

Comfort Systems USA (Arkansas), Inc.
P.O. Box 16620
Little Rock, AR 72231
Phone 501-834-3320
Fax 501-834-5416

Date: 07/29/2026
Return Request: 08/19/2026
Project: Highlands Building at Pinnacle Hills
Supplier: Comfort Systems USA
Manufacturer: Premier Flow
Submittal: Hydronic Pumps
Submittal Number: 23 21 23-01
Drawing # and Installation: Mechanical

ARCHITECT

Crafton Tull
Fayetteville, Ar

ENGINEER

IMEG

GENERAL CONTRACTOR

Clark Contractors
Rogers, Ar

MECHANICAL SUBCONTRACTOR

Comfort Systems USA (Arkansas), Inc.
116 Commercial Ave.
Lowell, AR 72745
(479) 770.8992

NOTES:

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CSUSA PROJECT NO.
26-5034

jzuber@comfortar.com



Submittal Section

PROJECT: Highlands Oncology Group

SECTION: Hydronic Pumps

SPECIFICATION: 23 21 23

PREPARED BY: Will Cunningham	
DATE: 7/30/2026	



6023 N. Yorktown Avenue
Tulsa, OK 74130
918-346-6312

SUBMITTAL

DATE: 07-13-26

QUOTE#: PF-069038-B

JOB: HOG Highland Building HWP-1

CUSTOMER: Jaco Sales

SYSTEM:

1- PREMIERflow Series PFV-15-PLB, Model PFVT-15-8, UL/C-UL listed, certified variable speed triplex chill water booster system consisting of:

System condition point: 588 gpm @ 53 psi

Suction pressure 10# min - 20# max (psi), 89# max working pressure

PUMPS/MOTORS (NSF):

3- Ebara Series EVMSU Model: EVMSU64-1, 304 stainless steel fitted, vertical multistage, each coupled, 15HP, 3600 rpm, 460/3/60 to a ODP, Premium efficient motor. **REGULATED PUMPS SHALL BE DOE 2020 COMPLIANT WITH A PUMP ENERGY INDEX (PEI) RATING ON NAME PLATE.,**

Conditions of Service: 294 gpm @ 100' tdh (each) (25% Prop Glycol)

VALVES: (NSF)

3- 4" Wafer style, non-slam, check valves

6- 4" Isolation butterfly valves

HEADERS, BRANCHES (NSF) 8" x 4" 316 stainless steel:

CONTROLS:

1- PF, VB Series, NEMA 1, UL/C-UL listed variable speed power and control panel:

System short circuit rating of 10ka RMS @ 600 VAC standard

U.L. 508

1-Delta DVP, micro-PLC controller

Flash Main Memory

SD memory for all user variables

Real time clock

Multi-level password security

32bit controller

MODBUS RTU, SMS, GPRS

USB programing port

RS-232,485 Ethernet communication ports

1-7" Color, touch screen HMI

PV-VB Self Tuning pressure sequencing (ASHRAE 90.1 compliant)

Suction and System discharge pressure read out in PSI

Individual pump run indication

Hand-off-auto selection

ETM's (Elapsed Time Meters)

Automatic alternation

100 Event Log

Low Suction alarm with TDR delay

Low System Alarm with TDR delay
High System alarm with TDR delay
High Suction Energy Saving Mode
1-120V fused transformer
2 sets of Auxiliary Alarm Contacts
1- Main through the door Disconnect
3- Individual motor circuit protection
3- Sub Micro, PWM, NEMA 1, 15hp, Variable Speed Drives
3- Panel mounted VFD operator interfaces
1- BACnet Communication
2- 4-20MA, stainless steel pressure transducers, header mounted suction and discharge

BASE:

Stainless Steel base with stainless steel panel stand and wiring for complete package system.
Blue PF painting process

TESTING:

System shall be factory electrically, hydrostatically and full flow run tested complete with test report before shipment

CERTIFICATIONS AND LISTINGS:

ETL/C-ETL NSF/ANSI/CA-61/372 listed as a pump system for domestic water use
All pipe welding to be by ASME Section 9 certified welders
all structural steel welding to be by AWS D1.6 certified welders

Each PREMIERflow package system is ETL/C-ETL THIRD PARTY LISTED as a system meeting OSHA and Federal Regulations: 29CFR1910.303 & .399, also in compliance with NFPA-70 (National Electric Code) Article 90-7.

Respectfully Submitted:
PREMIERflow, LLC

Keith Pirtle
Sales



DATE: June 2025

REFERENCE: TARIFF PLAN/POLICY

ATTN: ALL

In reference to the questions raised about increasing tariffs and the effect on pricing:
First let me say I agree with the concerns.

At PREMIERflow we are forward looking and have already implemented a TARIFF PLAN/POLICY.

TARRIFF PLAN/POLICY:

1- Every quote is only valid for 30 days. Each quote is reviewed at the time of an order hold for approval(HFA). The quote will be adjusted if required.

2- At the time of release for production the quote is again reviewed and adjusted if required.

3-All PREMIERflow quotes, HFA's, Terms and Conditions include an economic statement, stating any impact caused by tariffs will be listed on finial invoice as a line item.

4-FORCE MA-JEURE- PREMIERflow is not responsible for any uncontrollable circumstances that prevent fulfilling the contract.

5- Monroe continues to work with vendors directly (not through their distribution). He has increased our inventory levels and orders when tariffs are adjusting downward.

This allows for the best pricing and for PREMIERflow to have the inventory, thus preventing us from having to source from the secondary markets at a higher price.

6- Monroe and purchasing continue to search for new and better vendors.

PREMIERflow continues to watch the political and economic climate so to change positions as necessary.

If you have any questions or need any additional information, please contact me: (918) 863. 3199.or via email at marviny@premier-flow.com.

Respectfully Submitted,
PREMIERflow, a DXP Company

Marvin F. Yoder, Jr.
President



**A DXP COMPANY
PREMIERflow Warranty**

PREMIERflow, systems and controls are warrantied from defects in workmanship and material, under normal use and service the earlier of 24 months invoiced "ready to ship date" or for a period of 18 months from the date of startup, whichever occurs first ("Warranty Period"), and as herein provided:

This Warranty does not cover the effects of normal wear, tear or deterioration of the systems and controls; effects of abrasion, erosion, or corrosion, effects of improper storage, damaged caused by improperly install or erection of equipment, improper maintenance, nor operation not in accordance with its intended use. Further, PREMIERflow offers no warranty for mechanical seals, gauges, transducers are not covered under warranty for wear, or damage due to the liquid or particulate being pumped.

If at any time prior to expiration of the Warranty Period, Buyer or Owner shall discover any defect or other failure of the delivered systems and controls, to conform to the Warranties, PREMIERflow, upon written notice from Buyer, given within a reasonable time after discovery, shall correct the defect or nonconformity or replace the defective items to comply with the order requirements. Notwithstanding the foregoing, PREMIERflow's obligation to correct or replace any defect or nonconformity shall only occur during the Warranty Period and no such corrections or replacements shall occur upon expiration of the Warranty Period. Any defects or nonconformities not corrected or replaced during the Warranty Period shall be deemed accepted by the Buyer. Any substitution of parts not provided by PREMIERflow, or not authorized by PREMIERflow, or any modification, tampering, or manipulation of PREMIERflow's systems and controls shall void any and all Warranties. Alteration of any parts without express written permission of PREMIERflow for a purpose other than that intended shall void any and all Warranties.

PREMIERflow's responsibility under this Warranty is limited to, at its option, to repair or replace the defective item. All items that are repaired or replaced will require a RMA issued by the company and will be shipped at no charge, F.O.B. factory, plus all freight and handling charges. PREMIERflow reserves the right to provide replacement items similar in design and functionality without prior notice.

PREMIERflow does not warrant and shall not be responsible or liable for any and all labor charges, rigging charges, transportation charges, nor damages, loss of time, incidental, liquidated, damages to life or property, loss of income, consequential damages or any cost for removing or replacing defective items.

PREMIERflow's maximum liability shall not exceed the cost for the defective items. This warranty is in leu of any and all other express or implied warranties, and no warranty, express or implied, shall be extended beyond the Warranty Period. The Warranty shall not be effective unless Buyer has fully paid for all systems and controls as provided.

Respectfully Submitted,

PREMIERflow, a DXP Company

6023 N. Yorktown Avenue
Tulsa, Ok 74130
(918) 749-1766



PREMIERflow - a DXP Company
STANDARD TERMS AND CONDITIONS OF SALE

By engaging the services of PREMIERflow-a DXP Company, (herein referred to as "PREMIERflow" and/or "Seller") pursuant to offer and/or quotation, the Buyer agrees to be bound by the following Standard Terms and Conditions of Sale along with PREMIERflow's Standard Warranty. No changes or additional or different terms will be part of this contract unless approved by us in writing.

1. PRICE. Price does not include freight, duties or any sales, use, excise, value-added or similar taxes and where applicable, such charges will be billed as separate items and paid by you, unless otherwise stated in our written quotation. Prices are subject to change without notice, unless otherwise stated in our written quotation. There will be a minimum charge of \$100 on all sales.

ANY CHANGE IN COST DUE TO THE ECONOMIC IMPACT ASSOCIATED WITH TARRIFFS WILL BE REFLECTED ON THE FINAL INVOICE AT TIME OF "NOTICE OF READY TO SHIP"

2. QUOTATIONS. Quotations are offers for labor and services for custom built systems, and credit where applicable, manufactured and contracted for in Tulsa, Oklahoma. Unless otherwise stated, offers contained in Seller's quotations expire thirty (30) days from the date of issuance and may be withdrawn prior to your written acceptance, subject to the minimum lawful period. All quotations are subject to change by Seller at any time upon verbal or written notice to Buyer. Buyer's acceptance in writing and/or submittal of Buyer's Purchase Order shall be emailed to Seller in Tulsa, Oklahoma for acceptance within thirty (30) days as provided herein.

3. ERRORS & OMISSIONS. This quotation is for the items expressly listed or stated. No other terms or items should be assumed or implied as being provided.

4. PAYMENT TERMS. Payment Terms shall be net 30 days upon notice of ready to ship or shipment, whichever occurs first and subject to credit approval. However, orders of \$50,000 or more are subject to non-refundable progress billing to be determined by Seller. A statement of account will be invoiced upon "notice of ready to ship", unless other terms are set forth in Seller's quotation.

5. TAXES. Any and all sales, use, personal property or other excise taxes which the Seller may be required to pay or collect including first destination taxes, will be added to each invoice and shall be payable by Buyer on the same terms as the purchase price unless the Buyer has furnished the Seller a tax exemption certificate acceptable to the taxing authority.

6. FREIGHT TERMS. All sales are F.O.B. factory (Tulsa, Oklahoma) plus freight, unless other terms are set forth in Seller's quotation. Title transfers at factory, at the time of notice of time to ship, thereafter Buyer takes responsibility for risk of loss or damage. Goods shall be promptly inspected upon delivery. Buyer shall examine and inspect all deliverables and will notify Seller of any defect in material or workmanship, or of any missing items. Failure to inspect and inform Seller of defects or missing items, shall be conclusive evidence that Seller has satisfactorily tendered all agreed upon services and goods and Buyer has inspected and accepted the deliverables.

6. LIMITATION OF LIABILITY. Seller shall not be liable for any liquidated, incidental, consequential, or other damage.

7. STORAGE. If the products are not shipped within (15) fifteen days after notification to Buyer that they are ready for shipping, for any reason beyond Seller's reasonable control including Buyer's failure to give shipping instructions, Seller may store such products at Buyers risk. Buyers shall pay all handling, transportation, and storage costs. Title transfer occurs for all goods upon notice of ready to ship or invoiced statement of account whichever occurs first. Storage and insurance fees will be assessed as required.

8. DELAYS OR DEFAULT IN DELIVERY. Seller shall have no liability to Buyer, and Buyer shall not be entitled to cancel any purchase order for Seller's delay or default in delivery due to strikes, secondary boycotts, riots, wars, accidents, fires, floods, explosions, vandalism, pandemics, government embargoes, priorities or regulations, shortages of labor, fuel, materials, supplies, power or transportation facilities, or other similar or dissimilar causes beyond Seller's reasonable control. Under no circumstances shall Seller have any liability for penalties or consequential damages of any kind resulting in whole or in part from Seller's delay in delivering, or failure to deliver any products ordered by Buyer.

9. CHANGES TO ORDERS IN PROGRESS. There shall be a charge for any and all changes in specification after an order is in process, based on the status of the order at the time the change is made. The additional charge shall be a minimum of \$100 net per item when engineering has not been started or is not required and a minimum of \$500 net per item when re-engineering is required. The additional charge shall be in addition to any Vendor charges in the price of the product resulting from the change. The order "Issue Date" will be moved forward to the date of the change and shipment will be rescheduled in accordance with the then current lead times. Buyer shall pay escalation charges based on the new "Issue Date" and scheduled shipping date as defined in Seller's acknowledgment.

10. CANCELLATIONS. After Seller accepts buyer's purchase order by emailing Seller's written acknowledgement, Buyer's cancellation of any order or portion thereof may be accomplished only upon (1) Seller's receipt of written cancellation notice at Seller's location and (2) buyer's payment of the following cancellation charges: Seller is due cancellation charges for all labor and materials used for that project. Seller will determine amount at the time of cancellation to be no less than 35% of total sales price.

11. WARRANTY. Seller disclaims any and all liability for damages to property, loss of time, loss of income, loss of profits. Seller disclaims any liability for incidental, liquidated or consequential damages. PREMIERflow Warranty, attached to and made apart hereof, covers material only and does not include labor required to install or repair said warranty equipment. Labor warranties may be quoted upon request. MECHANICAL SEALS ARE NOT WARRANTIED.

12. INSTALLATION FIELD SERVICE. Prices stated do not include installation labor or materials or field service unless specifically stated in Seller's quotation.

13. RETURN POLICY. ALL ITEMS ARE SUBJECT TO INSPECTION AND MUST HAVE APPROVAL FOR CREDIT. Systems are custom built and manufactured in Tulsa, Oklahoma, for each project and therefore have a 100% restocking fee, plus freight. Parts: stock items may be returned within 30 days of the invoice date and are subject to a minimum 30% restocking fee, plus freight. Non-stock items are not returnable.

14. INDEMNIFICATION. Buyer upon reviving title, shall at all times indemnify, defend Seller and their respective affiliates, employees, officers, directors, and agents, harmless from and against any and all costs, liabilities, losses and expenses resulting from and against all claims for personal injury, property damage, wrongful death or other damages, losses, and expenses, including attorney's fees arising out of, or resulting from, performance of the work or any services on behalf of the Buyer, commenced pursuant to this agreement. It is expressly understood and agreed that this obligation to completely indemnify, defend and hold harmless shall apply and be enforceable for all claims without regard to whether or not Buyer is claimed to be negligent or otherwise liable for any such damages, losses and expenses.

15. PAST-DUE ACCOUNTS. A finance charge of the lesser of 1.5% per month (18% APR) or the highest rate permitted by law will be assessed on all past due accounts. An invoice is past due if the net amount is not paid within 30 days from the date of invoice. Interest charged on a past due invoice will be assessed from the date on which that invoice was due. The above charges will be billed on the date that the invoice becomes 30 days past due, and on each monthly period thereafter. Failure of buyer to make any payment to the Seller within 45 days from the date of invoice, in addition to the herein describe charges, Seller shall be entitled to notify Buyer of Buyer's breach of agreement and default for failing to pay for services and goods/systems received on credit, and to the extent permitted by law receive all expenses incurred in its collection of full payment, including reasonable attorney fees and costs.

16. GOVERNING LAW. The laws of the State of Oklahoma govern these Standard Terms and Condition of Sale, and provided Quotation, without regard to conflict of laws principles for any dispute between the Parties or relating in any way to the subject matter of this agreement that may in any way cause another jurisdiction's laws to be applied. EACH PARTY STIPULATES THAT THE TULSA COUNTY DISTRICT COURT, STATE OF OKLAHOMA, SHALL HAVE IN PERSONAM JURISDICTION AND VENUE OVER EACH OF THEM FOR THE PURPOSE OF LITIGATING ANY ACTION(S) OR PROCEEDING(S) ARISING OUT OF OR RELATED TO THIS AGREEMENT. THE PARTIES EACH HEREBY INDIVIDUALLY AUTHORIZE AND ACCEPT SERVICE OF PROCESS SUFFICIENT FOR PERSONAL JURISDICTION IN ANY ACTION AGAINST ONE OF THEM AS CONTEMPLATED BY THIS PARAGRAPH BY CERTIFIED MAIL, RETURN RECEIPT REQUESTED, POSTAGE PREPAID. ANY FINAL JUDGMENT RENDERED AGAINST A PARTY IN ANY ACTION OR PROCEEDING SHALL BE CONCLUSIVE AS TO THE SUBJECT OF SUCH FINAL JUDGMENT AND MAY BE ENFORCED IN OTHER JURISDICTIONS IN ANY MANNER PROVIDED BY LAW. THE PREVAILING PARTY IN LITIGATION IS ENTITLED TO RECOVER ITS ATTORNEY FEES AND COSTS FROM THE OTHER PARTY.

17. SEVERABILITY. In the event that any provision contained herein is held to be invalid or unlawful, such provisions shall be severable from the remaining provisions of these terms and conditions shall remain in tun force and effect.



**6023 N Yorktown Ave
Tulsa, OK 74130
918.346.6312**

INSTALLATION & STORAGE

UPON ARRIVAL:

System should be inspected upon arrival – any freight damage or missing equipment should be noted on the freight bill of lading at this time. Spare parts, miscellaneous equipment should be stored in a protected location. All equipment should be inspected for hardware that has become loosened during transit.

STORAGE:

The system must be covered to protect from: damage, contamination, etc. Do not remove crating or plastic covering (unless for inspection of possible freight damage). System must be stored in a dry environmentally controlled location (40° F min - 104° f max.).

EXTENDED STORAGE:

All rotating equipment should be turned by hand (if possible) at least once every 30 days. Care should be taken to ensure condensation and dirt are removed.

LOCATION:

System should be stored for ease of access, rigging, maintenance and visual inspection.

FOUNDATION:

SLAB ON GRADE:

System should be mounted on slab on grade with concrete weight per local and engineer's requirements.

ALL FLOORS OTHER THAN "SLAB ON GRADE":

In addition, the system should be mounted on a concrete welded pouring form inertia base with a minimum of 1-1/2" deflection springs. Install flex-connectors on system suction, discharge, and tank feed connection (if applicable).

LEVELING:

Systems should be level, so that skid surface is above and parallel with concrete. Shim anchors and system unit until it is correct and level.

ANCHOR BOLTS:

System must be anchored to foundation and/or inertia base with proper size anchor bolts per anchor bolt manufacturer's or engineer's recommendation.

GROUTING:

After anchor bolts and leveling processes have been completed, the system skid must be filled with concrete with slope to floor drain if applicable. The pump base shall be poured with a good grade of non-ferrous, non-shrink grout.

PIPING:

System suction, discharge and tank feed connection (if applicable) should have flex connectors installed. Pumping system must not support any of the building piping. No strain of any kind may be imposed on the pumping system. All piping should be level.

DRAIN:

Over-temperature purge line, packing gland lines (if applicable), etc., must be run to floor drain.

Listing Constructional Data Report (CDR)

1.0 Reference and Address			
Report Number	103986301COL-001	Original Issued: 15-Jul-2019	Revised: 7-Dec-2020
Standard(s)	Drinking Water System Components - Health Effects [NSF/ANSI/CAN 61:2018]		
Applicant	<u>Premierflow, LLC</u>	Manufacturer	<u>Premierflow, LLC</u>
Address	6023 North Yorktown Avenue Tulsa, OK 74130	Address	6023 North Yorktown Avenue Tulsa, OK 74130
Country	USA	Country	USA
Contact	Brynda K. Bolte Marvin F. Yoder Jr.	Contact	Brynda K. Bolte Marvin F. Yoder Jr.
Phone	(918) 346-6312 (918) 863-3199	Phone	(918) 346-6312 (918) 863-3199
FAX	(918) 382-5745	FAX	(918) 382-5745
Email	<u>bryndab@premier-flow.com</u> <u>marviny@premier-flow.com</u>	Email	<u>bryndab@premier-flow.com</u> <u>marviny@premier-flow.com</u>



CONFORMS TO
NSF / ANSI / CAN
STD 61/372

1.0 Reference and Address			
Report Number	102735143COL-001	Original Issued: 18-Oct-2016	Revised: 4-Dec-2020
Standard(s)	Drinking Water System Components - Lead Content [NSF/ANSI 372:2016]		
Applicant	<u>Premierflow, LLC</u>	Manufacturer	<u>Premierflow, LLC</u>
Address	6023 North Yorktown Avenue Tulsa, OK 74130	Address	6023 North Yorktown Avenue Tulsa, OK 74130
Country	USA	Country	USA
Contact	Brynda K. Bolte Marvin F. Yoder Jr.	Contact	Brynda K. Bolte Marvin F. Yoder Jr.
Phone	(918) 346-6312 (918) 863-3199	Phone	(918) 346-6312 (918) 863-3199
FAX	(918) 382-5745	FAX	(918) 382-5745
Email	<u>bryndab@premier-flow.com</u> <u>marviny@premier-flow.com</u>	Email	<u>bryndab@premier-flow.com</u> <u>marviny@premier-flow.com</u>

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CERTIFICATE OF COMPLIANCE

Certificate Number 20171020- E496209
Report Reference E496209-20171020
Issue Date 2017-OCTOBER-20

Issued to: Premierflow L L C
5422 108th East Ave
Tulsa OK 74146

**This is to certify that
representative samples of** INDUSTRIAL CONTROL PANELS
General Coverage

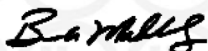
Have been investigated by UL in accordance with the
Standard(s) indicated on this Certificate.

Standard(s) for Safety: 508A - Standard for Industrial Control
CSA C22.2 No. 14 - Standard for Industrial Control
Equipment.

Additional Information: See the UL Online Certifications Directory at
www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's
Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.



