSS, Quick Link, Stainless Steel | 44506-4772 |
| SM06-TB30, Turnbuckle, Stainless Steel | 44506-4730 |
| SM06-TB31, Turnbuckle, Galvanized | 44506-4731 |
| SM06-SP30, Spring, Galvanized | 44506-0730 |
| SM06-SP50, Spring, Stainless Steel | 44506-4750 |
| SM06-RPSS, Rope Pulley, Stainless Steel | 44506-4780 |
| SM06-ES60, E-Stop Mechanism | 44506-4760 |
| SM06-LF40, Replacement LED Indicator Beacon, 24 VDC | 44506-4740 |
| SM06-LF41, Replacement LED Indicator Beacon, 120 VAC | 44506-4741 |

Safety Precautions

Operating instructions

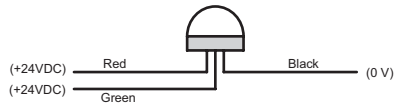
Installation must be in accordance with the following steps and stated specifications and should be carried out by suitably competent personnel. Adherence to the recommended maintenance instructions forms part of the warranty.

WARNING Do not defeat, tamper, remove or bypass this unit. Severe injury to personnel could result.

Optional 24 VDC Indicator Beacon

When +24VDC is applied to the **red** wire, the beacon will illuminate red and flash.

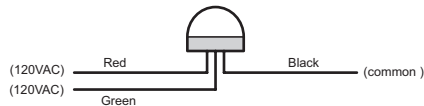
When +24 VDC is applied to the **green** wire, the beacon will illuminate green.



Optional 120 VAC Indicator Beacon

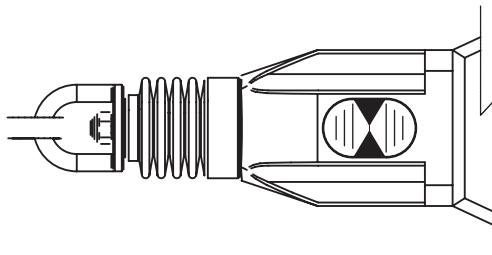
When +120VAC is applied to the **red** wire, the beacon will illuminate red and flash.

When +120 VAC is applied to the **green** wire, the beacon will illuminate green.



Tension Indicator

Indicator shown with steel rope properly adjusted.



WARNING

1. Installation of all Safety Rope Switch systems must be in accordance with a risk assessment for the individual application. Installation must only be carried out by competent personnel and in accordance with these instructions.
2. Rope support eyebolts must be fitted at 2.5 m. min. to 3 m. max. intervals along all rope lengths between switches. The rope must be supported no more than 500 mm from the switch eyebolt or Safety Spring (if used). It is important that this first 500 mm is not used as part of the active protection coverage.
3. M5 mounting bolts must be used to fix the switches. Tightening torque for mounting bolts to ensure reliable fixing is 4 Nm. Tightening torque for the lid screws, conduit entry plugs and cable glands must be 1.5 Nm to ensure IP seal. Only use correct sizing glands for conduit entry and cable outside diameter.
4. Tensioning of rope is achieved by use of tensioner / gripper assemblies. Upon installation, tension to mid-position as indicated by the red arrows in the viewing window of each switch. Check operation for all switches and the control circuits by pulling the rope at various locations along the active protection area and resetting each switch by depressing the Blue Reset button. Ensure each time that the switches latch off and require manual resetting by depressing the Blue Reset button. Increase the system tension further, if required, depending upon the checks along the active length of coverage. If fitted with a Mushroom type E-Stop button (Red) then test and reset each switch to ensure function of control circuits. Typical operational conditions for successful operation of system is less than 75 N. pulling force and less than 150 mm deflection of rope between eyebolt supports. If the optional LED is fitted but is not used, ensure that the conductors remain coiled and tied to the tie hole in the LED flange.
5. Every week: Check correct operation of system at locations along all coverage length. Check for nominal tension setting, re-tension rope if necessary. Every 6 months: Isolate power and remove cover. Check screw terminal tightness and check for signs of moisture ingress. Never attempt to repair any switch.

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