Bruce Mahrenholz, Director North American Certification Program
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please
contact a local UL Customer Service Representative at <http://ul.com/aboutul/locations/>



Item number	: 001	Product Description	: EVMSU64-1
Service	:	Stages	: 1
Quantity	: 1	Based on curve number	: EVMSU64-1-0
Quote number	: 750566	Basic model number	: -
		Date last saved	: 21 Dec 2025 10:27 AM

Operating Conditions

Flow, rated	: 294.0 USgpm
Differential head / pressure, rated (requested)	: 100.0 ft
Differential head / pressure, rated (actual)	: 110.6 ft
Suction pressure, rated / max	: 0.00 / 0.00 psi.g
NPSH available, rated	: Ample
Site Supply Frequency	: 60 Hz

Performance

Speed criteria	: Synchronous
Speed, rated	: 3500 rpm
Impeller diameter, rated	: 5.63 in
Impeller diameter, maximum	: 5.63 in
Impeller diameter, minimum	: 5.63 in
Efficiency	: 74.85 %
PEI (CL)	: -
NPSH required / margin required	: 10.11 / 0.00 ft
Ns (imp. eye flow) / Nss (imp. eye flow)	: 1,968 / 9,324 US Units
MCSF	: 158.5 USgpm
Head, maximum, rated diameter	: 159.1 ft
Head rise to shutoff	: 43.95 %
Flow, best eff. point	: 330.6 USgpm
Flow ratio, rated / BEP	: 88.93 %
Diameter ratio (rated / max)	: 100.00 %
Head ratio (rated dia / max dia)	: 100.00 %
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Selection status	: Near miss

Liquid

Liquid type	: Glycol, Propylene, 25%
Additional liquid description	:
Solids diameter, max	: 0.00 in
Solids concentration, by volume	: 0.00 %
Temperature, max	: 68.00 deg F
Fluid density, rated / max	: 1.047 / 1.047 SG
Viscosity, rated	: 2.02 cP
Vapor pressure, rated	: 0.33 psi.a

Material

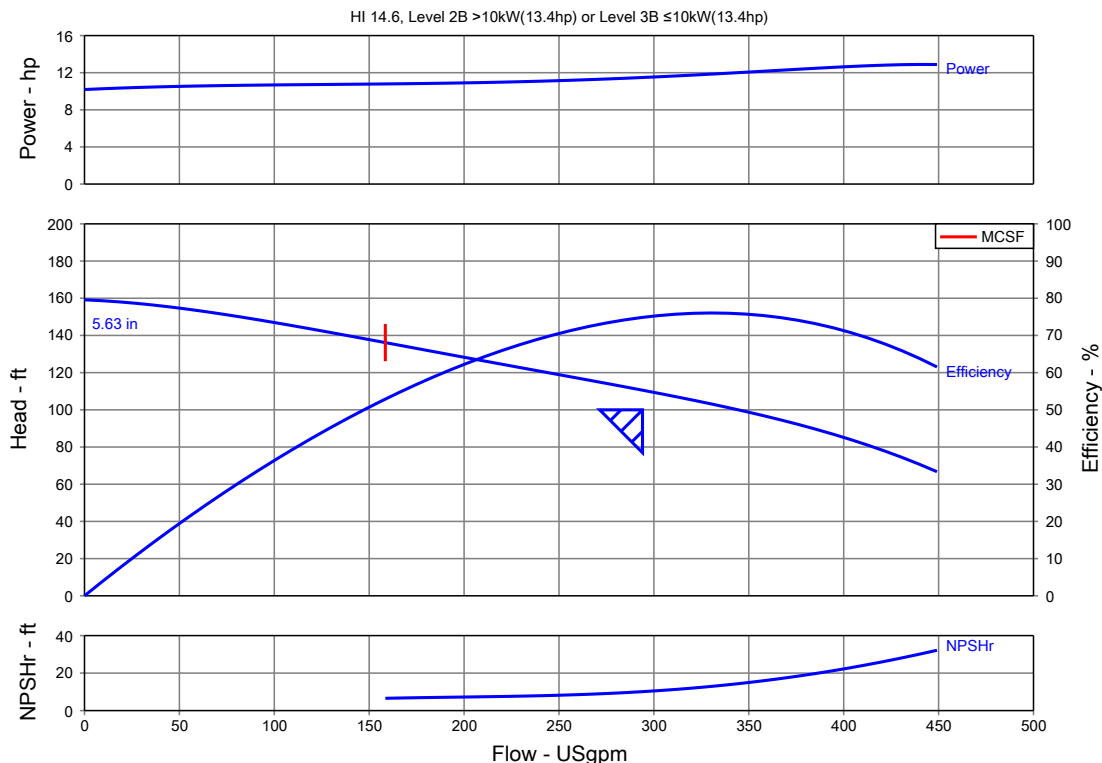
Material selected	: Standard
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Pressure Data

Maximum working pressure	: 72.14 psi.g
Maximum allowable working pressure	: 230.0 psi.g
Maximum allowable suction pressure	: 157.9 psi.g
Hydrostatic test pressure	: N/A

Driver & Power Data (@Max density)

Driver sizing specification	: Rated power
Margin over specification	: 0.00 %
Service factor	: 1.15 (Fixed)
Power, hydraulic	: 8.59 hp
Power, rated	: 11.48 hp
Power, maximum, rated diameter	: 12.89 hp
Motor rating	: 15.00 hp / 11.19 kW (Fixed)



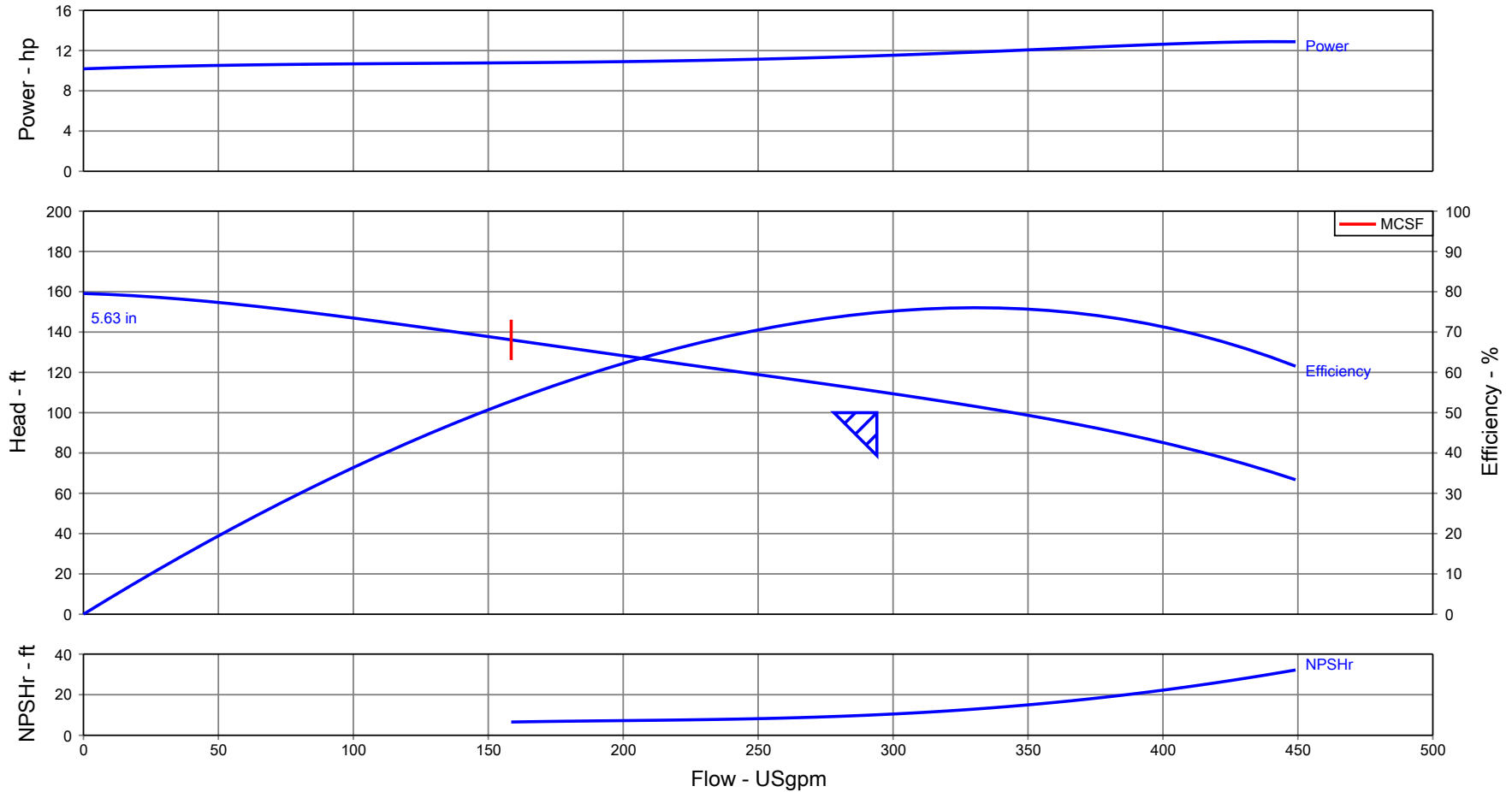


Customer :
Reference :

Pump Performance Curve

Ebara Quotation System 25.6.0

HI 14.6, Level 2B >10kW(13.4hp) or Level 3B ≤10kW(13.4hp)



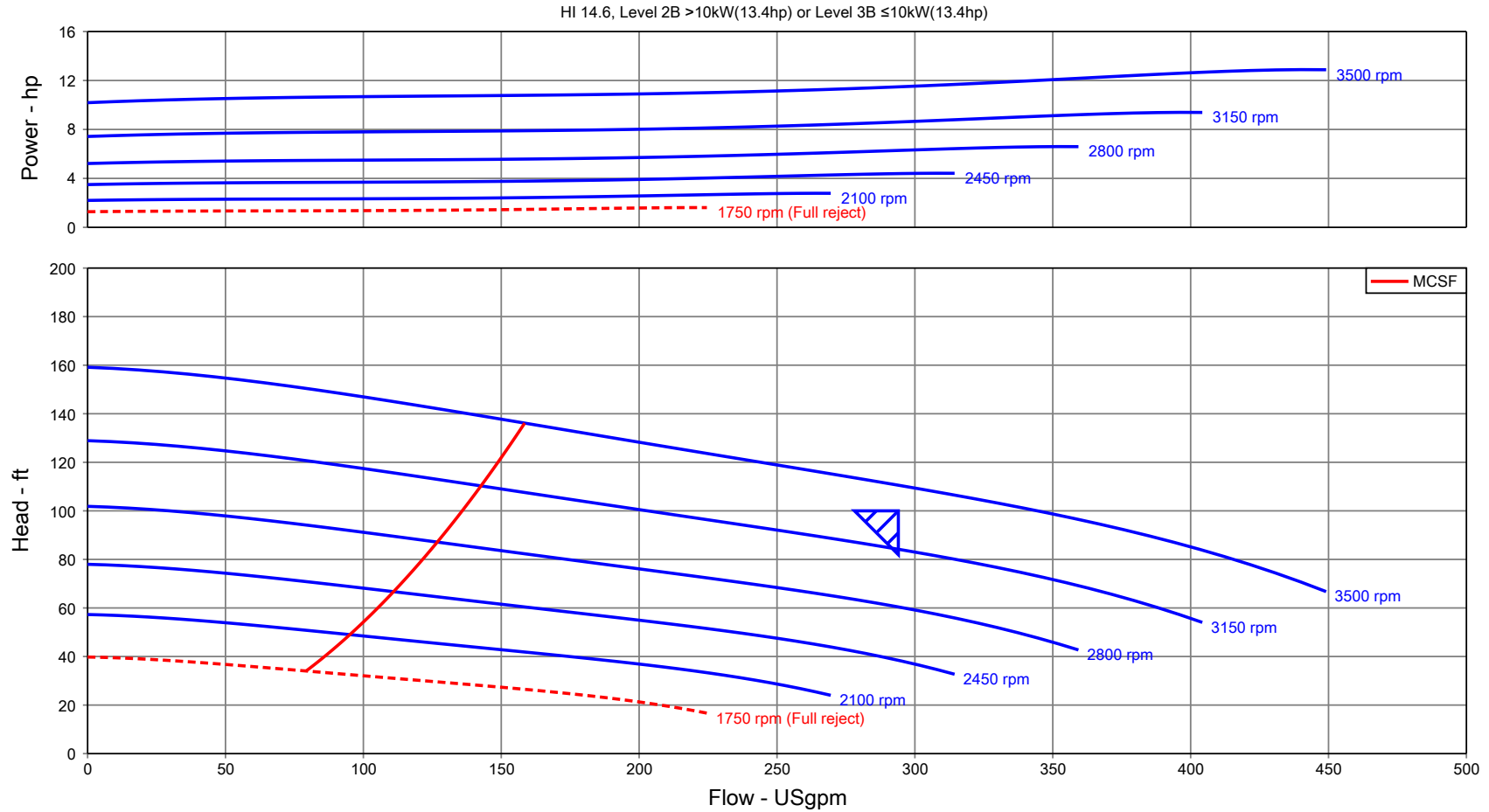
Item number	: 001	Product Description	: EVMSU64-1	Flow, rated	: 294.0 USgpm
Service	:	Stages	: 1	Differential head / pressure, rated	: 100.0 ft
Quantity	: 1	Speed, rated	: 3500 rpm	NPSH required	: 10.11 ft
Quote number	: 750566	Based on curve number	: EVMSU64-1-0	Fluid density, rated / max	: 1.047 / 1.047 SG
Date last saved	: 21 Dec 2025 10:27 AM	Basic model number	: -	Viscosity	: 2.02 cP
		Efficiency	: 74.85 %	Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
		PEI (CL)	: -		
		Power, rated	: 11.48 hp		



Customer :
Reference :

Multi-Speed Performance Curve

Ebara Quotation System 25.6.0



Item number	: 001	Product Description	: EVMSU64-1	Flow, rated	: 294.0 USgpm
Service	:	Stages	: 1	Differential head / pressure, rated	: 100.0 ft
Quantity	: 1	Efficiency	: 74.85 %	Speed, rated	: 3500 rpm
Quote number	: 750566	PEI (VL)	: -	Impeller diameter, rated	: 5.63 in
Based on curve number	: EVMSU64-1-0	Power, rated	: 11.48 hp	Fluid density, rated / max	: 1.047 / 1.047 SG
Basic model number	: -	NPSH required	: 10.11 ft	Viscosity	: 2.02 cP
Date last saved	: 21 Dec 2025 10:27 AM	Site Supply Frequency	: 60 Hz	Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
		Nominal speed	: 3525 rpm		

Construction Datasheet

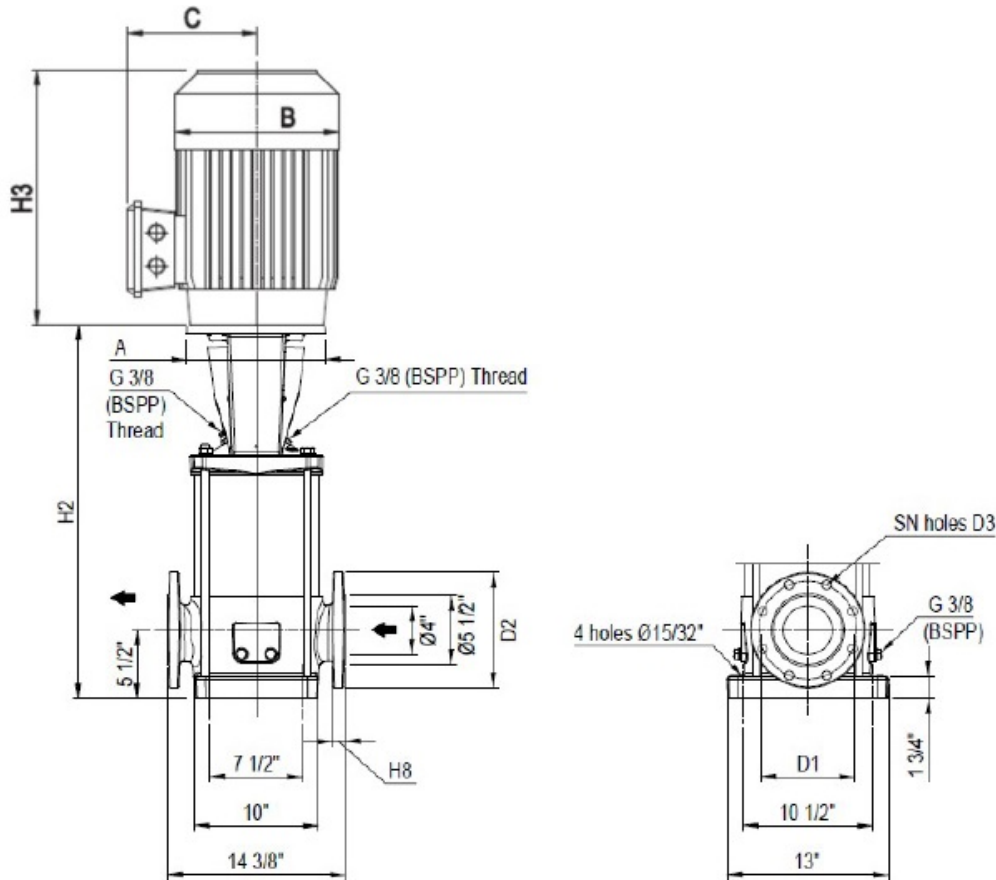
Customer	:	Quote number	: 750566
Customer reference	:	Pump Model	: EVMSUG64-1F1500D3S
Sales Order	: -	Quantity	:1
Job Name	: -	Date last saved	: 21 Dec 2025 10:27 AM
Pump Data			
Nominal Size	64	Discharge Size (in)	4"
Max Working Pressure (PSI)	230	Suction Size (in)	4"
Liquid Temperature Range	-22° - 248°F	Pipe Connection	F- #150 Round ANSI Compatible Flange
Pump Weight (lbs)	319		
Pump Materials of Construction			
Impeller	AISI 304	O-Ring	FPM
Intermediate Casing	AISI 304	Outer Casing	AISI 304
Liner Ring	AISI 304	Motor Bracket	Cast Iron
Bottom Casing	Cast Iron	Tie Rod	AISI 431
Casing Cover	AISI 304	Coupling	Cast Iron
Shaft	AISI 304	Base	Cast Iron
Shaft Sleeve Bearing	Tungsten Carbide		
Mechanical Seal and Ball Bearing Data			
Type	-	Elastomers	FPM
Rotating Part	SiC	Compression Ring	AISI 316
Stationary Part	Carbon	Collar	AISI 316
Motor Data			
Type	NEMA TC Frame	Synchronous Speed (RPM)	3500
Horsepower	15	Phase	Three
Enclosure	ODP	Voltage	230/460
Frame Size	215TC	Service Factor	1.15
Hertz	60	Current (A)	35.0/17.5

General Arrangement

EBARA Stainless Steel Vertical Multistage Pump

Dimensions

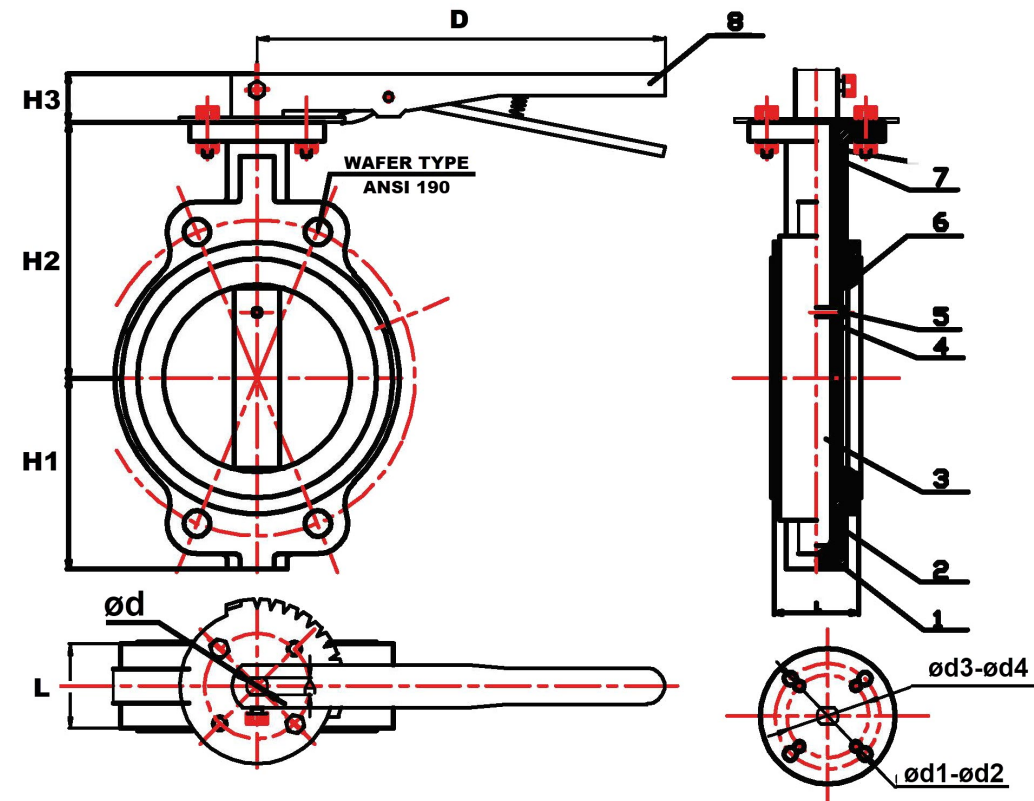
Model: EVMSUG64-1F1500D3S



Max PSI	HP	NEMA Frame Size	-	A	B	C	H2	H3	D1	D2	D3	H8	SN
230	15	215TC	-	9.19	9.81	7.94	25.81	16.88	7.50	9.00	0.69	0.94	8

NOTES:

- Dimensions are in inches

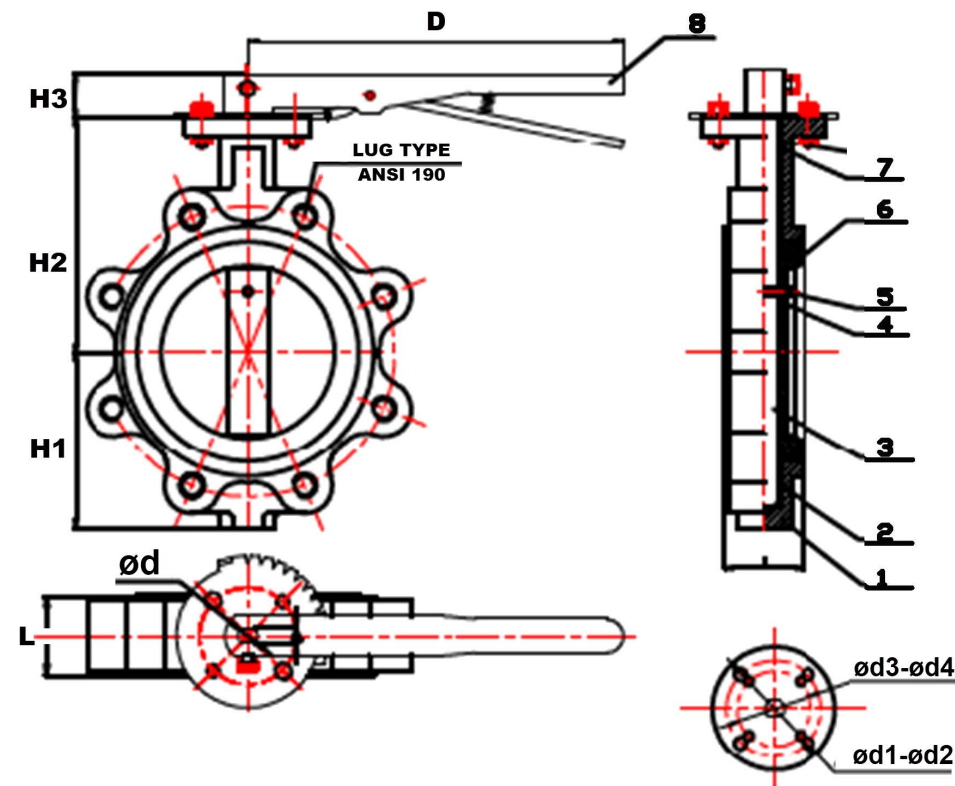


NO.	Part Name	Qty.	Material
1	BODY	1	D.I. Epoxy Coating
2	LONG BUSHING	3	PTFE
3	SHAFT	1	S.S. 316 S.S. 416
4	DISC	1	S.S. 316 C95400 DI
5	PIN	1	S.S. 316
6	SEAT	1	EPDM
7	SHORT BUSHING	1	PTFE
8	LEVER	1	D.I. Epoxy Coating

2-6"

NO.	Part Name	Qty.	Material
1	BODY	1	D.I. Epoxy Coating
2	LONG BUSHING	3	PTFE
3	SHAFT	1	S.S. 316 S.S. 416
4	DISC	1	S.S. 316 C95400 DI
5	PIN	2	S.S. 316
6	SEAT	1	EPDM
7	SHORT BUSHING	1	PTFE
8	LEVER	1	D.I. Epoxy Coating

8-12"



SIZE	H2	H1	H3	L	Ød	A	Ød1xn-Ød2	Ød3xn-Ød4	D	PSI Rating
2"	6.375	3.25	1.25	1.625	0.5	3/8	Ø2-3/4x4-Ø3/8		10.5	200 psig
2.5"	6.875	3.75	1.25	1.75	0.5	3/8	Ø2-3/4x4-Ø3/8		10.5	200 psig
3"	7.125	4	1.25	1.75	0.5	3/8	Ø2-3/4x4-Ø3/8		10.5	200 psig
4"	7.875	4.875	1.25	2.0625	0.625	1/2	Ø2-3/4x4-Ø3/8		10.5	200 psig
5"	8.375	5.375	1.25	2.125	0.75	9/16	Ø2-3/4x4-Ø3/8		10.5	200 psig
6"	8.875	5.875	1.25	2.1875	0.75	9/16	Ø2-3/4x4-Ø3/8		10.5	200 psig
8"	10.25	7.125	1.75	2.375	0.875	11/16	Ø4-15/16x4-Ø9/16	Ø4x4-Ø7/16	13.875	200 psig
10"	11.5	8.25	1.75	2.625	1.125	7/8	Ø4-15/16x4-Ø9/16	Ø4x4-Ø7/16	13.875	200 psig
12"	13.25	9.75	1.75	3	1.25	15/16	Ø4-15/16x4-Ø9/16		13.875	200 psig

- ☐ SUBMITTAL DRAWING
- ALL DIMENSIONS (XX) ARE FOR REFERENCE ONLY
- DO NOT SCALE DRAWING
- ☒ MANUFACTURING DRAWING
- LINEAR TOLERANCE ±1/4"
- ANGULAR TOLERANCE ±5°
- DO NOT SCALE DRAWING
- ALL DIMENSIONS ARE IN INCHES
- DIMENSIONS ARE PER ANSI Y14.5

SHEET DESCRIPTION:

2"-12" Centerline BFV

NOTICE:

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND IT SHALL NOT BE USED OR REPRODUCED OR ITS CONTENTS DISCLOSED, IN WHOLE OR IN PART, WITHOUT THE PRIOR CONSENT OF PREMIERFlow.

	NAME	DATE
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APPROVED BY:	E. KUREK	4/13/2021
CHECKED BY:	B. Bolte	4/13/2021

PREMIER *flow*

6023 North Yorktown Avenue
Tulsa, OK 74130

PHONE: (918) 346-6312
WEB SITE: www.premier-flow.com

DESCRIPTION: APC Butterfly Valve Dimensions

Listing: NSF/ANSI/CA-61/372 Listed

PROJECT: Standard Butterfly

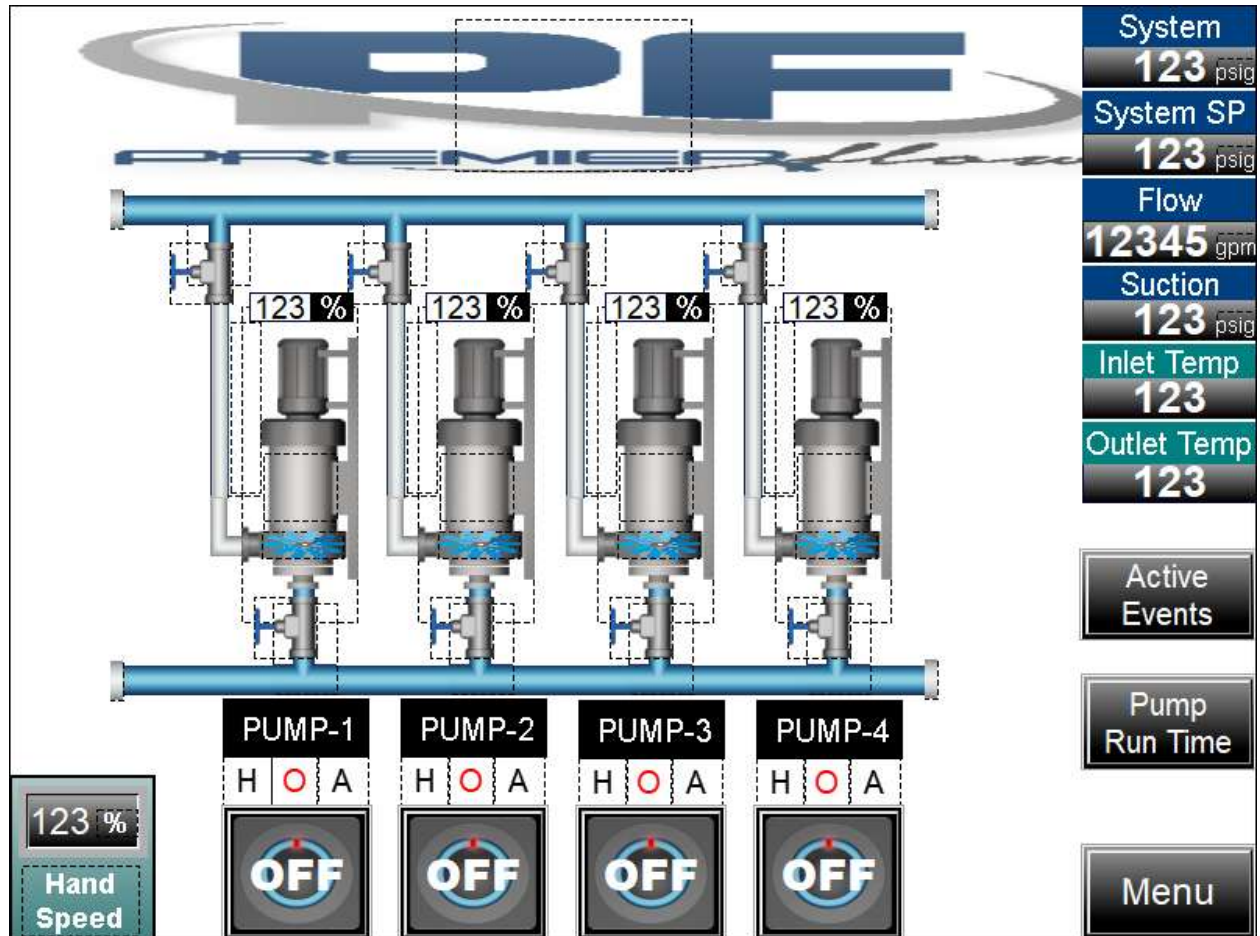
REV 1

SHEET of SHEETS: 1/1

Manufacturer: MG-01

APC

Domestic Water Booster Package



6023 N Yorktown Ave

Tulsa, OK 74130

918-346-6312

www.premier-flow.com

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1 Introduction:

The standard PREMIERflow Model PF-VFD controller provides automatic pump operation for one to six booster pumps. Each pump has a variable frequency drive. Controller continuously changes pump speed as required to maintain the system pressure set point.

The system is controlled by a Delta Electronics DVP PLC and a color touchscreen Human Machine Interface (HMI). PLC monitors pressure via pressure transducers on both the suction and discharge of the system and adjusts accordingly to maintain system pressure setpoint. The suction transmitter monitors package inlet conditions and helps protect pumps from dry run conditions. Package includes a flow meter which allows pumps to be staged ON based on pressure OR flow. Lag pumps stage OFF based on pressure AND flow (both pressure and flow set points must be met for Lag pumps to stop). This prevents Lag pumps from short cycling while flow is present. It also insures the lead booster pump continues to run until demand is within the jockey pump design capacity.

2 Sequence of Operation:

This system is designed to maintain water system pressure under a variety of flow conditions. Pumps are automatically sequencing based on system pressure and flow (if flow meter is present). Equally sized pumps running in parallel, run at the same speed.

2.1 Hand Mode:

Each pump can be run manually from either the HMI or the VFD keypad. With all VFD keypads in auto, change a pump HOA on the touchscreen HMI to Hand and pump will ramp to the Hand % speed setting. Touch the Hand speed setting to change the speed. Pumps running in hand will respond to the setting change immediately.

To manually operate a pump from the VFD keypad, press the Hand button and increase / decrease speed using the up and down arrow keys. Press Stop to shutdown a pump running locally in Hand.

Hand operation whether from the HMI touchscreen or the VFD keypad overrides all system safeties. Therefore, it should only be used for maintenance or emergency situations. Hand operation is not meant for unattended operation. Doing so could result in damage to pumps

and / or the water distribution system. The owner assumes all operational responsibility while pumps are running in Hand.

2.2 Auto Mode:

A pump is considered available to run automatically while both the touch screen and VFD HOAs are in AUTO, and no fatal alarms exist. Fatal alarms include low suction, high system pressure, high flow, pressure sensor failure (suction / system) and pump failure. See the Alarm section below for further details on alarms. While reviewing normal Auto operation, it is assumed no alarms exist and all pumps are available to run automatically.

2.2.1 Jockey Pump Operation

The jockey pump (lead) starts when system discharge pressure drops below the lead start set point for the ON-delay period. Lead pump VFD immediately ramps the motor to the initial starting speed setting. A time delay allows the pump to reach this speed before additional speed changes are made. The initial starting speed is the speed required to produce the system design pressure at zero flow. To determine this setting, deadhead the pump and manually increase VFD speed until the design pressure is achieved. The speed at which this occurs is the initial speed setting. Once the lead pump has time to reach this speed, pressure controls automatically adjust pump speed as required to maintain the system pressure setpoint. The lead pump will not stop until pressure control reduces pump speed to the initial speed setting or less. When this occurs the lead pump continues to run for the OFF-delay time and stops.

When the jockey pump HOA is OFF or is not available, the lead pump alternates between the two booster pumps. If HOAs for jockey pump and both boosters are OFF, the high service pump becomes the lead pump.

2.2.2 Booster Pump Operation

The first booster (Lag) starts when system flow exceeds jockey pump capacity OR system pressure falls below the Lag start pressure for the ON-delay period. Typically, Lag pump flow setpoint is the jockey pump design flow plus 5 gpm. The booster pump continues to run until BOTH system pressure AND flow are equal to or less than the stop setpoints for the OFF-delay period.

As flow increases to the Lag2 flow setpoint OR system pressure falls below the Lag2 start pressure setpoint the second booster pump starts after the ON-delay period. Both boosters are running together at the same speed. Speed automatically modulates as required to maintain the system pressure setpoint (Lead pump stop pressure set point). Both booster continue to run together until BOTH the flow is less than the Lag2 setpoint and the Lag2 stop

pressure setpoint is met for the OFF-delay period. The Lag2 booster stages OFF. Lag booster continues to run until BOTH system flow AND pressure setpoints are satisfied.

2.2.3 High Service Pump Operation

When system flow exceeds the Lag3 setpoint OR system pressure is less than the Lag3 setpoint the High Service Pump starts after the ON-delay. All boosters stop. High service pump immediately ramps to its initial speed setting. After this speed is reached, pump speed ramps up and down as required to maintain system pressure.

As system flow falls below the Lag3 setpoint, flow is now within the capacity of the two booster pumps and the high service pump stages OFF. Booster pumps start and resume providing water to the system.

High service pump provides water during high flow events such as system flushing and will seldom run. During long periods of no use, it is automatically exercised to maintain and prove operability. Exercise settings include days since last run, exercise speed and duration. These settings are found on the pump start / stop settings screen and are readily adjustable. If the high service pump fails to run during an exercise routine, a pump failure alarm is generated. This failure alerts operators to the need for maintenance and service.

2.3 Pump Alternation

Three alternation options are provided for booster pumps. These options are found on the pump alternation settings screen and include:

- Manual
- Auto
- Timed

Manual mode maintains the same lead booster pump until an operator selects the ALTERNATE button on the alternation settings screen. Auto mode alternates lead boosters each time all boosters stop (pumps 2 and 3). If pump 2 starts first, after all boosters stop, pump 3 starts first next time.

In applications where a booster pump runs for long periods, the timed mode insures regular lead alternation. Timed alternation provides three options: daily, weekly or monthly. When daily alternation is selected, lead pump will alternate at the time specified each day. Weekly alternation allows alternation to occur on a specified day of the week and time. Monthly alternation occurs during the first week of the month on the day and time specified. If the current lead pump is running at the time of alternation, the new lead pump starts and ramps to speed, before the original lead is stopped. If the new lead were to fail to run, the current

lead pump continues to run as system flow requires. Timed alternation still occurs even if no booster pumps are running.

Regardless of alternation mode, pumps will not alternate if the new lead pump is not auto available. The new lead must be in Auto at the touchscreen and not in a failed state. Otherwise, the current lead pump continues to run as required to satisfy system flow conditions.

3 System Alarms

System alarms protect the pump package and water system, while alerting operators to abnormal conditions that could need attention. These include the following:

- High System pressure
- Low system pressure
- Low suction pressure
- High flow
- Pump failure
- Sensor failure
 - System pressure
 - Suction pressure
 - Flow meter

System status screen lists all active alarms and provides buttons for operators to Acknowledge (silence alarm horn) and/or Reset. All alarms have user adjustable setpoints and delays on the alarm settings screen. Manual and automatic reset options are provided when applicable. Manual reset maintains the alarm condition until an operator resets it at the touchscreen HMI. Auto reset, resets the alarm once the alarm condition no longer exists for the OFF-delay period.

3.1 System Pressure Alarms

System pressure alarms protect the system from damage and alert operators when system pressures do not satisfy minimum requirements.

High pressure alarm protects the water distribution system piping. When pressure is equal or greater than the high pressure setpoint for the ON-delay period, a high system pressure alarm is generated. This alarm shuts down all pumps (jockey, booster, and high service) immediately and prevents them from starting.

Low pressure alarm alerts operators when system pressure is near or below minimum system requirements. Depending on the setting, this alarm could identify the need for a boiled water notice for customers. It also makes operators aware of a water delivery problem, due to pump or transmitter failures.

Both of these high and low pressure alarms are provided with Manual / Auto reset options. Manual option requires an operator to acknowledge and reset the alarm at the HMI touch screen. Auto reset option, resets the alarm once pressure had returned to a normal range for the specified OFF-delay period.

3.2 Suction Pressure Alarm

Suction pressure alarm is provided to protect pumps from cavitation and dry run conditions. Low suction alarm is generated when suction pressure is less than or equal to setpoint for the ON-delay period. It is a fatal alarm that shuts down all pumps and prevents them from starting.

This alarm is provided with a Manual / Auto reset option. Manual option requires an operator to acknowledge and reset the alarm at the HMI touch screen. Auto reset option, resets the alarm once pressure had returned to a normal range for the specified OFF-delay period.

3.3 High Flow Alarm

High flow alarm is provided to help detect a major rupture in distribution system piping. Alarm setting should be hundreds of gpm higher than the maximum system design flow. If flow exceeds this setpoint for the ON-delay period, a high flow alarm is generated and all pumps are shut down and prevented from starting.

Due to the intended purpose of this alarm (detecting a catastrophic system failure), auto reset is not provided. High flow alarm must be reset manually. This gives operators the opportunity to review the system for damage prior to resetting. If this feature isn't desired, the setpoint should be set to the maximum range, 9999.

3.4 Pump Failure Alarm

When a pump is automatically commanded to run and doesn't, it is tagged as failed. Pump run status is verified via the VFD running dry contact. Once a pump is failed, it is excluded from the automatic start / stop routine until this alarm is reset.

Possible causes of this alarm include the following:

- VFD is not powered up.
- VFD is not in AUTO.
- VFD has a fault.
- Loose run command wiring.
- Loose run feedback wiring.

3.5 Sensor Failure Alarms

This package includes three analog sensors: system pressure, suction pressure, and system flow. Each provide 4-20mA feedback to the control system. A sensor failure alarm is generated when a signal is less than 3.5 mA or greater than 20 mA. These alarms alert operators to a potential transmitter failure or loose wire. Each alarm automatically resets when the respective signal returns to the normal 4-20mA range.

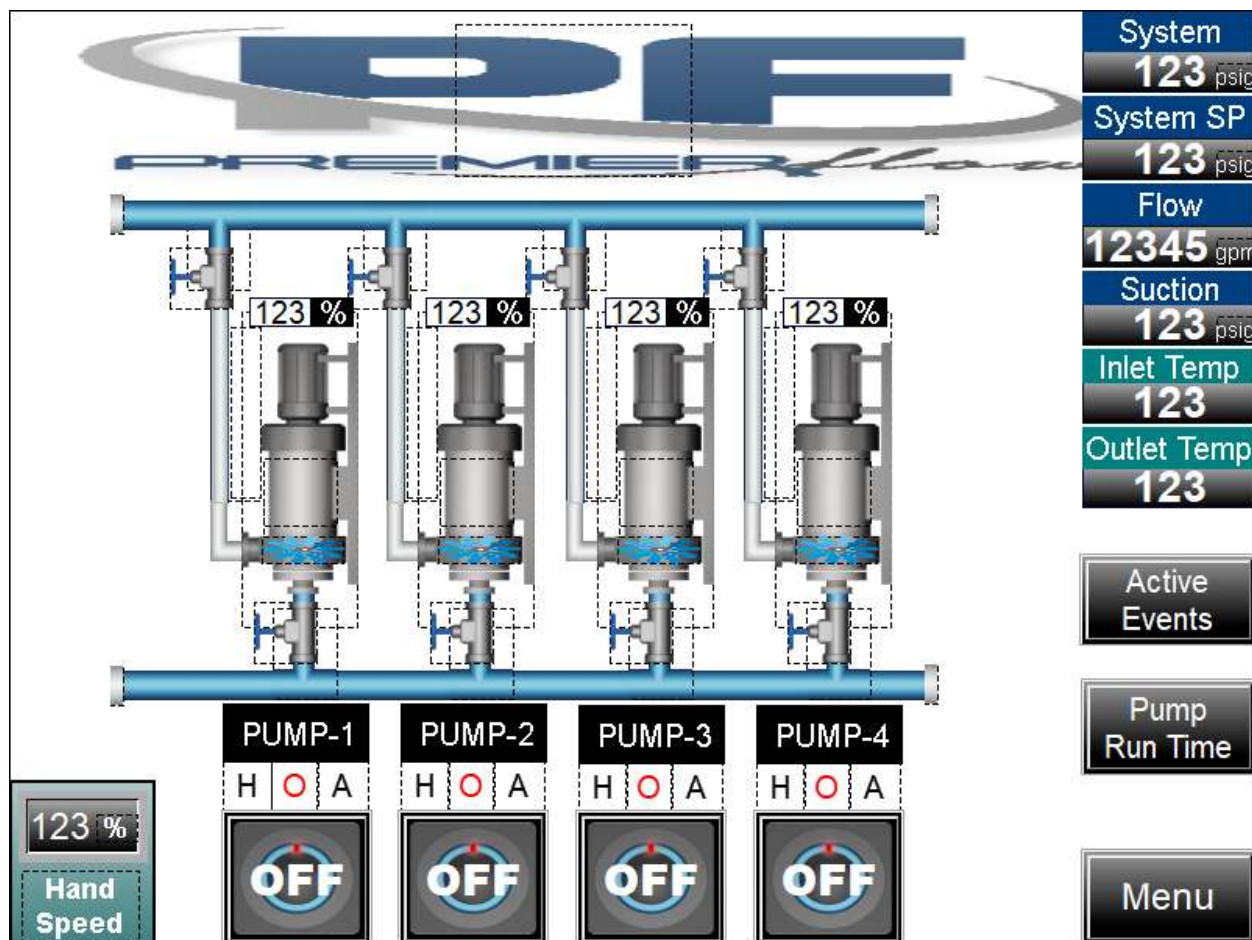
Both the system and suction pressure failure alarm shut down all pumps and prevent automatic starting. Pumps can be ran in hand from HMI or VFD keypads.

Flow meter failure is not a fatal alarm and does not shut down pumps. It does disable pump flow sequencing. Pumps will continue to start and stop as needed, however, pumps will tend to short cycle due to the absence of flow feedback.

4 Operating Screens

This section contains typical screen shots from the touch screen operators panel (HMI).

4.1 Main Screen



This is the main system operating screen.

- All HOA are shown in the OFF position. Touch to change.
- Red triangle indicates Jockey Pump 1 has failed to run. Select “Active Event” to reset.
- “Exercise” label means the Hi Service pump exercise route is active.
- Select Hand Speed to change pump hand operating speed.
- “Active Events” button opens summary screen of all active conditions.
- Menu button opens the main menu screen.

4.2 Pump Run Times

The screenshot shows a control interface titled "Pump Run Time". It contains a table with 4 rows, each representing a pump. Each row has a pump number, a run time value, and a "RESET" button. The run time for all pumps is 12345678.9 hrs. At the bottom of the screen, there are four buttons: "Back", "HH:MM:SS", "mm/dd/yy", and "Main".

Pump	Run Time	RESET
1	12345678.9 hrs	RESET
2	12345678.9 hrs	RESET
3	12345678.9 hrs	RESET
4	12345678.9 hrs	RESET

Back HH:MM:SS mm/dd/yy Main

Display shows the actual pump run time. Run time is based on the VFD running contact. It includes run time for both PLC commanded and local run commands at the VFD.

Touch a reset button to clear the time register for the respective pump.

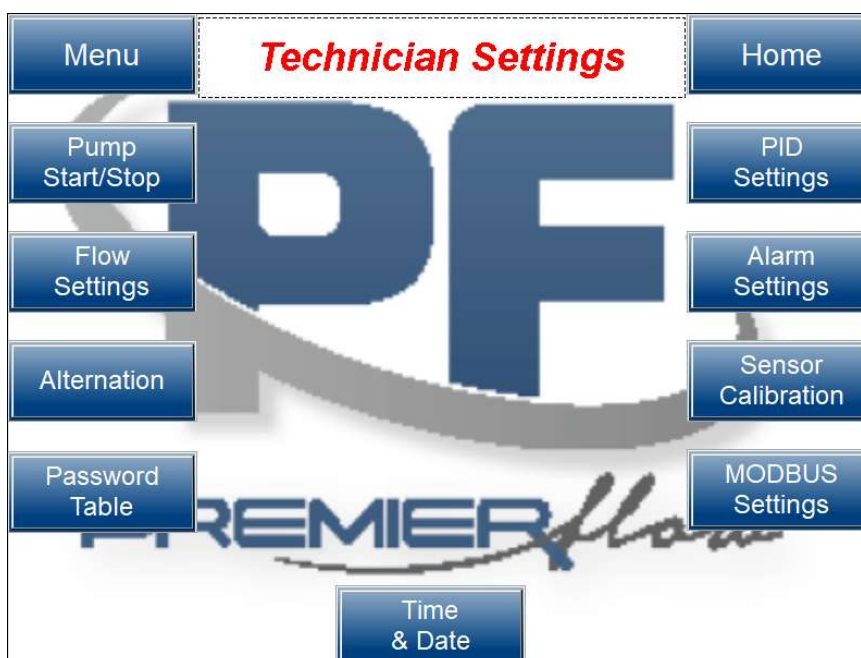
4.3 Menu Screens

Two menu screens are provided. The main menu screen is available to anyone touching the screen. The Technician menu screen requires a password to access and provides access to password protected system settings.

4.3.1 Main Menu



4.3.2 Technician Menu



4.4 Pump Start / Stop Settings

Pump Start/Stop Settings					
	Start Pressure (0-999 psig)	Stop Pressure (0-999 psig)	Start / Stop Flow (0-9,999 gpm)	Start Delay (0-999 sec)	Stop Delay (0-999 sec)
LEAD	123	123		123	123
LAG1	123	123	1234	123	123
LAG2	123	123	123	123	123
HI Service	123	123	123	123	123

Exercise HI Service Pump

Exercise Now

Max days between runs

123 days

Duration of Run

123.4 sec

Exercise Speed

123 %

Back

HH:MM:SS

mm/dd/yy

Menu

Screen provides overview of all pump start / stop settings including the exercise HI service pump routine. Touch any number to change the setting.

4.5 Fault (Alarm) Settings

Main Menu		Fault Settings			Return	
	Activation	Reset	On Delay 0-999 Sec	Stop Delay 0-999 Sec		
Low Discharge (PSI)	123		123			
High Discharge (PSI)	123	Manual	123	123		
Low Suction (PSI)	123.4	Manual	123	123		
High Level (FT)	123.4	Manual	123	123		
Float Switch Suction Bypass	No					
Pump Failure Delay			123			

Screen provides overview of all alarm settings. Touch any number to change the setting.

4.6 Pump Alternation

Three modes of pump alternation are provided. Two screens are provided for setup. The alternation mode is selected on the first screen. The second screen only applies to the Timed (Monthly/Weekly/Daily) alternation option.

4.6.1 Alternation Mode

Main Menu	Alternation		Return
Auto (Default)	Off		
Monthly/Weekly/Daily	Off	M/W/D Setup Screen	
Manual	Off	Change Lead	
		Current Lead Pump	1

Touch the button shown as “Off” in the middle column to select an alternation mode. The options are “Auto,” “Monthly/Weekly/Daily” (Timed), and “Manual.”

Please refer to the Alternation section of the sequence of operation for additional details.

4.6.2 Timed Alternation Settings (M/W/D Setup Screen)

Main Menu		Monthly/Weekly/Daily Alternation		Return	
Monthly - (1st wk of mo.) Select Day	Off	Day of Wk. (Monday=1)	1		
Weekly Select Day	Off	Day Selected			
Daily Select Time of Day	Off	12	:	12	
		HH	:	MM	
		HH:MM:SS mm/dd/yy			

Touch the button shown as “Off” in the middle column to setup timed alternation mode. The options are “Monthly”, “Weekly”, and “Daily.”

- Daily alternation requires a time entry (24hr clock).
- Weekly alternation requires a time and day of week (1= Monday ... 7= Sunday).
- Monthly alternation also requires a time and day. Monthly alternation occurs the first week of each month on the corresponding weekday and time.

Please refer to the Alternation section of the sequence of operation for additional details.

4.7 Speed Control

The screenshot shows the 'Speed Control' screen with the following settings and status:

Parameter	Value	Unit
Initial Jockey Speed	12.3	%
Initial Booster Speed	123.4	%
Initial Hi Serv Speed	123.4	%
Integration Time	12.3	sec
Power UP Start Delay	12.3	sec
No Flow Speed (Req Boost @ no flow)	12.3	%
Min Speed	12.3	%
Deadband (SP +)	12.3	psi
Flow	12345	gpm
PV System	123	psig
SP System	123	psig
Output	123.4	%

Below the settings, there is a table for Error and Response:

Error (psig)	Response (% Speed Chg)
12.3	Fine
12.3	Normal
12.3	Coarse

At the bottom, there are buttons for 'Back', 'Main', and a date/time display showing 'HH:MM:SS' and 'mm/dd/yy'.

Settings on this screen control the system speed response. Upper left box has settings for the initial speed for the jockey, boosters and hi service pumps. When each of these pump start, these are the speed commands.

Jockey pump initial speed should be the speed required to produce the system pressure set point at no flow. The initial booster speed is the speed required to produce the same flow as the jockey at 100% speed. Hi serv initial speed setting is provided to provide a softer transition from booster pumps to the larger Hi Service pump.

- Integration time is the minimum time between speed changes. (typically 1s)
- Power up delay allows system to avoid start attempts during power outages / brown out on/off short cycles.
- No flow speed is the same as the jockey pump initial speed setting.
- Minimum speed is the lowest speed a pump is allowed to run. This setting should be less than all initial speed settings.
- Deadband is pressure range +/- the setpoint in which no speed changes are made.

- Error is the difference between the setpoint and actual pressure minus the deadband. Three error levels are provided. Typical settings are:
 - Error (Fine level) = 5 psi
 - Normal Error Level = 15 psi
 - Coarse Error Level = 25 psi
- Response is the speed change made each integration cycle for each error level. Typical settings are:
 - Fine response = 0.5 %.
 - Normal response = 3%.
 - Coarse response = 5%.

4.8 Sensor Calibration

Menu		Sensor Calibration		Return	
*Touch Each Number to Change					
Level Sensor Range (0-99 PSI)	123.4	Level Sensor Present			
Discharge Sensor Range (0-999 PSI)	123				
Number of Pumps Present (0-4)	1	Lead Pump Allowed to Stop			
Water Present Switch	No				
Maximum Output Speed (0-100%)	123				
Incoming Temperature Transmitter Range (f)	123	No Incoming Temperature Transmitter Present			
Outlet Temperature Transmitter Range (f)	123	No Outlet Temperature Transmitter Present			

Screen shows max range for each sensor. Touch number to change range for a respective sensor.



- 3Ø 230V:1.0HP~125HP
- 3Ø 460V:1.0HP~800HP
- 3Ø 575V:1.0HP~125HP

Significant Energy Savings With LS Drive Solutions

The H100+ Drive was developed to build an environment-friendly system that realizes significant energy savings in the commercial and industrial field of fans/pumps and water treatment applications based on leading drive solutions.



System Protection

To protect your pump and application, the following functions are provided for users: Soft Fill; start and stop slope adjustment; valve deceleration time setting; multi-motor control; and underload detection, pipe broken, pump clean



Optimized for HVAC and Water Treatment

User-friendly functions for convenient use of fans/pumps such as Fire mode, Lead lag, auxiliary motor PID compensation and load tuning.



Applications

- Building • Metal • Pulp/paper • Coal mine
- Oil/gas and water treatment; (fan/pump, dryer)

Product Type & Model

LSLV 0008 H100 - 4 C O F N(PLUS)

LS Low Voltage Drive Series

Motor Capacity
0008: 0.75kW~5000: 500kW

Series Name

Input Voltage
2: 3Ø 200~240 (V)
4: 3Ø 380~480 (V)
5: 3Ø 525~600 (V)

Keypad Type
C: LCD Keypad

UL Type
O: UL Open
E: UL Type1

EMC Filter
F: Built-in EMC
N: Non EMC

Reactor
D: Built-in DC Reactor
N: Non DC Reactor
PLUS: Sub Series Name



Main Features

Features	Description	Benefits
HVAC-only Features	Multi Motor Control, PID operation, flow (flux) compensation, scheduling operation, lead-lag function	Optimized operation for HVAC applications
Fan/Pump Protection Features	Protective functions include Soft Fill; valve deceleration time setting; pump clean; pipe breakage level detection; Underload Detection; lubrication Fire Mode	Support for optimized fan/pump system performance; extended life of machinery with load; and reduced maintenance cost
Built-in EMC Filter	400V 5.5~30kW, 110~500kW built-in(C3) 400V 37~500kW built-in option (C3) ※ With a filter, 75~90kW meets the EMC standard	Reduced electromagnetic noise and additional space and cost for parts unnecessary
Various Field Networks	RS-485 and BACnet network support for general HVAC system; Modbus-RTU, Metasys N2 and LonWorks options	Connectable with all widely-used field networks; simple maintenance of option cards and easy mounting
Reduced Product Size and Side-by-Side Installation	The product size is reduced up to 60% of its original size; simple replacement of cooling fans; installation span between products is about 2mm	Reduced installation area; and when installing multiple motors, the control panel size is significantly reduced
DC Reactor	400V 37~500kW products have a built-in DC reactor	Improved power factor; and THD reduction
Global Standard Requirement	UL Plenum-Rated; obtained a certificate of new UL 61800-5-1 (improved quality of insulation distance)	Product reliability enhanced as it meets the new global standard

Control

Control Mode	V/F control, Slip compensation
Frequency Setting Resolution	Digital command: 0.01Hz Analog command: 0.06Hz (based on 60Hz)
Frequency Level	1% of the peak output frequency
V/F Pattern	Linear, square torque reduction, user V/F
Overload Tolerance	0.75~90kW rated current: 120% 1min 110~500kW rated current: 110% 1min
Torque Boost	Passive torque boost; auto torque boost

Operation

Operation Mode	Keypad, Terminal block, Communication network options		
Frequency Setting	Analog method: -10 ~ 10V, 0 ~ 10V, 0 ~ 20mA Digital method: keypad, pulse train input		
Operation Function	PID control; 3-wire operation; frequency limit; secondary function; forward/backward rotation prohibited; power switch; speed search; power brake; leakage-reduced operation; up-down operation; DC braking; frequency jump; slip compensation; auto restart; auto tuning; energy buffering operation; flux braking; energy saving operation		
Input	Multifunctional Terminal (7 inputs)	PNP(Source), NPN(Sink) options According to the parameter setting of IN-65~71 codes, the following functions can be set. Forward operation; reset; emergency trip; switching frequency – high/middle/low; DC braking upon stop; frequency increase; 3-wire operation; acceleration or deceleration stop; MMC interlock; backward operation; external trip; job operation; acceleration/deceleration by stage – high/middle/low; second motor option; frequency decline; analogue command fixed frequency; switching to the general operation during PID operation; Pre Heat; pump cleaning; RTC (time event function)	
	Pulse Train	0~32kHz, Low Level: 0~0.8V, High Level: 3.5~12V	
Output	Multifunctional Open Collector Terminal		DC26V, 50mA or below
	Fault Relay Terminal	Fault output and drive operation mode output	N.O.: AC 250V, 2A or below; DC 30V, 3A or below N.C.: AC 250V, 1A or below; DC 30V, 1A or below
	Multifunctional Relay Terminal		AC250V, 5A or below, DC30V, 5A or below
	Analog Output	0~12Vdc(0~20mA): Frequency, output current, output voltage, DC voltage options	
	Pulse Train	Up to 32kHz, 0~12V	

H100+

Fan & Pump Drive

Three Phase 200 ~ 240 VAC (-15% ~ +10%)

UL Three Phase Ratings				UL Single Phase Ratings		Model Number	Order Code	Dimensions(in) W X H X D	Approx. Weight (lbs.)	
Normal Duty(VT) 120%(~125HP) / 110%(150~800HP) for 60 seconds		Heavy Duty(VT)120% for 60 seconds		Normal Duty(VT) Single Phase Output						
HP	Output Current	HP	Output Current	HP	Amps					
1	5	0.5	2.5	0.5	2.9	LSLV0008H100-2CONN(PLUS_NEW)	67300001PL	6.3 X 9.1 X 7.1	7.3	
2	8	1	5	1	4.4	LSLV0015H100-2CONN(PLUS_NEW)	67300002PL			
3	12	2	8	1.5	6.4	LSLV0022H100-2CONN(PLUS_NEW)	67300003PL			
5	16	3	11	2	8.4	LSLV0037H100-2CONN(PLUS_NEW)	67300004PL			
7.5	22	5	17	3	11	LSLV0055H100-2CONN(PLUS_NEW)	67300005PL			
10	30	7.5	24	5	16	LSLV0075H100-2CONN(PLUS_NEW)	67300006PL			
15	42	10	32	5	23	LSLV0110H100-2CONN(PLUS_NEW)	67300007PL			
20	56	15	46	7.5	30	LSLV0150H100-2CONN(PLUS_NEW)	67300008PL	7.1 X 11.4 X 8.1	10.1	
25	69	20	60	10	37	LSLV0185H100-2CONN(PLUS_NEW)	67300009PL	8.7 X 13.8 X 8.8	15.6	
30	82	25	68	15	45	LSLV0220H100-2COND(PLUS_NEW)	67360010PL	10.8 X 17.7 X 11.2	55.8	
30	82	25	68	15	45	LSLV0220H100-2COFD(PLUS_NEW)	67360011PL			
40	110	30	81	20	58	LSLV0300H100-2COND(PLUS_NEW)	67360012PL	12.8 X 20.1 X 11.2	72.5	
40	110	30	81	20	58	LSLV0300H100-2COFD(PLUS_NEW)	67360013PL			
50	142	40	106	25	78	LSLV0370H100-2COFD(PLUS_NEW)	67360014PL	12.8 X 21.7 X 12.2	86.4	
60	169	50	136	30	92	LSLV0450H100-2COFD(PLUS_NEW)	67360015PL			
75	223	60	169	40	122	LSLV0550H100-2COFD(PLUS_NEW)	67360016PL	11.8 X 27.8 X 15.2	118.2	
100	264	75	195	50	145	LSLV0750H100-2COFD(PLUS_NEW)	67360017PL			
125	325	100	255	60	178	LSLV0900H100-2COFD(PLUS_NEW)	67360018PL	15.0 X 27.8 X 15.6	159.2	

Three Phase 380 ~ 480 VAC (-15% ~ +10%)

UL Three Phase Ratings				UL Single Phase Ratings		Model Number	Order Code	Dimensions(in) W X H X D	Approx. Weight (lbs.)	
Normal Duty(VT) 120%(~125HP) / 110%(150~800HP) for 60 seconds		Heavy Duty(VT)120% for 60 seconds		Normal Duty(VT) Single Phase Output						
HP	Output Current	HP	Output Current	HP	Amps					
1	2.5	0.5	1.3	0.5	1.6	LSLV0008H100-4COFN(PLUS_NEW)	67310025PL	6.3 X 9.1 X 7.1	7.3	
2	4	1	2.5	1	2.4	LSLV0015H100-4COFN(PLUS_NEW)	67310026PL			
3	6	2	4.0	1.5	3.5	LSLV0022H100-4COFN(PLUS_NEW)	67310027PL			
5	8	3	5.5	2	4.6	LSLV0037H100-4COFN(PLUS_NEW)	67310028PL			
7.5	12	5	8	3	6.8	LSLV0055H100-4COFN(PLUS_NEW)	67310029PL			
10	16	7.5	12	5	9.2	LSLV0075H100-4COFN(PLUS_NEW)	67310030PL			
15	24	10	15	7.5	14	LSLV0110H100-4COFN(PLUS_NEW)	67310031PL		7.5	
20	30	15	22	10	17	LSLV0150H100-4COFN(PLUS_NEW)	67310032PL	7.1 X 11.4 X 8.1	10.1	
25	38	20	28	10	22	LSLV0185H100-4COFN(PLUS_NEW)	67310033PL		10.6	
30	45	25	35	15	26	LSLV0220H100-4COFN(PLUS_NEW)	67310034PL	8.7 X 13.8 X 8.8	16.5	
40	61	30	41	20	36	LSLV0300H100-4COFN(PLUS_NEW)	67310035PL			
50	75	40	55	25	39	LSLV0370H100-4COFD(PLUS_NEW)	67310012PL 67310036PL	10.8 x 17.7 x 11.2	57.3	
60	91	50	67	30	47	LSLV0450H100-4COFD(PLUS_NEW)	67310013PL 67310037PL			
75	107	60	81	40	55	LSLV0550H100-4COFD(PLUS_NEW)	67310014PL 67310038PL	12.8 x 20.1 x 11.2	77.2	
100	142	75	106	50	73	LSLV0750H100-4COFD(PLUS_NEW)	67310015PL			
125	169	100	136	60	86	LSLV0900H100-4COFD(PLUS_NEW)	67310016PL	12.8 x 21.7 x 12.2	94.8	
150	223	125	169	60	93	LSLV1100H100-4COFD(PLUS_NEW)	67310041PL			
200	264	150	195	75	101	LSLV1320H100-4COFD(PLUS_NEW)	67310042PL	11.8 x 27.8 x 15.2	123	
250	325	200	255	100	137	LSLV1600H100-4COFD(PLUS_NEW)	67310043PL			
300	370	250	303	125	137	LSLV1850H100-4COFD(PLUS_NEW)	67310044PL	15.0 x 27.8 x 15.6	164.7	
350	432	250	345	150	181	LSLV2200H100-4COFD(PLUS_NEW)	67310045PL			
400	481	300	375	150	218	LSLV2500H100-4COFD(PLUS_NEW)	67310046PL	17.3 x 36.3 x 17.3	264.6	
500	613	400	478	150	232	LSLV3150H100-4COFD(PLUS_NEW)	67310047PL			
550	683	450	541	200	245	LSLV3550H100-4COFD(PLUS_NEW)	67310048PL	23.6 x 39.4 x 19.7	409.0	
650	770	500	591	250	280	LSLV4000H100-4COFD(PLUS_NEW)	67310049PL			
800	962	650	740	350	361	LSLV5000H100-4COFD(PLUS_NEW)	67310050PL	30.6 x 41.5 x 19.7	584.2	

	Conduit Connection Box NEMA1 Enclosure	Flange Mount Kit Heat Sink Out the Back	Additional Data			Disconnect Switch Option	
	Order Code	Order Code	Keypad	Reactor	Filter	Model Number	Order Code
	64160002	64150016	Built-in LCD keypad	NO	NO	MMS-32H,8A & HANDLE,MEH32R,115,UL	64160028
						MMS-32H,13A & HANDLE,MEH32R,115,UL	64160029
						MMS-32H,17A & HANDLE,MEH32R,115,UL	64160030
						MMS-32H,22A & HANDLE,MEH32R,115,UL	64160031
						MMS-32H,32A & HANDLE,MEH32R,115,UL	64160032
						MMS-32H,40A & HANDLE,MEH32R,115,UL	64160033
						MMS-63H,50A & HANDLE,MEH63,115,UL	64160034
	64160003	64150017	Built-in LCD keypad	YES	Built-in EMC filter	MMS-100H,75A & HANDLE,MEH100,115,UL	64160035
	64160004	64150018				MMS-100H,90A & HANDLE,MEH100,115,UL	64160036
	64150010	64150019					
	64150011	64150020					
	64150012	64150021					
	64160020	64160015					
	64160021	64160016					

	Conduit Connection Box NEMA1 Enclosure	Flange Mount Kit Heat Sink Out the Back	Additional Data			Disconnect Switch Option	
	Order Code	Order Code	Keypad	Reactor	Filter	Model Number	Order Code
	64160002	64150016	Built-in LCD keypad	NO	Built-in EMC Filter	UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160037
						UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160038
						UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160039
						UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160040
						UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160041
						UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160042
						UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160043
	64160003	64150017	Built-in LCD keypad	Built-in DC Reactor	Built-in EMC Filter	UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160044
	64160004	64150018				UTS150LT FTU 50A 3P & HANDLE,REH2-S-12,UTS250	64160045
	64150010	64150019				UTS150LT FTU 60A 3P & HANDLE,REH2-S-12,UTS250	64160046
	64150011	64150020				UTS150LT FTU 80A 3P & HANDLE,REH2-S-12,UTS250	64160047
	64150012	64150021				UTS150LT FTU 100A 3P & HANDLE,REH2-S-12,UTS250	64160048
	64160020	64160015				UTS150LT ATU 125A 3P & HANDLE,REH2-S-12,UTS250	64160049
	64160021	64160016				UTS150LT ATU 150A 3P & HANDLE,REH2-S-12,UTS250	64160050
	64160022	64160017	Built-in LCD keypad	Built-in DC Reactor	NO	UTS250LT FTU 175A 3P & HANDLE,REH2-S-12,UTS250	64160051
	64160023	64160018				UTS250LT FTU 225A 3P & HANDLE,REH2-S-12,UTS250	64160052
	64160024	64160019					
					Built-in EMC Filter	NONE	

Three Phase 525 ~ 600 VAC (-15% ~ +10%)

UL Three Phase Ratings				Model Number	Order Code	Dimensions(in) W X H X D	Approx. Weight (lbs.)	
Normal Duty(VT)110% for 60 seconds		Heavy Duty(VT)120% for 60 seconds						
HP	Output Current (Amps)	HP	Output Current					
7.5	9	5	6.6	LSLV0055H100-5CEND(PLUS)	67320005PL	7.1X18.9X8.1	20.9	
10	12	7.5	9	LSLV0075H100-5CEND(PLUS)	67320006PL		21.2	
15	17	10	12	LSLV0110H100-5CEND(PLUS)	67320007PL		21.9	
20	23	15	17	LSLV0150H100-5CEND(PLUS)	67320008PL		22.1	
25	27	20	23	LSLV0185H100-5CEND(PLUS)	67320009PL		22.4	
30	34	25	27	LSLV0220H100-5CEND(PLUS)	67320010PL	8.7X21.7X8.8	31.5	
40	43	30	34	LSLV0300H100-5CEND(PLUS)	67320011PL		32.3	
50	55	40	43	LSLV0370H100-5COND(PLUS)	67320012PL	10.8X17.7X11.2	55.1	
60	64	50	55	LSLV0450H100-5COND(PLUS)	67320013PL	12.8X20.1X11.2	74.1	
75	80	60	64	LSLV0550H100-5COND(PLUS)	67320014PL		74.3	
100	104	75	80	LSLV0750H100-5COND(PLUS)	67320015PL	12.8X21.7X12.2	96.1	
125	128	100	104	LSLV0900H100-5COND(PLUS)	67320016PL		96.4	

Remote Cable with Keypad

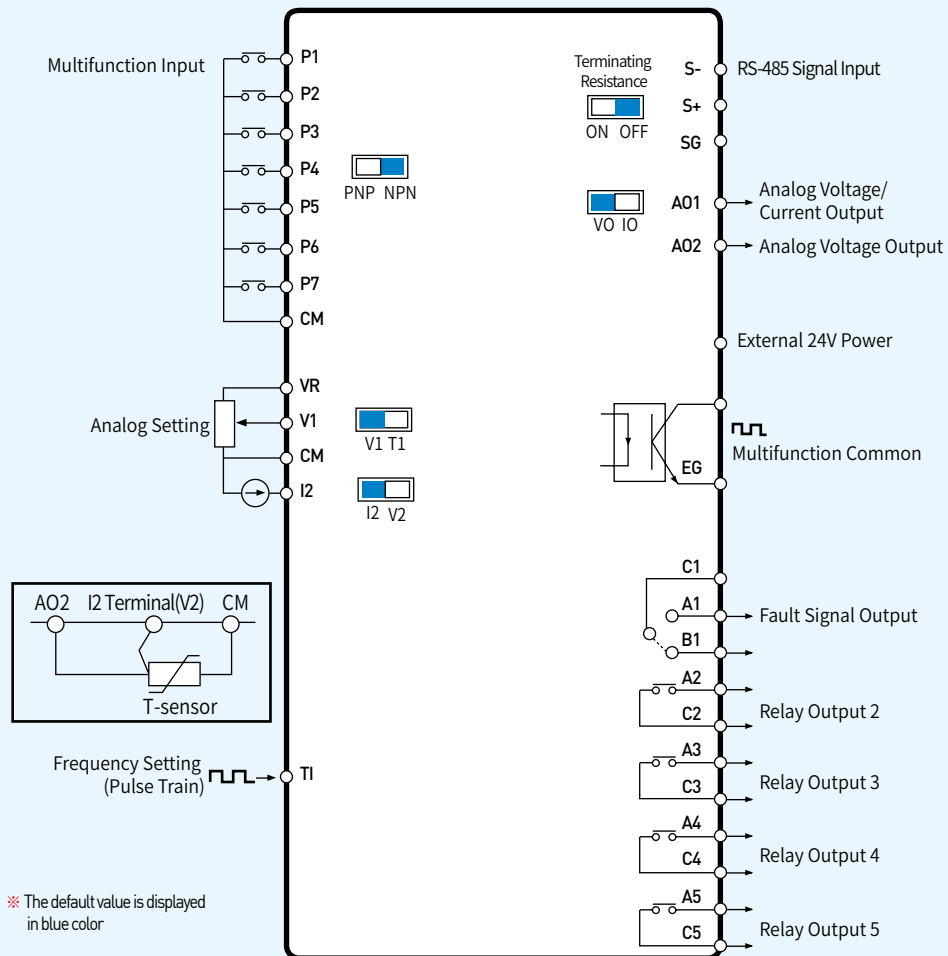
Length	Model Number	Order Code
6.6 ft	REMOTE 2M (LSLV-H100)	64110009PL
9.8 ft	REMOTE 3M (LSLV-H100)	64110010PL

Option

	Model Number	Order Code
LCD Keypad	OPTION (H100+ LCD LOADER), LCEN-H100PLUS	64160057PL
USB-RJ45 Cable	USB-RJ45 Cable for LSLV-H100	46310162
Extension I/O	Extension I/O for LSLV-H100	64160005
Lonwork	LonWorks for LSLV-H100	64160001
Ethernet IP & Modbus TCP	Ethernet IP & Modbus TCP for H100+ Series	64160056
BACnet IP, Ethernet IP & Modbus TCP	Ethernet IP & Modbus TCP for H100+ Series	64160058

	Conduit Connection Box NEMA1 Enclosure	Flange Mount Kit Heat Sink Out the Back	Additional Data			Disconnect Switch Option
	Order Code	Order Code	Keypad	Reactor	Filter	OrderCode
	Comes with conduit box as a standard	Not applicable	Built-in LCD keypad	Built into conduit option	Yes	None
				64150010		
	64150011	64150020		No		
	64150012	64150021				

Wiring



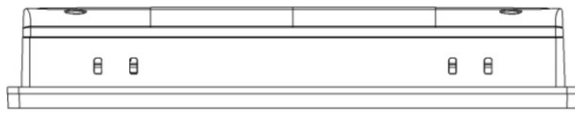
7.0" Touchscreen HMI with IIoT Features



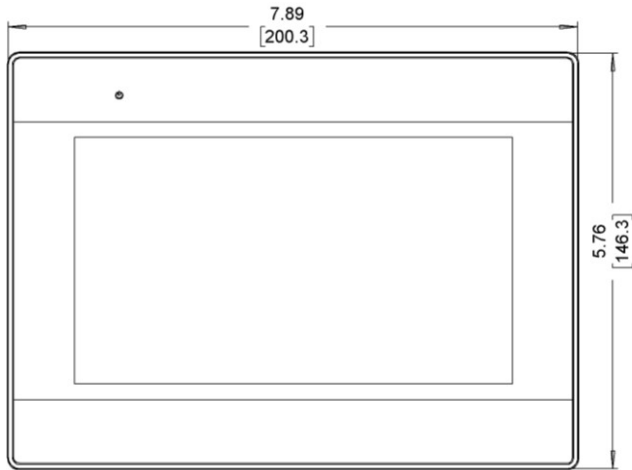
- High Speed Screen Update
- Dual Ethernet Ports
- Built-in Edge Gateway Function
- Enhanced Graphics & Security
- Email Alarm Notification and Recipe Functionality
- PDF Reader



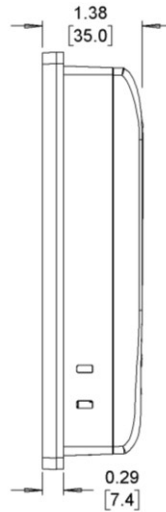
System	CPU	Quad-Core RISC, 1.5 GHz
	Memory (RAM)	1 GB
	Memory (Flash)	4 GB
	RTC	Built-in
I/O Ports	Serial	1 x DE9P COM1: RS-232, COM3: RS-232* 1 x DE9S COM2: RS-485 2 or 4 wire, COM3: RS-485 2 wires
	LAN	2 x 10/100 Base-T RJ-45
	CANbus	N/A
	USB Host	1 x USB 2.0
	USB Client	N/A
	Audio	N/A
	Video	N/A
	Wi-Fi	N/A
	HDMI®	N/A
	SD Card Slot	N/A
	Display Type	7" TFT LCD
Display	Size (W x H)	6.02 x 3.39 inches [153 x 86 mm]
	Max. Resolution	800 x 480
	Max. Colors	16.7 M
	Luminance (cd/m²)	400
	View Angle (H°/V°)	160/140
	Contrast Ratio	800:1
	Backlight Lifetime (Hours)	30,000+
	Type	4-wire resistive touch
Touch Screen	Active Area Accuracy	Length (X) ±2%, width (Y) ±2%
	Input Voltage	24 ± 20% VDC
Electrical	Input Current	820mA @ 24 VDC
	Input Power	19.7 W
	Power Isolation	Built-in
	Isolation Resistance	Exceed 50 MΩ at 500 VDC
Mechanical	Enclosure	Plastic Front, Aluminum Rear, charcoal grey
	PCB Coating	Yes
	Dimensions (W x H x D)	7.89 x 5.76 x 1.38 inches [200.3 x 146.3 x 35 mm]
	Panel Cutout (W x H)	7.56 x 5.43 inches [192.0 x 138.0 mm]
	Net Weight	Approx. 1.32 lbs. [0.6 kg]
	Mounting	Panel mounting
Environmental	Operating Temperature	32° ~ 131°F [0° ~ 55°C]
	Storage Temperature	-4° ~ 140°F [-20° ~ 60°C]
	Relative Humidity	10% ~ 90% (non-condensing)
	Altitude (Air Pressure)	Below 3,000 meters (70.1 kPa)
	Vibration Endurance	10 to 25 Hz (X, Y, Z direction, 2G, 30 minutes)
	Rating	UL Type 4X (indoor use only), NEMA 4, IP66 compliant front panel
	Certifications	cULus, CE, RoHS
Software	EBPro (v6.05.02 or later), EasyAccess 2.0 (optional), CODESYS (optional), IIoT Ready, MQTT, Sparkplug B, VNC, CMTViewer, WebView	
Notes	*Only Tx and Rx may be used for COM1 RS-232 while COM3 RS-232 is in use. CODESYS® is a trademark of CODESYS GmbH. Specifications subject to change without notice	



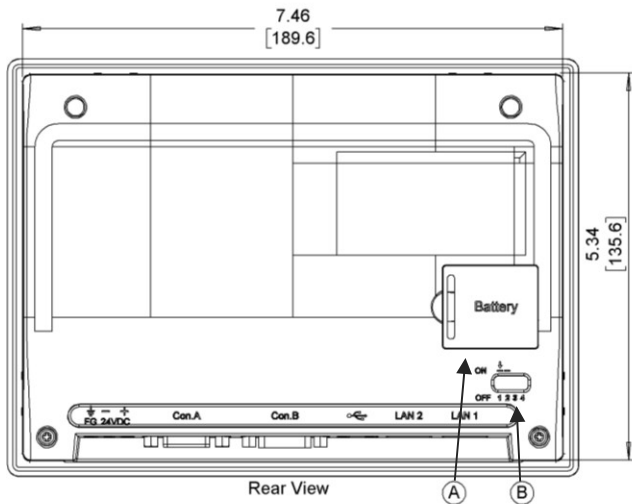
Top View



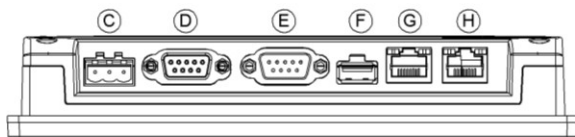
Front View



Side View

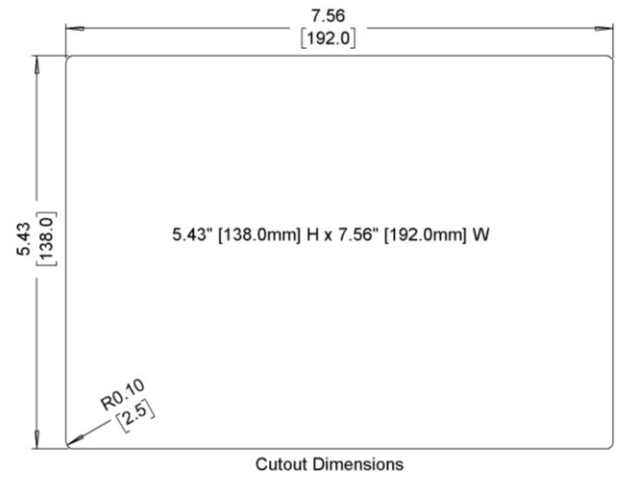


Rear View



Bottom View

Dimensions are in inches [mm]



Cutout Dimensions

- A Battery Compartment
- B DIP Switches
- C Power Connector
- D COM Port DE9S
- E COM Port DE9P
- F USB 2.0 Host Port
- G Ethernet Port
- H Ethernet Port

Why Buy A Maple HMI

In addition to our powerful and affordable hardware, we'll also continue to support your company long after a sale. Wide product selection, large in-stock inventory, outstanding product warranty, free technical support and software, and in-house repairs with quick turnaround times, Maple Systems has your business covered.



Add Remote IO for PLC Functionality

Select Maple Advanced and High-Performance HMIs have a sleek hardware platform that runs both an HMI application created with our free HMI software and PLC logic programmed with CODESYS; each on its own dedicated processor. Unlike the typical multicore set up, where the operating system scheduler is responsible for allocating tasks to each processor, these HMIs have a hard separation between cores. One core is dedicated to the HMI application, the other to executing PLC logic of the CODESYS project. This ensures taxing graphics processing operations will not interfere with deterministic real time control tasks executing on the other processor.

After selecting your HMI, choose from a suite of easy to use [powerful I/O modules](#) to connect to your field equipment. We offer a complete set of I/O modules which can be combined with one of our communication couplers to create a remote I/O block.

Remote Access and the IIoT

[Remote access](#) is the ability to access an HMI or connected device, from another device, at any time, and from anywhere. With our [free HMI software](#) and supported hardware solutions, you have the freedom to access the HMI, and all its data and applications, from another device and control it as if you were standing in front of it. Our Advanced and High-Performance HMIs support [cMT Viewer](#), [WebView](#), Web Streaming, and [EasyAccess 2.0](#) and are designed to make accessing your HMI and data fast and streamlined.

Let us serve as your guide, making it an easy process to join the next evolution of automated control. Our Advanced and High-Performance HMIs can act as an access point enabling operating equipment on the plant floor to connect to information technologies of the Industrial Internet of Things (IIoT). With our IIoT solutions, that are already included in the EBPro software, we can help you achieve better access to invaluable data and open a world of possibilities for your business. Read more about our [IIoT solutions](#).

Build your SCADA

We offer all the components you need to create your own unique level of supervisory data acquisition and control, from the simplest stand-alone machine to sophisticated multi-device networked production line(s), all the way to enterprise-level operations and IIoT functionalities leveraging cloud connectivity.

Our products can help you standardize communications between devices, gluing different systems together for one source to your SCADA. No need to redesign your entire application. Keep the components that are already working for you, just add Maple Systems components to grow your abilities to supervise, control, and acquire data.

Incredible Functionality Out of the Box

- Easily and quickly create the project with functional objects including numeric object, lamp object, combo-button, alarms, and recipes
- Pick and place objects, pictures, and shapes
- Import/export recipes
- Create trend display, graphs, XY plots, and pie charts
- Add passwords and security levels
- Assign communication (PLC) drivers easily and more with our Free HMI software

Additionally our HMIs support remote access solutions with VNC, MQTT, and OPC UA. For additional features see our High-Performance HMI series.



User Friendly HMI Configuration Software

Because designing the layout of screens and user-interface (UI) of the HMI is typically where most of the development time is spent, we've made our Free HMI configuration software easy to use.

- Import tags feature
- Tools to diagnose and monitor PLC to HMI connection
- Debugging tools
- Pre-built libraries
- Off-line and on-line simulation

These are just a few of the ways our software makes creating your project easier. We also have controller information sheets, cable drawings, sample projects, Getting Started Guides, and videos/tutorials available in our [support center](#) 24/7.



Programmable Logic Controller (PLC) Connectivity

With over 300 PLC & Controller communication protocols, these HMIs will easily integrate with your preferred PLC brands, including:

Allen-Bradley
Siemens
Omron
Emerson
GE
Panasonic
Mitsubishi
[...and many more](#)

Allen-Bradley **ABB** babcock™

BALDOR *Danfoss* SIEMENS

MITSUBISHI **Parker**

TOSHIBA YASKAWA **Koyo**

Matsushita

Panel Mount HMI Feature Overview

With few exceptions, all our Standard HMIs support (this covers all the HMI prefix models, ex: HMI5043L/LB, HMI5070L/LB):	With few exceptions, all our Advanced HMIs support (this covers all the cMT2xxx series):	With few exceptions, all our High Performance HMIs support (this covers all the cMT3xxx series HMIs):
Alarm & Event Messages	Alarm & Event Messages	Alarm & Event Messages
Animation - Flow Block	Animation - Flow Block	Animation - Flow Block
ASCII Characters	ASCII Characters	ASCII Characters
Bar Graphs	Bar Graphs	Bar Graphs
Combo Button	Combo Button	Combo Button
Data Logging and Sampling	Data Logging and Sampling	Data Logging and Sampling
Date / Time	Date / Time	Date / Time
Dynamic Drawing	Dynamic Drawing	Dynamic Drawing
Dynamic Scale	Dynamic Scale	Dynamic Scale
EasyAccess 2.0	EasyAccess 2.1	EasyAccess 2.0
EasyWatch	EasyWatch	EasyWatch
Enhanced Security Mode	Enhanced Security Mode	Enhanced Security Mode
Event Alarm Log	Event Alarm Log	Event Alarm Log
File Browser	File Browser	File Browser
Grid Display	Grid Display	Grid Display
Languages (Up to 24)	Languages (Up to 24)	Languages (Up to 24)
Libraries	Libraries	Libraries
Macros	Macros	Macros
Meters & Gauges	Meters & Gauges	Meters & Gauges
Modbus	Modbus	Modbus
Objects (Grouping, Layering, Aligning, Flip)	Objects (Grouping, Layering, Aligning, Flip)	Objects (Grouping, Layering, Aligning, Flip)
Off-line / On-line Simulation	Off-line / On-line Simulation	Off-line / On-line Simulation
OPC UA Client	OPC UA Client	OPC UA Client
Operation Log	Operation Log	Operation Log
Pass-Through Mode	Pass-Through Mode	Pass-Through Mode
Picture Object	Picture Object	Picture Object
Picture Viewer	Picture Viewer	Picture Viewer
Pie Chart	Pie Chart	Pie Chart
PLC Tag Embedded in Project	PLC Tag Embedded in Project	PLC Tag Embedded in Project
Project Password	Project Password	Project Password
Recipes	Recipes	Recipes
Remote Access	Remote Access	Remote Access
Scheduler	Scheduler	Scheduler
Security Levels (Enhanced)	Security Levels (Enhanced)	Security Levels (Enhanced)
System Setting Editor	System Setting Editor	System Setting Editor
Table	Table	Table
Text Object	Text Object	Text Object
Timer Object	Timer Object	Timer Object
Trend Display (Graphs)	Trend Display (Graphs)	Trend Display (Graphs)
User-Defined Start-Up Screen	User-Defined Start-Up Screen	User-Defined Start-Up Screen
Utility Manager	Utility Manager	Utility Manager
VNC Server	VNC Server	VNC Server
XY Plot	XY Plot	XY Plot
Email (1)	Email	Email
Macro Windows Open / Cycle / Close (1)	Macro Windows Open / Cycle / Close	Macro Windows Open / Cycle / Close
MQTT (1)	MQTT	MQTT
String Table (1)	String Table	String Table
Time Synchronization (1)	Time Synchronization	Time Synchronization
USB Tethering (1)	USB Tethering	USB Tethering
VNC Viewer (1)	VNC Viewer	VNC Viewer
	IP Camera	IP Camera
	USB Camera	USB Camera
	Animation (Objects, Word Lamp, GIFs, Moving Shape)	Animation (Objects, Word Lamp, GIFs, Moving Shape)
	BACnet	BACnet
	CANbus	CANbus
	cMT Diagnoser	cMT Diagnoser
	cMT Viewer Support	cMT Viewer Support
	CODESYS (2)	CODESYS (2)
	Media Player	Media Player
	MQTT - Advanced JSON	MQTT - Advanced JSON
	MQTT - AWS IoT, Sparkplug B, Azure IoT Hub, Google Cloud IoT Core	MQTT - AWS IoT, Sparkplug B, Azure IoT Hub, Google Cloud IoT Core
	PDF Reader	PDF Reader
	Web Streaming	Web Streaming
	WebView	WebView
		Barcode Scanner (Android Camera)
		Database Server
		File Transfer Protocol (FTP)
		OPC UA Server
		PLC Web Browser
		SQL Database Server Integration

This table is for illustration only and subject to change. Always check the software to see if a feature is supported in your specific hardware.

(1) Not supported in the B Series

(2) Not supported on the cMT2166X



Industrial Pressure Transmitter

Model 220TST



Applications

- Industrial Environments
- Process Automation
- Hydraulic Systems
- Pump System Control
- Testing Technologies
- Commercial / HVAC

Features

- Ranges from 30" Hg to 0 thru 0 to 20,000 psi
- 4-20mA and 0-10Vdc Standard Industrial Output Signals
- Fully welded "Dry Measuring Cell", requires no internal transmission fluid or seals
- 17-4 PH stainless steel wetted parts
- 304 stainless steel body
- Industry standard electrical connections including DIN 175301-803A, C and Shielded Cable
- Highly flexible modular design
- Protection Class IP65/NEMA 4X (Shielded Cable Connection IP67/NEMA 6)

DESCRIPTION

The **TRERICE 220TST** Pressure Transmitter is the ideal choice for demanding industrial, test & measurement and process control applications. Thanks to the stainless steel/thin-film sensor element being directly welded to the process connection, the 220TST requires no internal transmission media or seals insuring a high degree of reliability and stability. Stainless steel wetted parts provide long-term durability even in the harshest environments.

In addition, the modular design of the **220TST** Pressure Transmitter allows for a wide variety of electrical connections, output signals and process connections to be specified to meet the requirements of any application.

12950 W. Eight Mile Road • Oak Park • MI 48237-3288

Tel: 1.888.TRERICE • Fax: 1.248.399.7246

Website: www.TRERICE.com E-mail: sales@TRERICE.com

Transmitter-2

SPECIFICATIONS

Model	220TST • Standard Transmitter		
Sensor Element	Stainless steel membrane / poly-Si on SiO ₂ thin film resistors		
Process Connection	1/4 NPT male		
Materials of Construction	Housing: 304 stainless steel Wetted Parts: 17-4 PH stainless steel		
Accuracy	0.5% Full Scale (Terminal Point Method) / 0.35% Full Scale (BFSL) Includes: Non-Linearity, Hysteresis and Non-Repeatability.		
Operating Temperature Ranges	Medium: -40/+257°F (-40/+125°C) Ambient: -40/+221°F (-40/+105°C)		
Temperature Error Band	Temperature compensated to within 1% between -4°F and 185°F (-20°C and 85°C). Best accuracy of ≤0.5% at 77°F (25°C).		
Humidity	95% RH Non-condensing 0-100% RH with Shielded Cable Connection (E3)		
Electrical Connection	90° Angle "Standard" Connector / DIN 175301-803 (A) 90° Angle "Mini" Connector / DIN 175301-803 (C) Shielded Cable (3 Ft)		
Output Signal	4-20mA (2 wire) and 0-10Vdc (3 wire)		
Overpressure Limit	Ranges ≤ 5000 psi	1.5 x FS	
	Burst pressure	> 3 x FS	
	10,000-20,000 psi	1.2 x FS	
	Burst pressure	> 1.5 x FS	
Response Time (10-90%)	< 1 ms		
Power Supply	<u>Output Signal:</u>	<u>Minimum</u>	<u>Maximum</u>
	4-20mA:	10Vdc	32Vdc
	0-10Vdc:	12Vdc	32Vdc
Load Resistance	4-20 mA: Vdc Supply-10Vdc /0.02A = Ohm resistance (maximum) 0-10 Vdc: ≥ 5 kOhm (minimum)		
Circuit protection	Protected against reverse polarity and short circuits		
CE conformity	EC Directive 89/336/EWG		
Ingress Protection Rating	90° Angle Connector: IP65 / NEMA 4X Shielded Cable: IP67 / NEMA 6		
Approx. Shipping Weight	0.2 lbs (0.09kg)		

How To Order

Example: 220TST 02 C A 0/100 E1 3

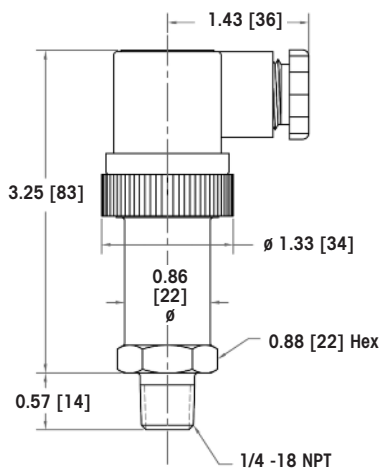
Model	Process Connection	Accuracy	Units of Measure	Range Code	Electrical Connection	Output Signal
220TST	02 1/4 NPT	C 0.5% FS (0.35% BFSL)	A psi	See Standard Ranges	E1 DIN 175301-803 (A) "std"	3 4-20mA (2-wire)
					E2 DIN 175301-803 (C) "mini"	2 0-10 Vdc (3-wire)
					E3 Shielded Cable (3 Feet)	

Other electrical connections, output signals and process connections available. Please consult factory.

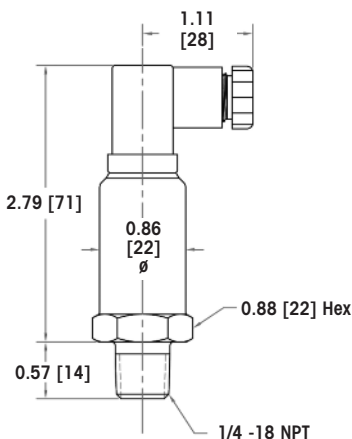
Configurations & Dimensions



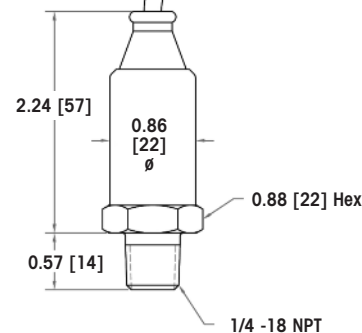
E1 90° Angle "std" Connector
DIN 175301-803 (A)



E2 90° Angle "mini" Connector
DIN 175301-803 (C)



E3 Shielded Cable
(3 Feet)



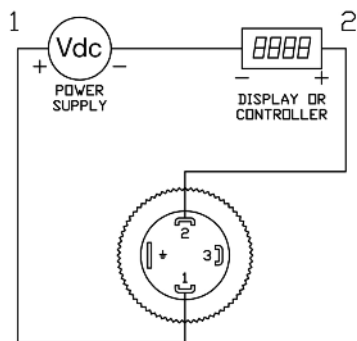
Standard Ranges

Range Code	Specific Range (psi)	Overpressure Limit	Burst Pressure
30/0	30"Hg to 0	23 psi	45 psi
30/15	30"Hg to 15 psi	45 psi	90 psi
30/30	30"Hg to 30 psi	68 psi	135 psi
30/60	30"Hg to 60 psi	113 psi	225 psi
30/100	30"Hg to 100 psi	173 psi	345 psi
30/150	30"Hg to 150 psi	248 psi	495 psi
30/300	30"Hg to 300 psi	473 psi	945 psi
0/15	0 to 15 psi	23 psi	45 psi
0/30	0 to 30 psi	45 psi	90 psi
0/60	0 to 60 psi	90 psi	180 psi
0/100	0 to 100 psi	150 psi	300 psi
0/160	0 to 160 psi	240 psi	480 psi
0/200	0 to 200 psi	300 psi	600 psi
0/300	0 to 300 psi	450 psi	900 psi
0/400	0 to 400 psi	600 psi	1200 psi
0/600	0 to 600 psi	900 psi	1800 psi
0/1000	0 to 1000 psi	1500 psi	3000 psi
0/1500	0 to 1500 psi	2250 psi	4500 psi
0/2000	0 to 2000 psi	3000 psi	6000 psi
0/3000	0 to 3000 psi	4500 psi	9000 psi
0/5000	0 to 5000 psi	7500 psi	15000 psi
0/10000	0 to 10000 psi	12000 psi	15000 psi
0/15000	0 to 15000 psi	18000 psi	22500 psi
0/20000	0 to 20000 psi	24000 psi	30000 psi

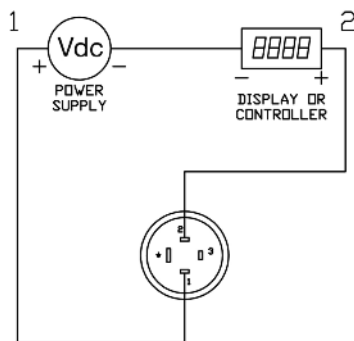
Electrical Connections Wiring Diagram

2- Wire Circuits (4 20mA)

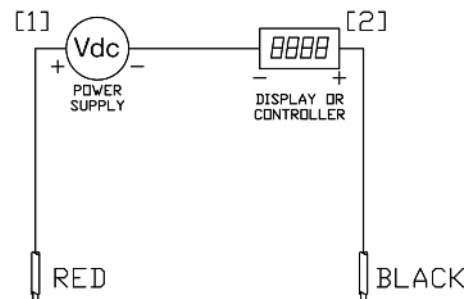
DIN 175301-803 (A)



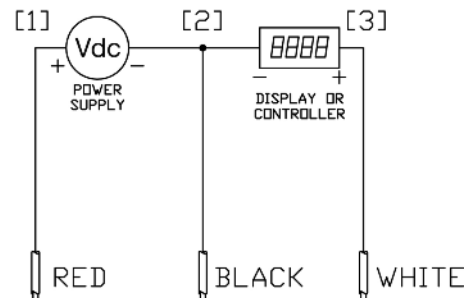
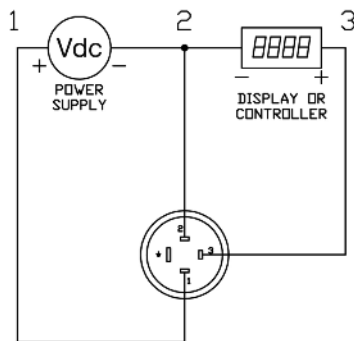
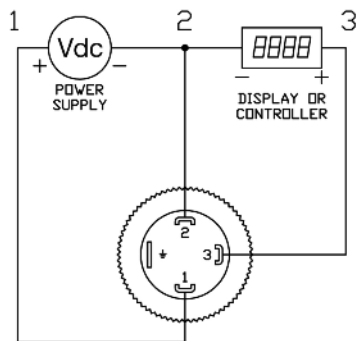
DIN 175301-803 (C)



Shielded Cable



3- Wire Circuits (0-10Vdc)



H.O. TRERICE Company

From its start in 1923 in Detroit, the H.O. Trerice Company has remained true to the commitment of its founder - QUALITY in both PRODUCT and SERVICE. This commitment has solidly established Trerice as a worldwide leader in the manufacture of specialized engineered products for industrial temperature and pressure measurement and control.

When your requirements demand quality instrumentation and controls, the broad line of Trerice products are ready for your application. Contact us today for detailed information on your particular areas of interest.

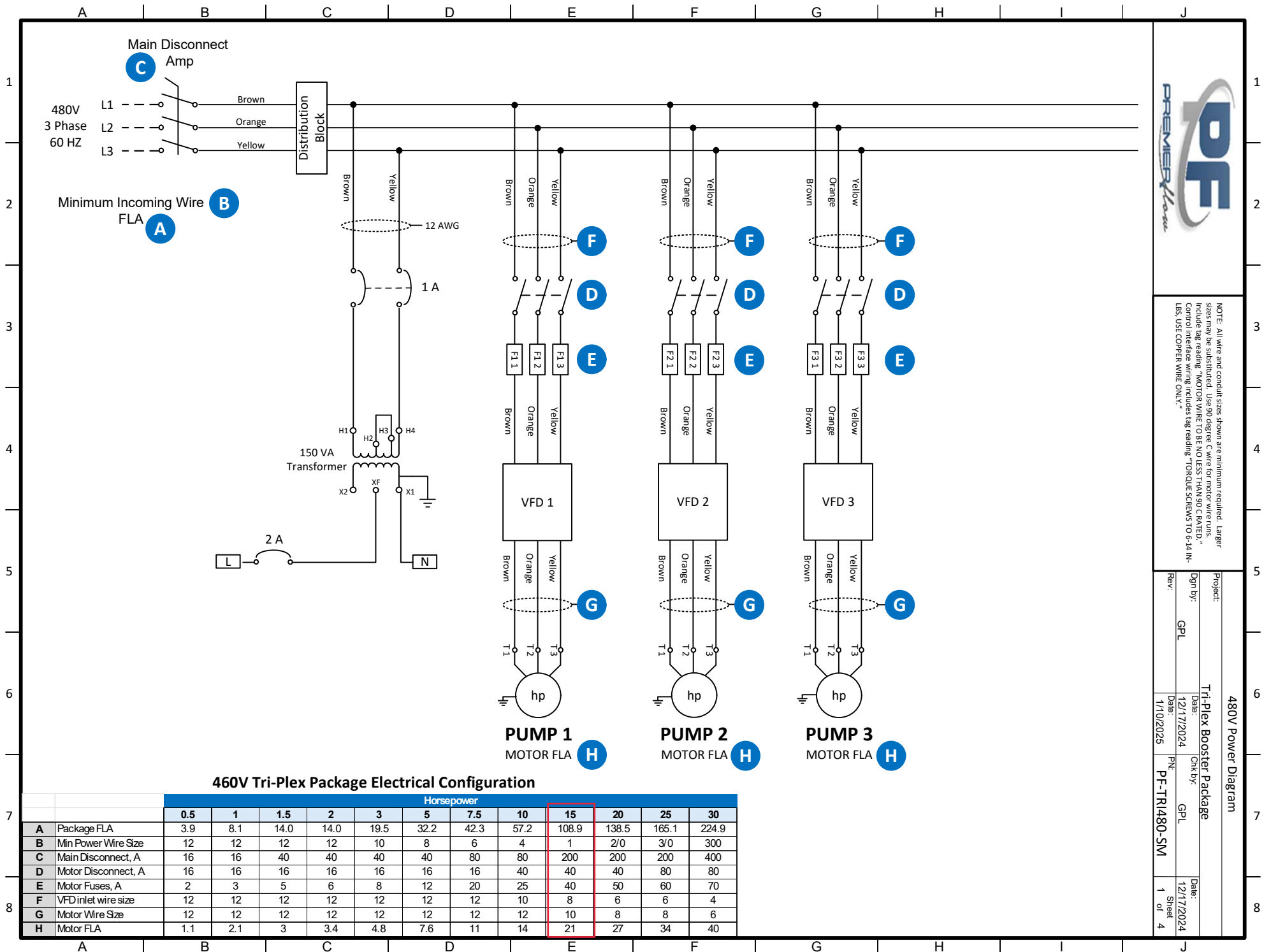


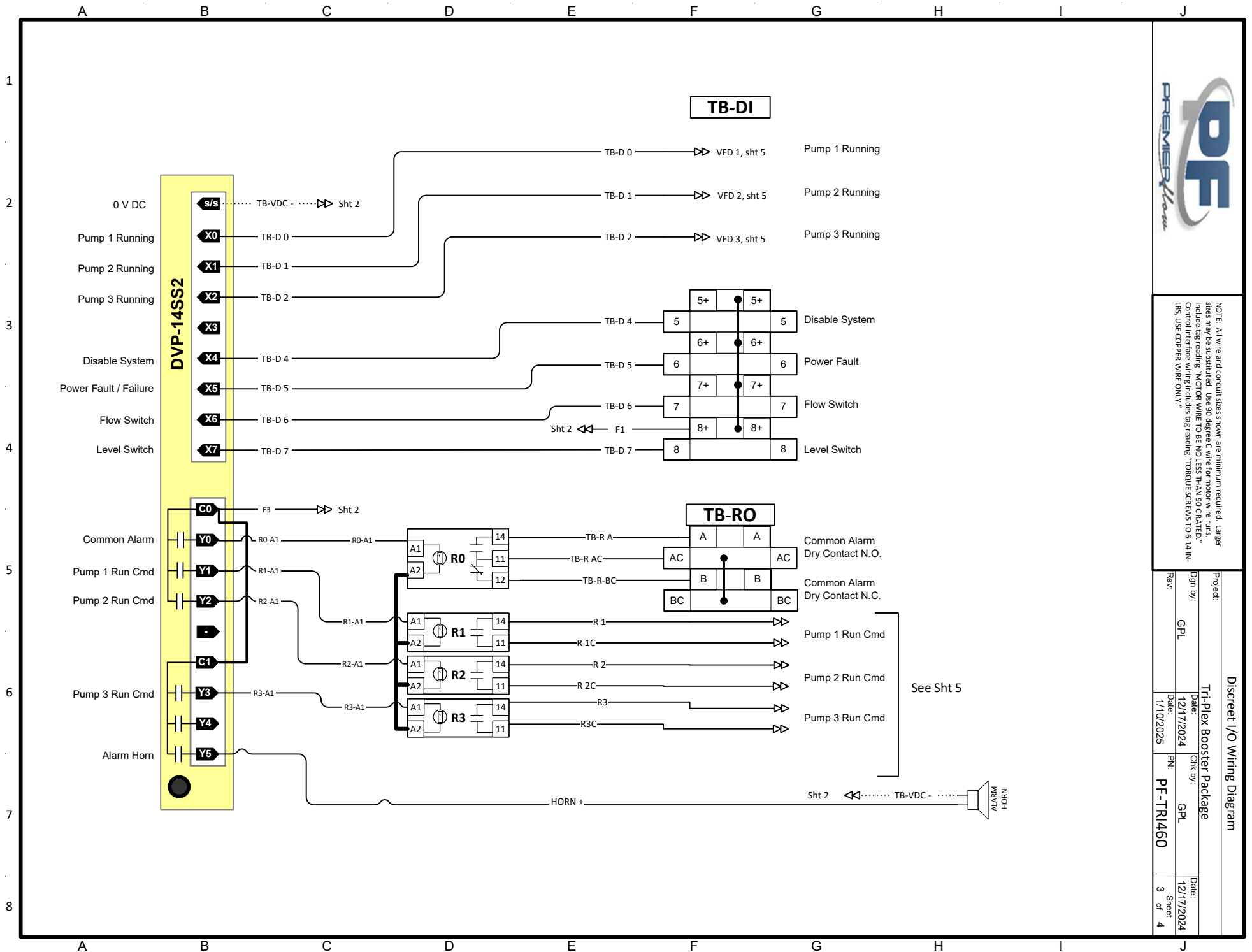
12950 W. Eight Mile Road • Oak Park • MI 48237-3288

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Website: www.TRERICE.com E-mail: sales@TRERICE.com

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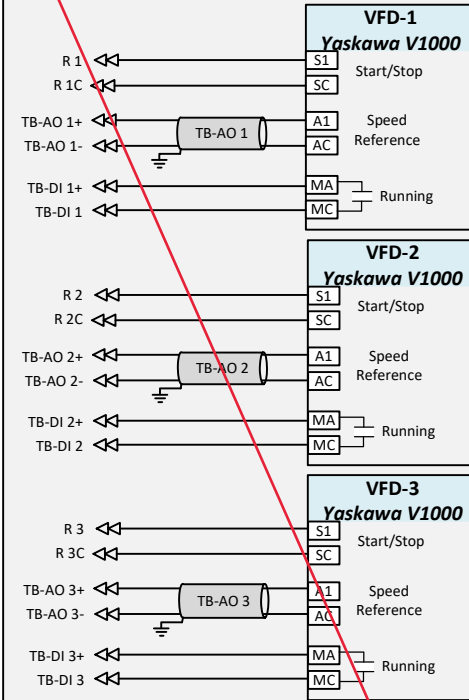
NOTE: All wire and conduit sizes shown are minimum required. Larger sizes may be substituted. Use 90 degree c wire for motor wire runs. Include tag reading, "MOTOR WIRE TO BE NO LESS THAN 90 C RATED." Control interface wiring includes tag reading, "TORQUE SCREWS TO 6-14 IN.-LBS. USE COPPER WIRE ONLY."

VFD Wiring and Customer Dry Contacts

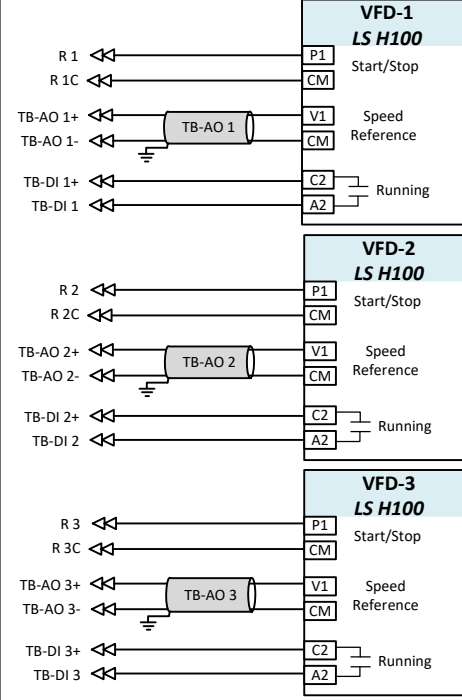
Tri-Plex Booster Package

Project:	Date:	Chk by:	Date:
Dgn by:	12/17/2024	GPL	12/17/2024
Rev:	1/10/2025	PF-TRI460	5 of 5

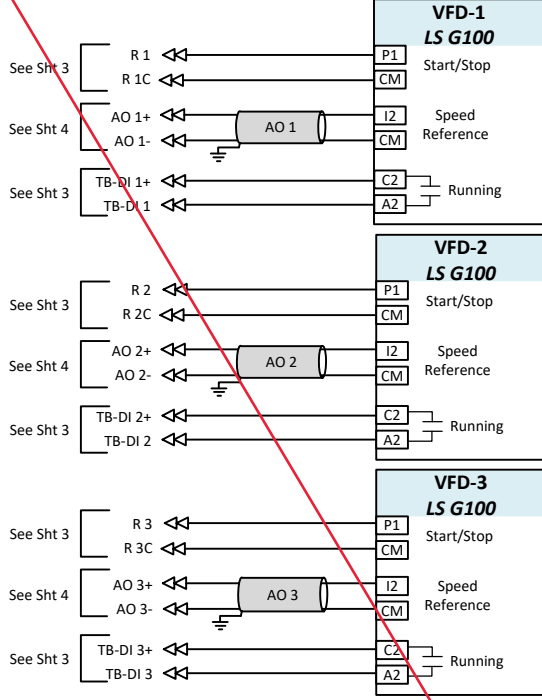
Yaskawa V1000 - Option



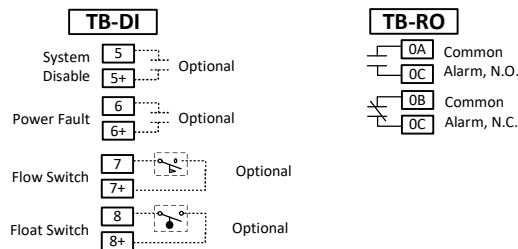
Pumps Greater Than 10 hp



Pumps 10 hp and Less



Terminals For Customer Use





6023 N. Yorktown Avenue
Tulsa, OK 74130
918-346-6312

SUBMITTAL

DATE: 07-13-26

QUOTE#: PF-069038-A

JOB: HOG Highland Building CWP-1

CUSTOMER: Jaco Sales

SYSTEM:

1- PREMIERflow Series PFV-15-PLB, Model PFVT-15-8, UL/C-UL listed, certified variable speed triplex chill water booster system consisting of:

System condition point: 770 gpm @ 49 psi

Suction pressure 10# min- 20# max (psi), 89# max working pressure

PUMPS/MOTORS (NSF):

3- Ebara Series EVMSU Model: EVMSU64-1, 304 stainless steel fitted, vertical multistage, each coupled, 15HP, 3600 rpm, 460/3/60 to a ODP, Premium efficient motor. **REGULATED PUMPS SHALL BE DOE 2020 COMPLIANT WITH A PUMP ENERGY INDEX (PEI) RATING ON NAME PLATE.,**

Conditions of Service: 385 gpm @ 90' tdh (each) (25% Prop Glycol)

VALVES: (NSF)

3- 4" Wafer style, non-slam, check valves

6- 4" Isolation butterfly valves

HEADERS, BRANCHES (NSF) 8" x 4" 316 stainless steel:

CONTROLS:

1- PF, VB Series, NEMA 1, UL/C-UL listed variable speed power and control panel:

System short circuit rating of 10ka RMS @ 600 VAC standard

U.L. 508

1-Delta DVP, micro-PLC controller

Flash Main Memory

SD memory for all user variables

Real time clock

Multi-level password security

32bit controller

MODBUS RTU, SMS, GPRS

USB programing port

RS-232,485 Ethernet communication ports

1-7" Color, touch screen HMI

PV-VB Self Tuning pressure sequencing (ASHRAE 90.1 compliant)

Suction and System discharge pressure read out in PSI

Individual pump run indication

Hand-off-auto selection

ETM's (Elapsed Time Meters)

Automatic alternation

100 Event Log

Low Suction alarm with TDR delay

Low System Alarm with TDR delay
High System alarm with TDR delay
High Suction Energy Saving Mode
1-120V fused transformer
2 sets of Auxiliary Alarm Contacts
1- Main through the door Disconnect
3- Individual motor circuit protection
3- Sub Micro, PWM, NEMA 1, 15hp, Variable Speed Drives
3- Panel mounted VFD operator interfaces
1- BACnet Communication
2- 4-20MA, stainless steel pressure transducers, header mounted suction and discharge

BASE:

Stainless Steel base with stainless steel panel stand and wiring for complete package system.
Blue PF painting process

TESTING:

System shall be factory electrically, hydrostatically and full flow run tested complete with test report before shipment

CERTIFICATIONS AND LISTINGS:

ETL/C-ETL NSF/ANSI/CA-61/372 listed as a pump system for domestic water use
All pipe welding to be by ASME Section 9 certified welders
all structural steel welding to be by AWS D1.6 certified welders

Each PREMIERflow package system is ETL/C-ETL THIRD PARTY LISTED as a system meeting OSHA and Federal Regulations: 29CFR1910.303 & .399, also in compliance with NFPA-70 (National Electric Code) Article 90-7.

Respectfully Submitted:
PREMIERflow, LLC

Keith Pirtle
Sales



DATE: June 2025

REFERENCE: TARIFF PLAN/POLICY

ATTN: ALL

In reference to the questions raised about increasing tariffs and the effect on pricing:
First let me say I agree with the concerns.

At PREMIERflow we are forward looking and have already implemented a TARIFF PLAN/POLICY.

TARRIFF PLAN/POLICY:

1- Every quote is only valid for 30 days. Each quote is reviewed at the time of an order hold for approval(HFA). The quote will be adjusted if required.

2- At the time of release for production the quote is again reviewed and adjusted if required.

3-All PREMIERflow quotes, HFA's, Terms and Conditions include an economic statement, stating any impact caused by tariffs will be listed on finial invoice as a line item.

4-FORCE MA-JEURE- PREMIERflow is not responsible for any uncontrollable circumstances that prevent fulfilling the contract.

5- Monroe continues to work with vendors directly (not through their distribution). He has increased our inventory levels and orders when tariffs are adjusting downward.

This allows for the best pricing and for PREMIERflow to have the inventory, thus preventing us from having to source from the secondary markets at a higher price.

6- Monroe and purchasing continue to search for new and better vendors.

PREMIERflow continues to watch the political and economic climate so to change positions as necessary.

If you have any questions or need any additional information, please contact me: (918) 863. 3199.or via email at marviny@premier-flow.com.

Respectfully Submitted,
PREMIERflow, a DXP Company

Marvin F. Yoder, Jr.
President



**A DXP COMPANY
PREMIERflow Warranty**

PREMIERflow, systems and controls are warrantied from defects in workmanship and material, under normal use and service the earlier of 24 months invoiced "ready to ship date" or for a period of 18 months from the date of startup, whichever occurs first ("Warranty Period"), and as herein provided:

This Warranty does not cover the effects of normal wear, tear or deterioration of the systems and controls; effects of abrasion, erosion, or corrosion, effects of improper storage, damaged caused by improperly install or erection of equipment, improper maintenance, nor operation not in accordance with its intended use. Further, PREMIERflow offers no warranty for mechanical seals, gauges, transducers are not covered under warranty for wear, or damage due to the liquid or particulate being pumped.

If at any time prior to expiration of the Warranty Period, Buyer or Owner shall discover any defect or other failure of the delivered systems and controls, to conform to the Warranties, PREMIERflow, upon written notice from Buyer, given within a reasonable time after discovery, shall correct the defect or nonconformity or replace the defective items to comply with the order requirements. Notwithstanding the foregoing, PREMIERflow's obligation to correct or replace any defect or nonconformity shall only occur during the Warranty Period and no such corrections or replacements shall occur upon expiration of the Warranty Period. Any defects or nonconformities not corrected or replaced during the Warranty Period shall be deemed accepted by the Buyer. Any substitution of parts not provided by PREMIERflow, or not authorized by PREMIERflow, or any modification, tampering, or manipulation of PREMIERflow's systems and controls shall void any and all Warranties. Alteration of any parts without express written permission of PREMIERflow for a purpose other than that intended shall void any and all Warranties.

PREMIERflow's responsibility under this Warranty is limited to, at its option, to repair or replace the defective item. All items that are repaired or replaced will require a RMA issued by the company and will be shipped at no charge, F.O.B. factory, plus all freight and handling charges. PREMIERflow reserves the right to provide replacement items similar in design and functionality without prior notice.

PREMIERflow does not warrant and shall not be responsible or liable for any and all labor charges, rigging charges, transportation charges, nor damages, loss of time, incidental, liquidated, damages to life or property, loss of income, consequential damages or any cost for removing or replacing defective items.

PREMIERflow's maximum liability shall not exceed the cost for the defective items. This warranty is in leu of any and all other express or implied warranties, and no warranty, express or implied, shall be extended beyond the Warranty Period. The Warranty shall not be effective unless Buyer has fully paid for all systems and controls as provided.

Respectfully Submitted,

PREMIERflow, a DXP Company

6023 N. Yorktown Avenue
Tulsa, Ok 74130
(918) 749-1766



PREMIERflow - a DXP Company
STANDARD TERMS AND CONDITIONS OF SALE

By engaging the services of PREMIERflow-a DXP Company, (herein referred to as "PREMIERflow" and/or "Seller") pursuant to offer and/or quotation, the Buyer agrees to be bound by the following Standard Terms and Conditions of Sale along with PREMIERflow's Standard Warranty. No changes or additional or different terms will be part of this contract unless approved by us in writing.

1. PRICE. Price does not include freight, duties or any sales, use, excise, value-added or similar taxes and where applicable, such charges will be billed as separate items and paid by you, unless otherwise stated in our written quotation. Prices are subject to change without notice, unless otherwise stated in our written quotation. There will be a minimum charge of \$100 on all sales.

ANY CHANGE IN COST DUE TO THE ECONOMIC IMPACT ASSOCIATED WITH TARRIFFS WILL BE REFLECTED ON THE FINAL INVOICE AT TIME OF "NOTICE OF READY TO SHIP"

2. QUOTATIONS. Quotations are offers for labor and services for custom built systems, and credit where applicable, manufactured and contracted for in Tulsa, Oklahoma. Unless otherwise stated, offers contained in Seller's quotations expire thirty (30) days from the date of issuance and may be withdrawn prior to your written acceptance, subject to the minimum lawful period. All quotations are subject to change by Seller at any time upon verbal or written notice to Buyer. Buyer's acceptance in writing and/or submittal of Buyer's Purchase Order shall be emailed to Seller in Tulsa, Oklahoma for acceptance within thirty (30) days as provided herein.

3. ERRORS & OMISSIONS. This quotation is for the items expressly listed or stated. No other terms or items should be assumed or implied as being provided.

4. PAYMENT TERMS. Payment Terms shall be net 30 days upon notice of ready to ship or shipment, whichever occurs first and subject to credit approval. However, orders of \$50,000 or more are subject to non-refundable progress billing to be determined by Seller. A statement of account will be invoiced upon "notice of ready to ship", unless other terms are set forth in Seller's quotation.

5. TAXES. Any and all sales, use, personal property or other excise taxes which the Seller may be required to pay or collect including first destination taxes, will be added to each invoice and shall be payable by Buyer on the same terms as the purchase price unless the Buyer has furnished the Seller a tax exemption certificate acceptable to the taxing authority.

6. FREIGHT TERMS. All sales are F.O.B. factory (Tulsa, Oklahoma) plus freight, unless other terms are set forth in Seller's quotation. Title transfers at factory, at the time of notice of time to ship, thereafter Buyer takes responsibility for risk of loss or damage. Goods shall be promptly inspected upon delivery. Buyer shall examine and inspect all deliverables and will notify Seller of any defect in material or workmanship, or of any missing items. Failure to inspect and inform Seller of defects or missing items, shall be conclusive evidence that Seller has satisfactorily tendered all agreed upon services and goods and Buyer has inspected and accepted the deliverables.

6. LIMITATION OF LIABILITY. Seller shall not be liable for any liquidated, incidental, consequential, or other damage.

7. STORAGE. If the products are not shipped within (15) fifteen days after notification to Buyer that they are ready for shipping, for any reason beyond Seller's reasonable control including Buyer's failure to give shipping instructions, Seller may store such products at Buyers risk. Buyers shall pay all handling, transportation, and storage costs. Title transfer occurs for all goods upon notice of ready to ship or invoiced statement of account whichever occurs first. Storage and insurance fees will be assessed as required.

8. DELAYS OR DEFAULT IN DELIVERY. Seller shall have no liability to Buyer, and Buyer shall not be entitled to cancel any purchase order for Seller's delay or default in delivery due to strikes, secondary boycotts, riots, wars, accidents, fires, floods, explosions, vandalism, pandemics, government embargoes, priorities or regulations, shortages of labor, fuel, materials, supplies, power or transportation facilities, or other similar or dissimilar causes beyond Seller's reasonable control. Under no circumstances shall Seller have any liability for penalties or consequential damages of any kind resulting in whole or in part from Seller's delay in delivering, or failure to deliver any products ordered by Buyer.

9. CHANGES TO ORDERS IN PROGRESS. There shall be a charge for any and all changes in specification after an order is in process, based on the status of the order at the time the change is made. The additional charge shall be a minimum of \$100 net per item when engineering has not been started or is not required and a minimum of \$500 net per item when re-engineering is required. The additional charge shall be in addition to any Vendor charges in the price of the product resulting from the change. The order "Issue Date" will be moved forward to the date of the change and shipment will be rescheduled in accordance with the then current lead times. Buyer shall pay escalation charges based on the new "Issue Date" and scheduled shipping date as defined in Seller's acknowledgment.

10. CANCELLATIONS. After Seller accepts buyer's purchase order by emailing Seller's written acknowledgement, Buyer's cancellation of any order or portion thereof may be accomplished only upon (1) Seller's receipt of written cancellation notice at Seller's location and (2) buyer's payment of the following cancellation charges: Seller is due cancellation charges for all labor and materials used for that project. Seller will determine amount at the time of cancellation to be no less than 35% of total sales price.

11. WARRANTY. Seller disclaims any and all liability for damages to property, loss of time, loss of income, loss of profits. Seller disclaims any liability for incidental, liquidated or consequential damages. PREMIERflow Warranty, attached to and made apart hereof, covers material only and does not include labor required to install or repair said warranty equipment. Labor warranties may be quoted upon request. MECHANICAL SEALS ARE NOT WARRANTIED.

12. INSTALLATION FIELD SERVICE. Prices stated do not include installation labor or materials or field service unless specifically stated in Seller's quotation.

13. RETURN POLICY. ALL ITEMS ARE SUBJECT TO INSPECTION AND MUST HAVE APPROVAL FOR CREDIT. Systems are custom built and manufactured in Tulsa, Oklahoma, for each project and therefore have a 100% restocking fee, plus freight. Parts: stock items may be returned within 30 days of the invoice date and are subject to a minimum 30% restocking fee, plus freight. Non-stock items are not returnable.

14. INDEMNIFICATION. Buyer upon reviving title, shall at all times indemnify, defend Seller and their respective affiliates, employees, officers, directors, and agents, harmless from and against any and all costs, liabilities, losses and expenses resulting from and against all claims for personal injury, property damage, wrongful death or other damages, losses, and expenses, including attorney's fees arising out of, or resulting from, performance of the work or any services on behalf of the Buyer, commenced pursuant to this agreement. It is expressly understood and agreed that this obligation to completely indemnify, defend and hold harmless shall apply and be enforceable for all claims without regard to whether or not Buyer is claimed to be negligent or otherwise liable for any such damages, losses and expenses.

15. PAST-DUE ACCOUNTS. A finance charge of the lesser of 1.5% per month (18% APR) or the highest rate permitted by law will be assessed on all past due accounts. An invoice is past due if the net amount is not paid within 30 days from the date of invoice. Interest charged on a past due invoice will be assessed from the date on which that invoice was due. The above charges will be billed on the date that the invoice becomes 30 days past due, and on each monthly period thereafter. Failure of buyer to make any payment to the Seller within 45 days from the date of invoice, in addition to the herein describe charges, Seller shall be entitled to notify Buyer of Buyer's breach of agreement and default for failing to pay for services and goods/systems received on credit, and to the extent permitted by law receive all expenses incurred in its collection of full payment, including reasonable attorney fees and costs.

16. GOVERNING LAW. The laws of the State of Oklahoma govern these Standard Terms and Condition of Sale, and provided Quotation, without regard to conflict of laws principles for any dispute between the Parties or relating in any way to the subject matter of this agreement that may in any way cause another jurisdiction's laws to be applied. EACH PARTY STIPULATES THAT THE TULSA COUNTY DISTRICT COURT, STATE OF OKLAHOMA, SHALL HAVE IN PERSONAM JURISDICTION AND VENUE OVER EACH OF THEM FOR THE PURPOSE OF LITIGATING ANY ACTION(S) OR PROCEEDING(S) ARISING OUT OF OR RELATED TO THIS AGREEMENT. THE PARTIES EACH HEREBY INDIVIDUALLY AUTHORIZE AND ACCEPT SERVICE OF PROCESS SUFFICIENT FOR PERSONAL JURISDICTION IN ANY ACTION AGAINST ONE OF THEM AS CONTEMPLATED BY THIS PARAGRAPH BY CERTIFIED MAIL, RETURN RECEIPT REQUESTED, POSTAGE PREPAID. ANY FINAL JUDGMENT RENDERED AGAINST A PARTY IN ANY ACTION OR PROCEEDING SHALL BE CONCLUSIVE AS TO THE SUBJECT OF SUCH FINAL JUDGMENT AND MAY BE ENFORCED IN OTHER JURISDICTIONS IN ANY MANNER PROVIDED BY LAW. THE PREVAILING PARTY IN LITIGATION IS ENTITLED TO RECOVER ITS ATTORNEY FEES AND COSTS FROM THE OTHER PARTY.

17. SEVERABILITY. In the event that any provision contained herein is held to be invalid or unlawful, such provisions shall be severable from the remaining provisions of these terms and conditions shall remain in tun force and effect.



**6023 N Yorktown Ave
Tulsa, OK 74130
918.346.6312**

INSTALLATION & STORAGE

UPON ARRIVAL:

System should be inspected upon arrival – any freight damage or missing equipment should be noted on the freight bill of lading at this time. Spare parts, miscellaneous equipment should be stored in a protected location. All equipment should be inspected for hardware that has become loosened during transit.

STORAGE:

The system must be covered to protect from: damage, contamination, etc. Do not remove crating or plastic covering (unless for inspection of possible freight damage). System must be stored in a dry environmentally controlled location (40° F min - 104° f max.).

EXTENDED STORAGE:

All rotating equipment should be turned by hand (if possible) at least once every 30 days. Care should be taken to ensure condensation and dirt are removed.

LOCATION:

System should be stored for ease of access, rigging, maintenance and visual inspection.

FOUNDATION:

SLAB ON GRADE:

System should be mounted on slab on grade with concrete weight per local and engineer's requirements.

ALL FLOORS OTHER THAN "SLAB ON GRADE":

In addition, the system should be mounted on a concrete welded pouring form inertia base with a minimum of 1-1/2" deflection springs. Install flex-connectors on system suction, discharge, and tank feed connection (if applicable).

LEVELING:

Systems should be level, so that skid surface is above and parallel with concrete. Shim anchors and system unit until it is correct and level.

ANCHOR BOLTS:

System must be anchored to foundation and/or inertia base with proper size anchor bolts per anchor bolt manufacturer's or engineer's recommendation.

GROUTING:

After anchor bolts and leveling processes have been completed, the system skid must be filled with concrete with slope to floor drain if applicable. The pump base shall be poured with a good grade of non-ferrous, non-shrink grout.

PIPING:

System suction, discharge and tank feed connection (if applicable) should have flex connectors installed. Pumping system must not support any of the building piping. No strain of any kind may be imposed on the pumping system. All piping should be level.

DRAIN:

Over-temperature purge line, packing gland lines (if applicable), etc., must be run to floor drain.

Listing Constructional Data Report (CDR)

1.0 Reference and Address			
Report Number	103986301COL-001	Original Issued: 15-Jul-2019	Revised: 7-Dec-2020
Standard(s)	Drinking Water System Components - Health Effects [NSF/ANSI/CAN 61:2018]		
Applicant	Premierflow, LLC	Manufacturer	Premierflow, LLC
Address	6023 North Yorktown Avenue Tulsa, OK 74130	Address	6023 North Yorktown Avenue Tulsa, OK 74130
Country	USA	Country	USA
Contact	Brynda K. Bolte Marvin F. Yoder Jr.	Contact	Brynda K. Bolte Marvin F. Yoder Jr.
Phone	(918) 346-6312 (918) 863-3199	Phone	(918) 346-6312 (918) 863-3199
FAX	(918) 382-5745	FAX	(918) 382-5745
Email	bryndab@premier-flow.com marviny@premier-flow.com	Email	bryndab@premier-flow.com marviny@premier-flow.com



CONFORMS TO
NSF / ANSI / CAN
STD 61/372

1.0 Reference and Address			
Report Number	102735143COL-001	Original Issued: 18-Oct-2016	Revised: 4-Dec-2020
Standard(s)	Drinking Water System Components - Lead Content [NSF/ANSI 372:2016]		
Applicant	Premierflow, LLC	Manufacturer	Premierflow, LLC
Address	6023 North Yorktown Avenue Tulsa, OK 74130	Address	6023 North Yorktown Avenue Tulsa, OK 74130
Country	USA	Country	USA
Contact	Brynda K. Bolte Marvin F. Yoder Jr.	Contact	Brynda K. Bolte Marvin F. Yoder Jr.
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Email	bryndab@premier-flow.com marviny@premier-flow.com	Email	bryndab@premier-flow.com marviny@premier-flow.com

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CERTIFICATE OF COMPLIANCE

Certificate Number 20171020- E496209
Report Reference E496209-20171020
Issue Date 2017-OCTOBER-20

Issued to: Premierflow L L C
5422 108th East Ave
Tulsa OK 74146

**This is to certify that
representative samples of** INDUSTRIAL CONTROL PANELS
General Coverage

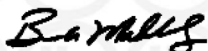
Have been investigated by UL in accordance with the
Standard(s) indicated on this Certificate.

Standard(s) for Safety: 508A - Standard for Industrial Control
CSA C22.2 No. 14 - Standard for Industrial Control
Equipment.

Additional Information: See the UL Online Certifications Directory at
www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's
Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.



Bruce Mahrenholz, Director North American Certification Program
UL LLC

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contact a local UL Customer Service Representative at <http://ul.com/aboutul/locations/>



Item number	: 001	Product Description	: EVMSU64-1
Service	:	Stages	: 1
Quantity	: 1	Based on curve number	: EVMSU64-1-0
Quote number	: 750566	Basic model number	: -
		Date last saved	: 21 Dec 2025 9:45 AM

Operating Conditions

Flow, rated	: 385.0 USgpm
Differential head / pressure, rated (requested)	: 90.00 ft
Differential head / pressure, rated (actual)	: 89.66 ft
Suction pressure, rated / max	: 0.00 / 0.00 psi.g
NPSH available, rated	: Ample
Site Supply Frequency	: 60 Hz

Performance

Speed criteria	: Synchronous
Speed, rated	: 3500 rpm
Impeller diameter, rated	: 5.63 in
Impeller diameter, maximum	: 5.63 in
Impeller diameter, minimum	: 5.63 in
Efficiency	: 73.18 %
PEI (CL)	: -
NPSH required / margin required	: 19.76 / 0.00 ft
Ns (imp. eye flow) / Nss (imp. eye flow)	: 1,968 / 9,324 US Units
MCSF	: 158.5 USgpm
Head, maximum, rated diameter	: 159.1 ft
Head rise to shutoff	: 77.49 %
Flow, best eff. point	: 330.6 USgpm
Flow ratio, rated / BEP	: 116.45 %
Diameter ratio (rated / max)	: 100.00 %
Head ratio (rated dia / max dia)	: 100.00 %
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Selection status	: Near miss

Liquid

Liquid type	: Glycol, Propylene, 25%
Additional liquid description	:
Solids diameter, max	: 0.00 in
Solids concentration, by volume	: 0.00 %
Temperature, max	: 68.00 deg F
Fluid density, rated / max	: 1.047 / 1.047 SG
Viscosity, rated	: 2.02 cP
Vapor pressure, rated	: 0.33 psi.a

Material

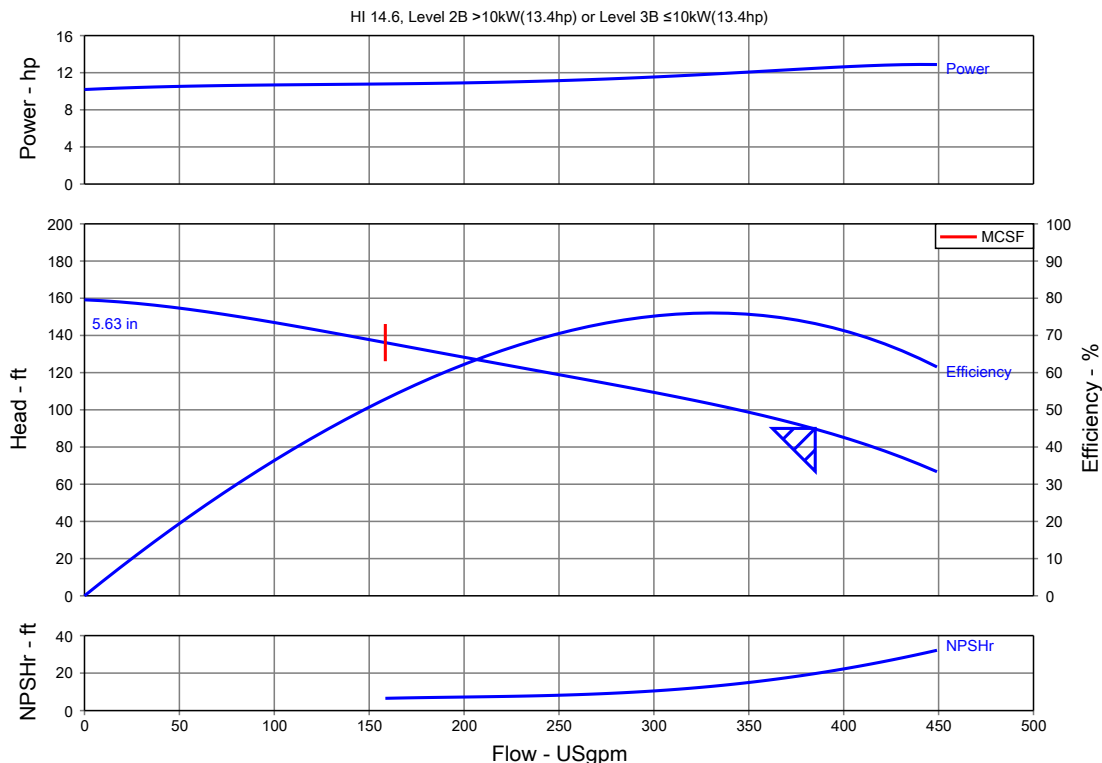
Material selected	: Standard
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Pressure Data

Maximum working pressure	: 72.14 psi.g
Maximum allowable working pressure	: 230.0 psi.g
Maximum allowable suction pressure	: 157.9 psi.g
Hydrostatic test pressure	: N/A

Driver & Power Data (@Max density)

Driver sizing specification	: Rated power
Margin over specification	: 0.00 %
Service factor	: 1.15 (Fixed)
Power, hydraulic	: 9.13 hp
Power, rated	: 12.47 hp
Power, maximum, rated diameter	: 12.89 hp
Motor rating	: 15.00 hp / 11.19 kW (Fixed)



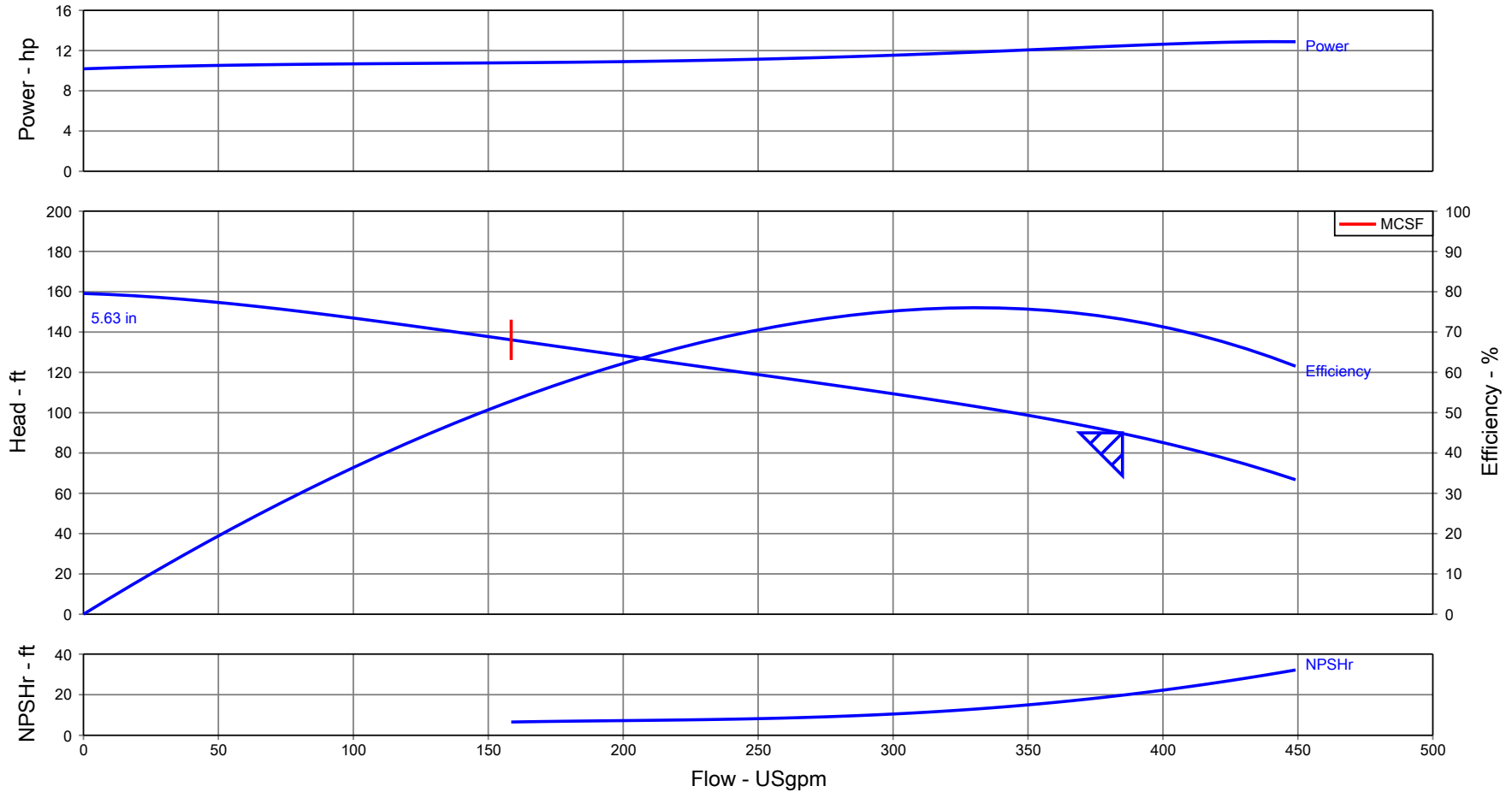


Customer :
Reference :

Pump Performance Curve

Ebara Quotation System 25.6.0

HI 14.6, Level 2B >10kW(13.4hp) or Level 3B ≤10kW(13.4hp)



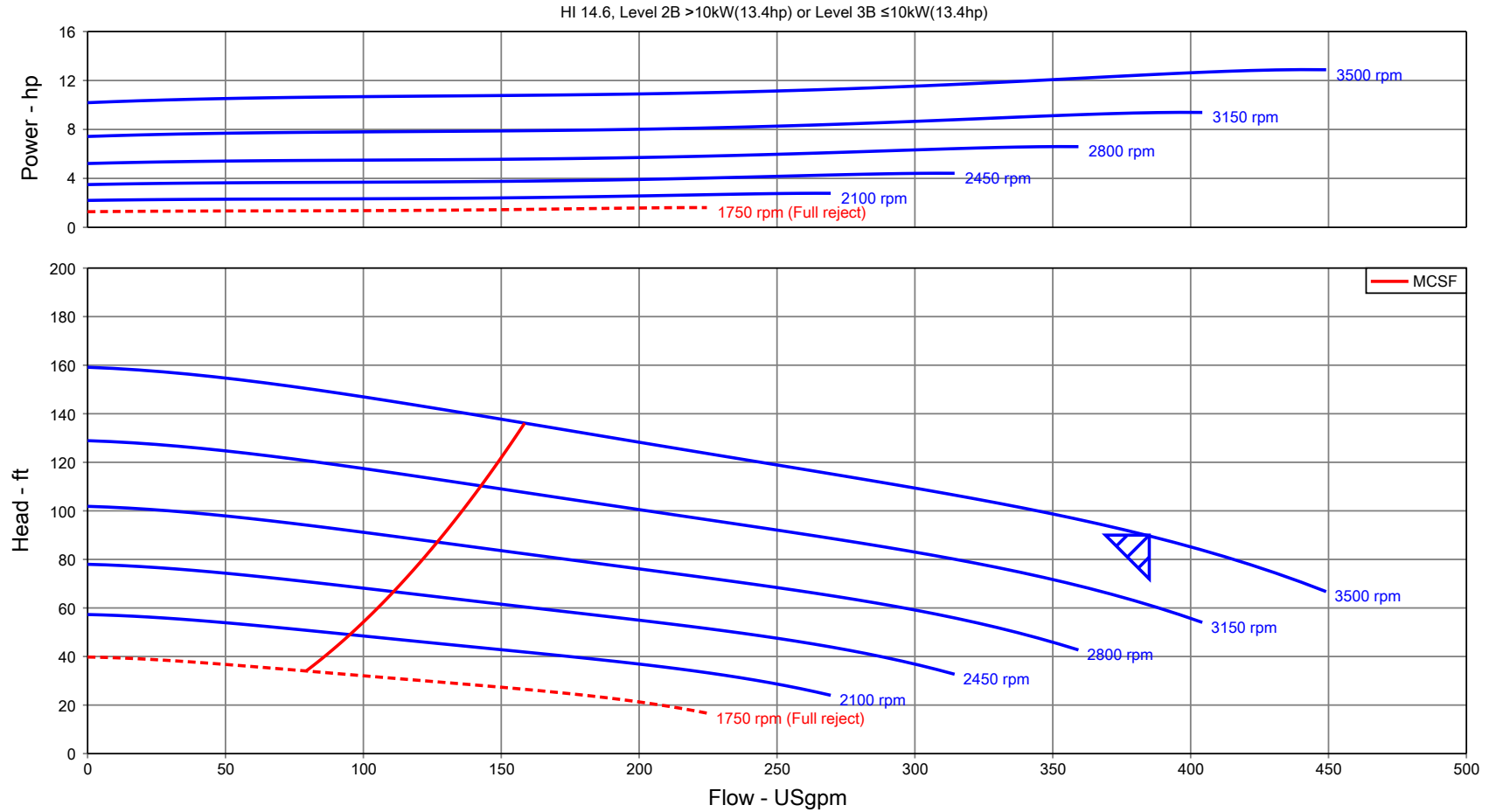
Item number	: 001	Product Description	: EVMSU64-1	Flow, rated	: 385.0 USgpm
Service	:	Stages	: 1	Differential head / pressure, rated	: 90.00 ft
Quantity	: 1	Speed, rated	: 3500 rpm	NPSH required	: 19.76 ft
Quote number	: 750566	Based on curve number	: EVMSU64-1-0	Fluid density, rated / max	: 1.047 / 1.047 SG
Date last saved	: 21 Dec 2025 9:45 AM	Basic model number	: -	Viscosity	: 2.02 cP
		Efficiency	: 73.18 %	Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
		PEI (CL)	: -		
		Power, rated	: 12.47 hp		



Customer :
Reference :

Multi-Speed Performance Curve

Ebara Quotation System 25.6.0



Item number	: 001	Product Description	: EVMSU64-1	Flow, rated	: 385.0 USgpm
Service	:	Stages	: 1	Differential head / pressure, rated	: 90.00 ft
Quantity	: 1	Efficiency	: 73.18 %	Speed, rated	: 3500 rpm
Quote number	: 750566	PEI (VL)	: -	Impeller diameter, rated	: 5.63 in
Based on curve number	: EVMSU64-1-0	Power, rated	: 12.47 hp	Fluid density, rated / max	: 1.047 / 1.047 SG
Basic model number	: -	NPSH required	: 19.76 ft	Viscosity	: 2.02 cP
Date last saved	: 21 Dec 2025 9:45 AM	Site Supply Frequency	: 60 Hz	Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
		Nominal speed	: 3525 rpm		

Construction Datasheet

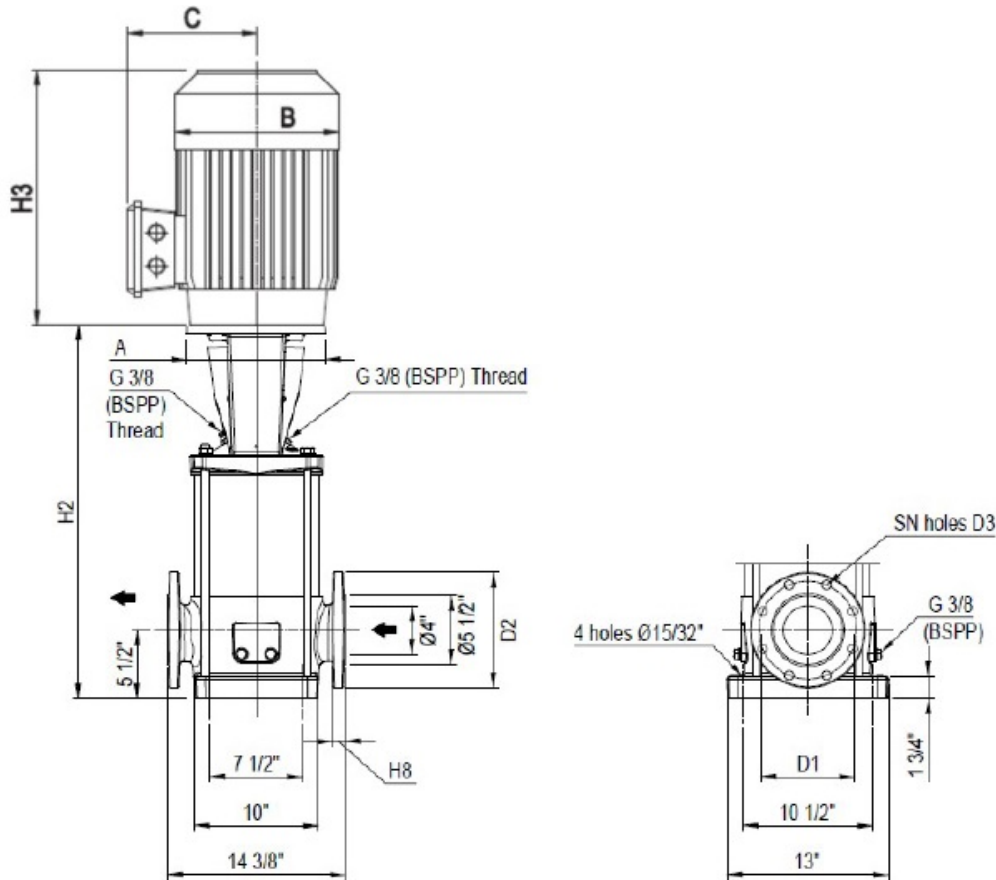
Customer	:	Quote number	: 750566
Customer reference	:	Pump Model	: EVMSUG64-1F1500D3S
Sales Order	: -	Quantity	:1
Job Name	: -	Date last saved	: 21 Dec 2025 9:45 AM
Pump Data			
Nominal Size	64	Discharge Size (in)	4"
Max Working Pressure (PSI)	230	Suction Size (in)	4"
Liquid Temperature Range	-22° - 248°F	Pipe Connection	F- #150 Round ANSI Compatible Flange
Pump Weight (lbs)	319		
Pump Materials of Construction			
Impeller	AISI 304	O-Ring	FPM
Intermediate Casing	AISI 304	Outer Casing	AISI 304
Liner Ring	AISI 304	Motor Bracket	Cast Iron
Bottom Casing	Cast Iron	Tie Rod	AISI 431
Casing Cover	AISI 304	Coupling	Cast Iron
Shaft	AISI 304	Base	Cast Iron
Shaft Sleeve Bearing	Tungsten Carbide		
Mechanical Seal and Ball Bearing Data			
Type	-	Elastomers	FPM
Rotating Part	SiC	Compression Ring	AISI 316
Stationary Part	Carbon	Collar	AISI 316
Motor Data			
Type	NEMA TC Frame	Synchronous Speed (RPM)	3500
Horsepower	15	Phase	Three
Enclosure	ODP	Voltage	230/460
Frame Size	215TC	Service Factor	1.15
Hertz	60	Current (A)	35.0/17.5

General Arrangement

EBARA Stainless Steel Vertical Multistage Pump

Dimensions

Model: EVMSUG64-1F1500D3S

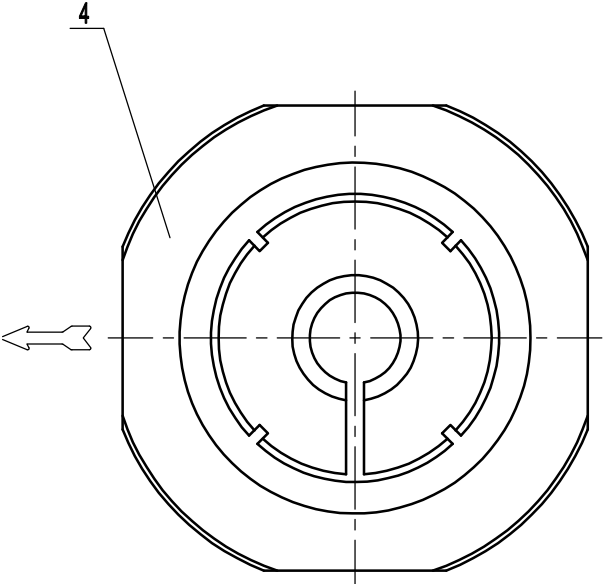
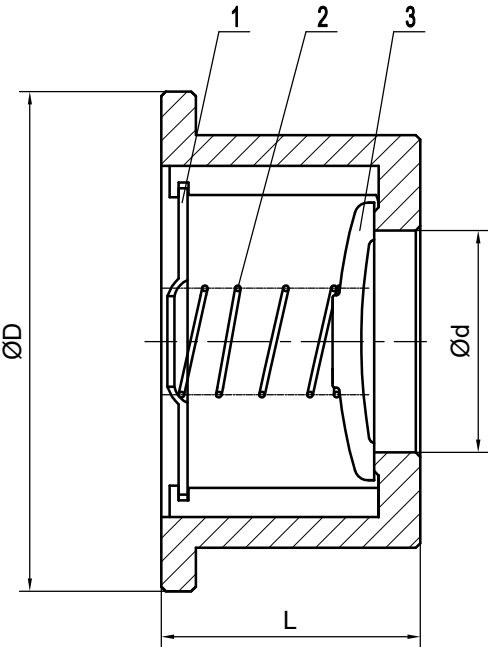


Max PSI	HP	NEMA Frame Size	-	A	B	C	H2	H3	D1	D2	D3	H8	SN
230	15	215TC	-	9.19	9.81	7.94	25.81	16.88	7.50	9.00	0.69	0.94	8

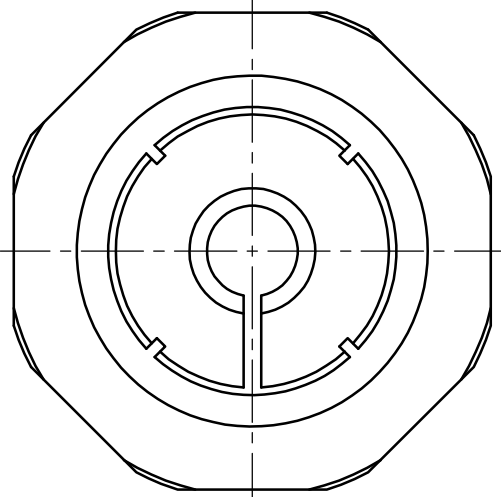
NOTES:

1. Dimensions are in inches

NPS	DN	d	L	D
1/2"	15	15	16	52
3/4"	20	19	19	62
1"	25	24	22	72
1 1/4"	32	31	28	83
1 1/2"	40	38	31.5	93
2"	50	48	40	107
2 1/2"	65	63	46	128
3"	80	76	50	142
4"	100	90	60	168
5"	125	120	90	194
6"	150	142	105	224



FOR 1/2"~2 1/2"
4 side



FOR 3" AND ABOVE
8 side

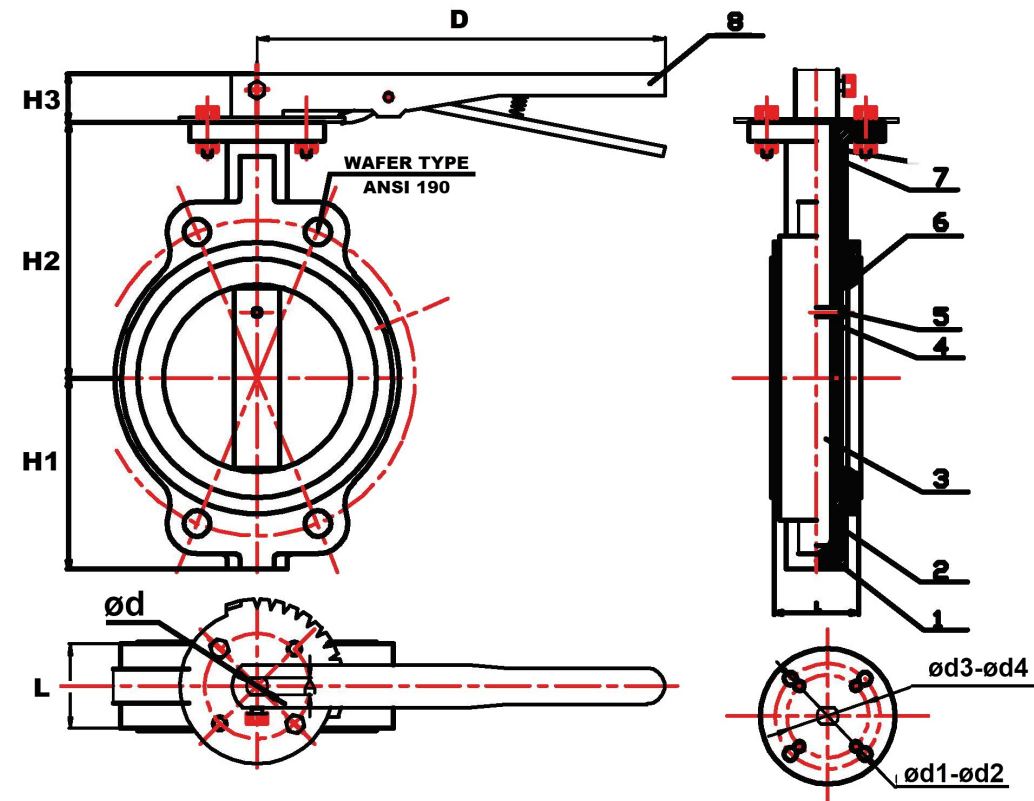
4	Body	CF8
3	Disc	CF8
2	Spring	304
1	Guide	304
NO:	PART NAME	MATERIAL

The technical requirements

- 1、Design and manufacture according to manufacturer's standard;
- 2、End connections: ANSI B16.5;
- 3、End to end according to DIN 3202-K4;
- 4、Sealing test (gas) : 0.6 ~ 0.8 MPa.

MARK	QTY	FILE NO.	SIGN	DATE	PATTERN MARKER	EDITION	SCALE	CHECK VALVE
DESIGN				170704				
CHECK						01	1:1	
AUDIT								
APPROVE					SHEET			H71W-400PSI

CHECKED BY
OLD DRAWING NO.
BASED DRAWING NO
SIGN
DATE

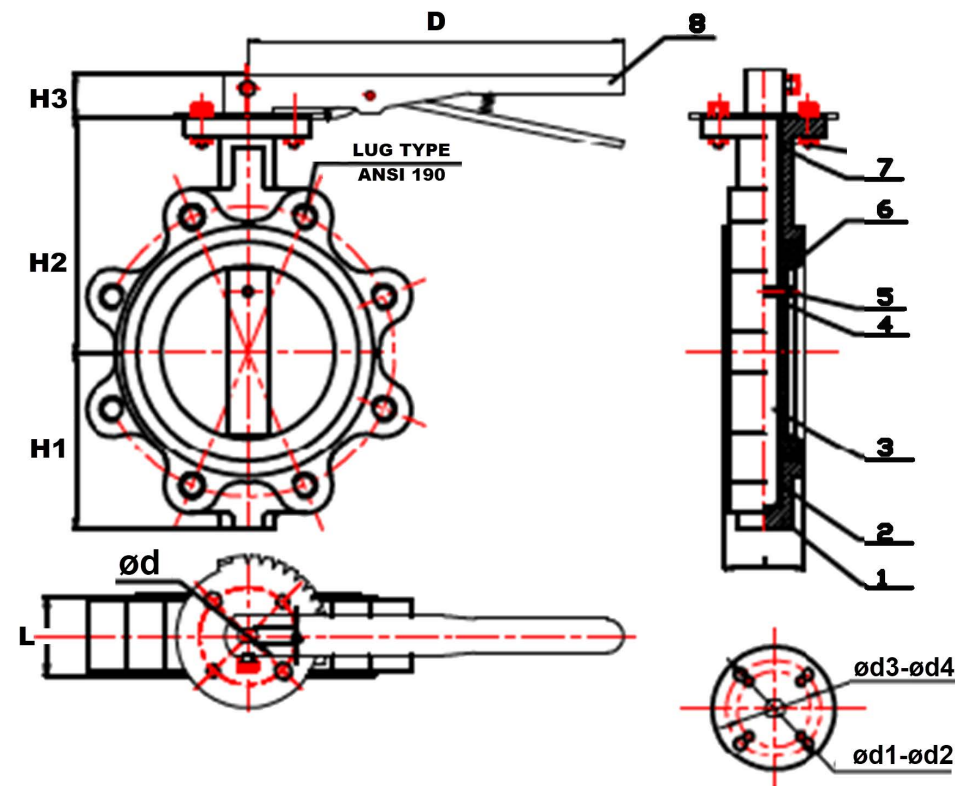


NO.	Part Name	Qty.	Material
1	BODY	1	D.I. Epoxy Coating
2	LONG BUSHING	3	PTFE
3	SHAFT	1	S.S. 316 S.S. 416
4	DISC	1	S.S. 316 C95400 DI
5	PIN	1	S.S. 316
6	SEAT	1	EPDM
7	SHORT BUSHING	1	PTFE
8	LEVER	1	D.I. Epoxy Coating

2-6"

NO.	Part Name	Qty.	Material
1	BODY	1	D.I. Epoxy Coating
2	LONG BUSHING	3	PTFE
3	SHAFT	1	S.S. 316 S.S. 416
4	DISC	1	S.S. 316 C95400 DI
5	PIN	2	S.S. 316
6	SEAT	1	EPDM
7	SHORT BUSHING	1	PTFE
8	LEVER	1	D.I. Epoxy Coating

8-12"



SIZE	H2	H1	H3	L	Ød	A	Ød1xn-Ød2	Ød3xn-Ød4	D	PSI Rating
2"	6.375	3.25	1.25	1.625	0.5	3/8	Ø2-3/4x4-Ø3/8		10.5	200 psig
2.5"	6.875	3.75	1.25	1.75	0.5	3/8	Ø2-3/4x4-Ø3/8		10.5	200 psig
3"	7.125	4	1.25	1.75	0.5	3/8	Ø2-3/4x4-Ø3/8		10.5	200 psig
4"	7.875	4.875	1.25	2.0625	0.625	1/2	Ø2-3/4x4-Ø3/8		10.5	200 psig
5"	8.375	5.375	1.25	2.125	0.75	9/16	Ø2-3/4x4-Ø3/8		10.5	200 psig
6"	8.875	5.875	1.25	2.1875	0.75	9/16	Ø2-3/4x4-Ø3/8		10.5	200 psig
8"	10.25	7.125	1.75	2.375	0.875	11/16	Ø4-15/16x4-Ø9/16	Ø4x4-Ø7/16	13.875	200 psig
10"	11.5	8.25	1.75	2.625	1.125	7/8	Ø4-15/16x4-Ø9/16	Ø4x4-Ø7/16	13.875	200 psig
12"	13.25	9.75	1.75	3	1.25	15/16	Ø4-15/16x4-Ø9/16		13.875	200 psig

- ☐ SUBMITTAL DRAWING
- ALL DIMENSIONS (XX) ARE FOR REFERENCE ONLY
- DO NOT SCALE DRAWING
- ☒ MANUFACTURING DRAWING
- LINEAR TOLERANCE ±1/4"
- ANGULAR TOLERANCE ±5°
- DO NOT SCALE DRAWING
- ALL DIMENSIONS ARE IN INCHES
- DIMENSIONS ARE PER ANSI Y14.5

SHEET DESCRIPTION:

2"-12" Centerline BFV

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	NAME	DATE
DRAWN BY:	E. KUREK	4/13/2021
APPROVED BY:	E. KUREK	4/13/2021
CHECKED BY:	B. Bolte	4/13/2021

PREMIERflow

6023 North Yorktown Avenue
Tulsa, OK 74130

PHONE: (918) 346-6312
WEB SITE: www.premier-flow.com

DESCRIPTION: APC Butterfly Valve Dimensions

Listing: NSF/ANSI/CA-61/372 Listed

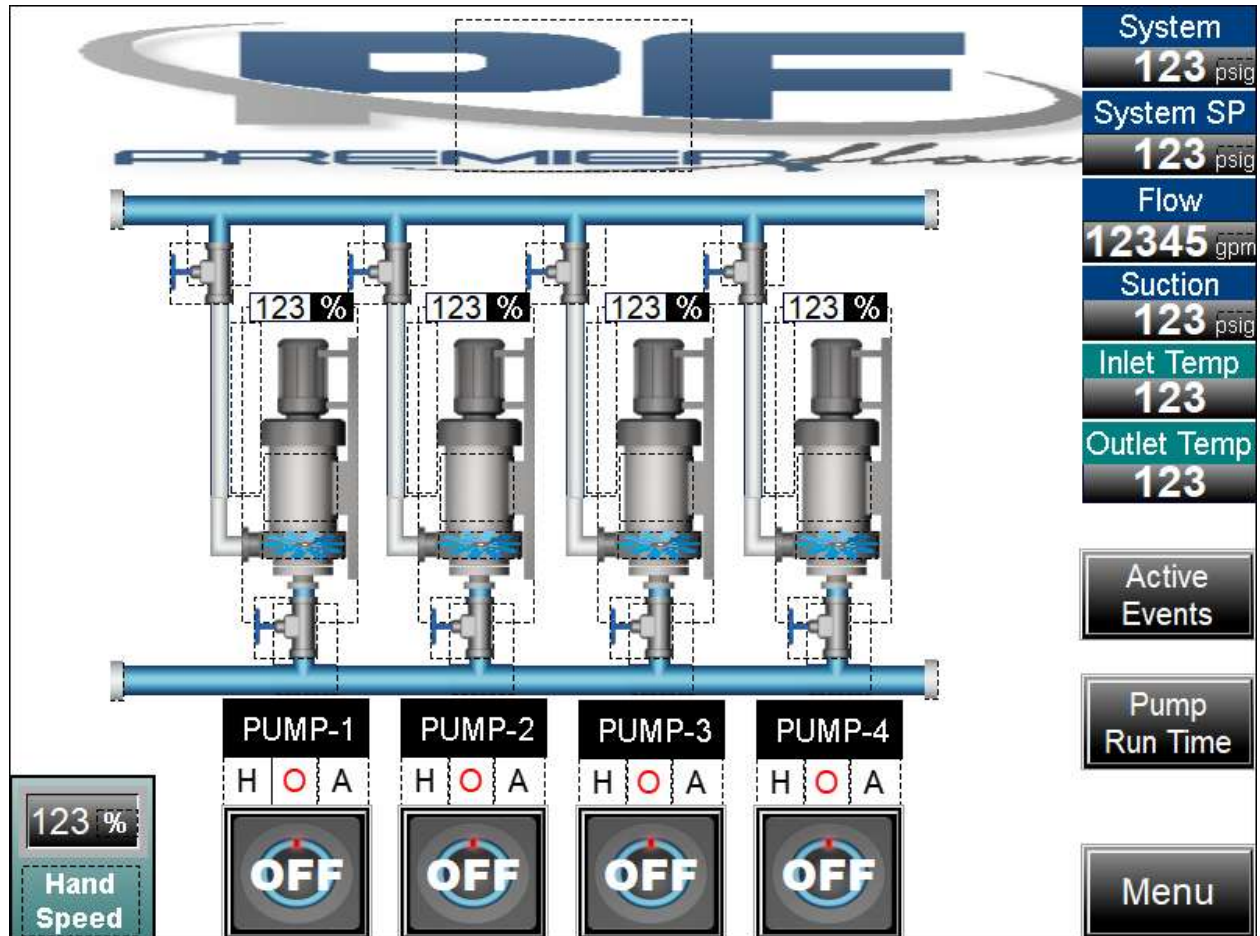
PROJECT: Standard Butterfly

REV 1

SHEET of SHEETS: 1/1

Manufacturer: MG-01

Domestic Water Booster Package



6023 N Yorktown Ave

Tulsa, OK 74130

918-346-6312

www.premier-flow.com

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1 Introduction:

The standard PREMIERflow Model PF-VFD controller provides automatic pump operation for one to six booster pumps. Each pump has a variable frequency drive. Controller continuously changes pump speed as required to maintain the system pressure set point.

The system is controlled by a Delta Electronics DVP PLC and a color touchscreen Human Machine Interface (HMI). PLC monitors pressure via pressure transducers on both the suction and discharge of the system and adjusts accordingly to maintain system pressure setpoint. The suction transmitter monitors package inlet conditions and helps protect pumps from dry run conditions. Package includes a flow meter which allows pumps to be staged ON based on pressure OR flow. Lag pumps stage OFF based on pressure AND flow (both pressure and flow set points must be met for Lag pumps to stop). This prevents Lag pumps from short cycling while flow is present. It also insures the lead booster pump continues to run until demand is within the jockey pump design capacity.

2 Sequence of Operation:

This system is designed to maintain water system pressure under a variety of flow conditions. Pumps are automatically sequencing based on system pressure and flow (if flow meter is present). Equally sized pumps running in parallel, run at the same speed.

2.1 Hand Mode:

Each pump can be run manually from either the HMI or the VFD keypad. With all VFD keypads in auto, change a pump HOA on the touchscreen HMI to Hand and pump will ramp to the Hand % speed setting. Touch the Hand speed setting to change the speed. Pumps running in hand will respond to the setting change immediately.

To manually operate a pump from the VFD keypad, press the Hand button and increase / decrease speed using the up and down arrow keys. Press Stop to shutdown a pump running locally in Hand.

Hand operation whether from the HMI touchscreen or the VFD keypad overrides all system safeties. Therefore, it should only be used for maintenance or emergency situations. Hand operation is not meant for unattended operation. Doing so could result in damage to pumps

and / or the water distribution system. The owner assumes all operational responsibility while pumps are running in Hand.

2.2 Auto Mode:

A pump is considered available to run automatically while both the touch screen and VFD HOAs are in AUTO, and no fatal alarms exist. Fatal alarms include low suction, high system pressure, high flow, pressure sensor failure (suction / system) and pump failure. See the Alarm section below for further details on alarms. While reviewing normal Auto operation, it is assumed no alarms exist and all pumps are available to run automatically.

2.2.1 Jockey Pump Operation

The jockey pump (lead) starts when system discharge pressure drops below the lead start set point for the ON-delay period. Lead pump VFD immediately ramps the motor to the initial starting speed setting. A time delay allows the pump to reach this speed before additional speed changes are made. The initial starting speed is the speed required to produce the system design pressure at zero flow. To determine this setting, deadhead the pump and manually increase VFD speed until the design pressure is achieved. The speed at which this occurs is the initial speed setting. Once the lead pump has time to reach this speed, pressure controls automatically adjust pump speed as required to maintain the system pressure setpoint. The lead pump will not stop until pressure control reduces pump speed to the initial speed setting or less. When this occurs the lead pump continues to run for the OFF-delay time and stops.

When the jockey pump HOA is OFF or is not available, the lead pump alternates between the two booster pumps. If HOAs for jockey pump and both boosters are OFF, the high service pump becomes the lead pump.

2.2.2 Booster Pump Operation

The first booster (Lag) starts when system flow exceeds jockey pump capacity OR system pressure falls below the Lag start pressure for the ON-delay period. Typically, Lag pump flow setpoint is the jockey pump design flow plus 5 gpm. The booster pump continues to run until BOTH system pressure AND flow are equal to or less than the stop setpoints for the OFF-delay period.

As flow increases to the Lag2 flow setpoint OR system pressure falls below the Lag2 start pressure setpoint the second booster pump starts after the ON-delay period. Both boosters are running together at the same speed. Speed automatically modulates as required to maintain the system pressure setpoint (Lead pump stop pressure set point). Both booster continue to run together until BOTH the flow is less than the Lag2 setpoint and the Lag2 stop

pressure setpoint is met for the OFF-delay period. The Lag2 booster stages OFF. Lag booster continues to run until BOTH system flow AND pressure setpoints are satisfied.

2.2.3 High Service Pump Operation

When system flow exceeds the Lag3 setpoint OR system pressure is less than the Lag3 setpoint the High Service Pump starts after the ON-delay. All boosters stop. High service pump immediately ramps to its initial speed setting. After this speed is reached, pump speed ramps up and down as required to maintain system pressure.

As system flow falls below the Lag3 setpoint, flow is now within the capacity of the two booster pumps and the high service pump stages OFF. Booster pumps start and resume providing water to the system.

High service pump provides water during high flow events such as system flushing and will seldom run. During long periods of no use, it is automatically exercised to maintain and prove operability. Exercise settings include days since last run, exercise speed and duration. These settings are found on the pump start / stop settings screen and are readily adjustable. If the high service pump fails to run during an exercise routine, a pump failure alarm is generated. This failure alerts operators to the need for maintenance and service.

2.3 Pump Alternation

Three alternation options are provided for booster pumps. These options are found on the pump alternation settings screen and include:

- Manual
- Auto
- Timed

Manual mode maintains the same lead booster pump until an operator selects the ALTERNATE button on the alternation settings screen. Auto mode alternates lead boosters each time all boosters stop (pumps 2 and 3). If pump 2 starts first, after all boosters stop, pump 3 starts first next time.

In applications where a booster pump runs for long periods, the timed mode insures regular lead alternation. Timed alternation provides three options: daily, weekly or monthly. When daily alternation is selected, lead pump will alternate at the time specified each day. Weekly alternation allows alternation to occur on a specified day of the week and time. Monthly alternation occurs during the first week of the month on the day and time specified. If the current lead pump is running at the time of alternation, the new lead pump starts and ramps to speed, before the original lead is stopped. If the new lead were to fail to run, the current

lead pump continues to run as system flow requires. Timed alternation still occurs even if no booster pumps are running.

Regardless of alternation mode, pumps will not alternate if the new lead pump is not auto available. The new lead must be in Auto at the touchscreen and not in a failed state. Otherwise, the current lead pump continues to run as required to satisfy system flow conditions.

3 System Alarms

System alarms protect the pump package and water system, while alerting operators to abnormal conditions that could need attention. These include the following:

- High System pressure
- Low system pressure
- Low suction pressure
- High flow
- Pump failure
- Sensor failure
 - System pressure
 - Suction pressure
 - Flow meter

System status screen lists all active alarms and provides buttons for operators to Acknowledge (silence alarm horn) and/or Reset. All alarms have user adjustable setpoints and delays on the alarm settings screen. Manual and automatic reset options are provided when applicable. Manual reset maintains the alarm condition until an operator resets it at the touchscreen HMI. Auto reset, resets the alarm once the alarm condition no longer exists for the OFF-delay period.

3.1 System Pressure Alarms

System pressure alarms protect the system from damage and alert operators when system pressures do not satisfy minimum requirements.

High pressure alarm protects the water distribution system piping. When pressure is equal or greater than the high pressure setpoint for the ON-delay period, a high system pressure alarm is generated. This alarm shuts down all pumps (jockey, booster, and high service) immediately and prevents them from starting.

Low pressure alarm alerts operators when system pressure is near or below minimum system requirements. Depending on the setting, this alarm could identify the need for a boiled water notice for customers. It also makes operators aware of a water delivery problem, due to pump or transmitter failures.

Both of these high and low pressure alarms are provided with Manual / Auto reset options. Manual option requires an operator to acknowledge and reset the alarm at the HMI touch screen. Auto reset option, resets the alarm once pressure had returned to a normal range for the specified OFF-delay period.

3.2 Suction Pressure Alarm

Suction pressure alarm is provided to protect pumps from cavitation and dry run conditions. Low suction alarm is generated when suction pressure is less than or equal to setpoint for the ON-delay period. It is a fatal alarm that shuts down all pumps and prevents them from starting.

This alarm is provided with a Manual / Auto reset option. Manual option requires an operator to acknowledge and reset the alarm at the HMI touch screen. Auto reset option, resets the alarm once pressure had returned to a normal range for the specified OFF-delay period.

3.3 High Flow Alarm

High flow alarm is provided to help detect a major rupture in distribution system piping. Alarm setting should be hundreds of gpm higher than the maximum system design flow. If flow exceeds this setpoint for the ON-delay period, a high flow alarm is generated and all pumps are shut down and prevented from starting.

Due to the intended purpose of this alarm (detecting a catastrophic system failure), auto reset is not provided. High flow alarm must be reset manually. This gives operators the opportunity to review the system for damage prior to resetting. If this feature isn't desired, the setpoint should be set to the maximum range, 9999.

3.4 Pump Failure Alarm

When a pump is automatically commanded to run and doesn't, it is tagged as failed. Pump run status is verified via the VFD running dry contact. Once a pump is failed, it is excluded from the automatic start / stop routine until this alarm is reset.

Possible causes of this alarm include the following:

- VFD is not powered up.
- VFD is not in AUTO.
- VFD has a fault.
- Loose run command wiring.
- Loose run feedback wiring.

3.5 Sensor Failure Alarms

This package includes three analog sensors: system pressure, suction pressure, and system flow. Each provide 4-20mA feedback to the control system. A sensor failure alarm is generated when a signal is less than 3.5 mA or greater than 20 mA. These alarms alert operators to a potential transmitter failure or loose wire. Each alarm automatically resets when the respective signal returns to the normal 4-20mA range.

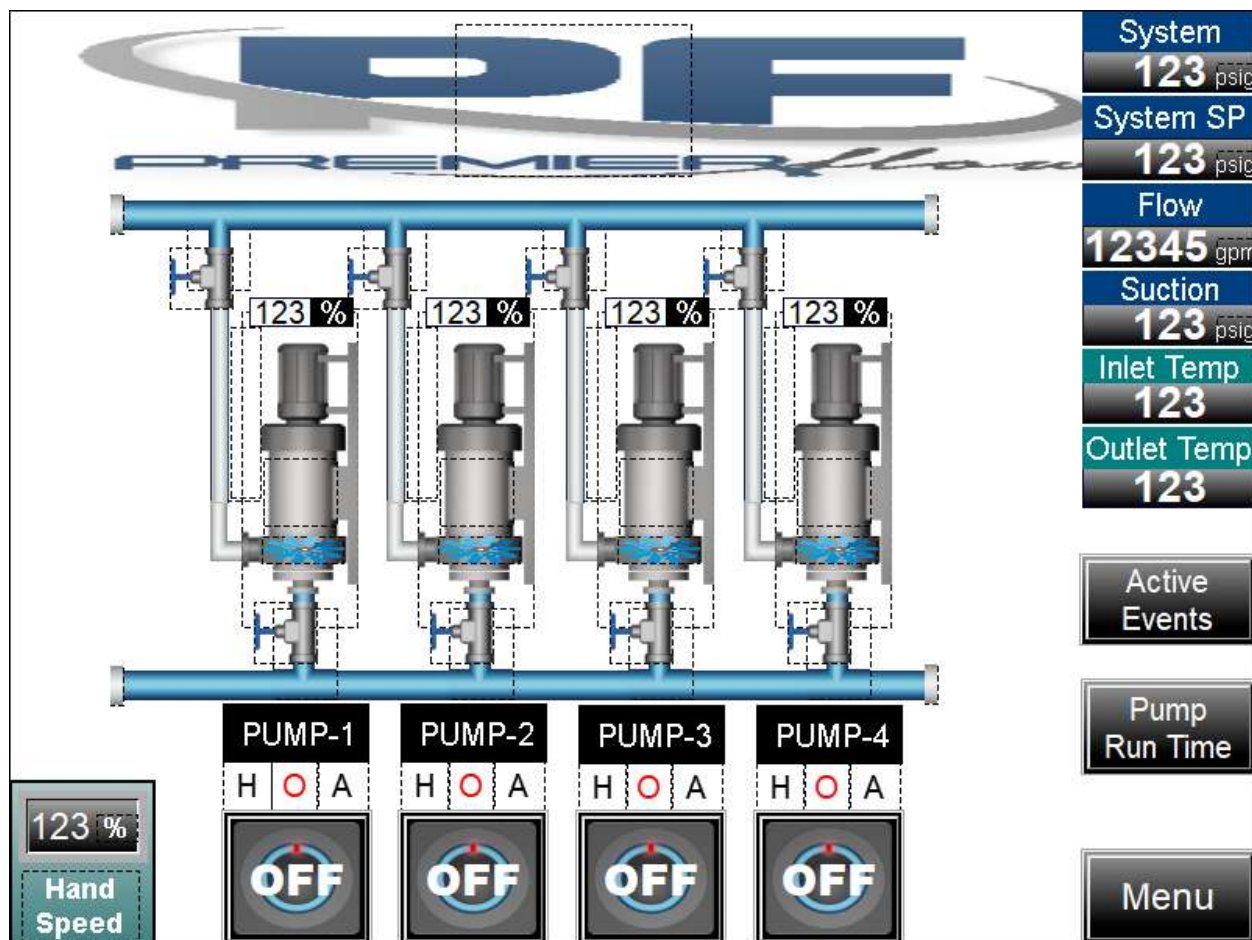
Both the system and suction pressure failure alarm shut down all pumps and prevent automatic starting. Pumps can be ran in hand from HMI or VFD keypads.

Flow meter failure is not a fatal alarm and does not shut down pumps. It does disable pump flow sequencing. Pumps will continue to start and stop as needed, however, pumps will tend to short cycle due to the absence of flow feedback.

4 Operating Screens

This section contains typical screen shots from the touch screen operators panel (HMI).

4.1 Main Screen



This is the main system operating screen.

- All HOA are shown in the OFF position. Touch to change.
- Red triangle indicates Jockey Pump 1 has failed to run. Select “Active Event” to reset.
- “Exercise” label means the Hi Service pump exercise route is active.
- Select Hand Speed to change pump hand operating speed.
- “Active Events” button opens summary screen of all active conditions.
- Menu button opens the main menu screen.

4.2 Pump Run Times

The screenshot shows a control interface titled "Pump Run Time". It features a table with four rows, each representing a pump. The first column is labeled "Pump" and contains numbers 1 through 4. The second column is labeled "Run Time" and shows the value "12345678.9 hrs" for each pump. To the right of each run time value is a red "RESET" button. Below the table, there are four buttons: "Back", "HH:MM:SS", "mm/dd/yy", and "Main".

Pump	Run Time	RESET
1	12345678.9 hrs	RESET
2	12345678.9 hrs	RESET
3	12345678.9 hrs	RESET
4	12345678.9 hrs	RESET

Back HH:MM:SS mm/dd/yy Main

Display shows the actual pump run time. Run time is based on the VFD running contact. It includes run time for both PLC commanded and local run commands at the VFD.

Touch a reset button to clear the time register for the respective pump.

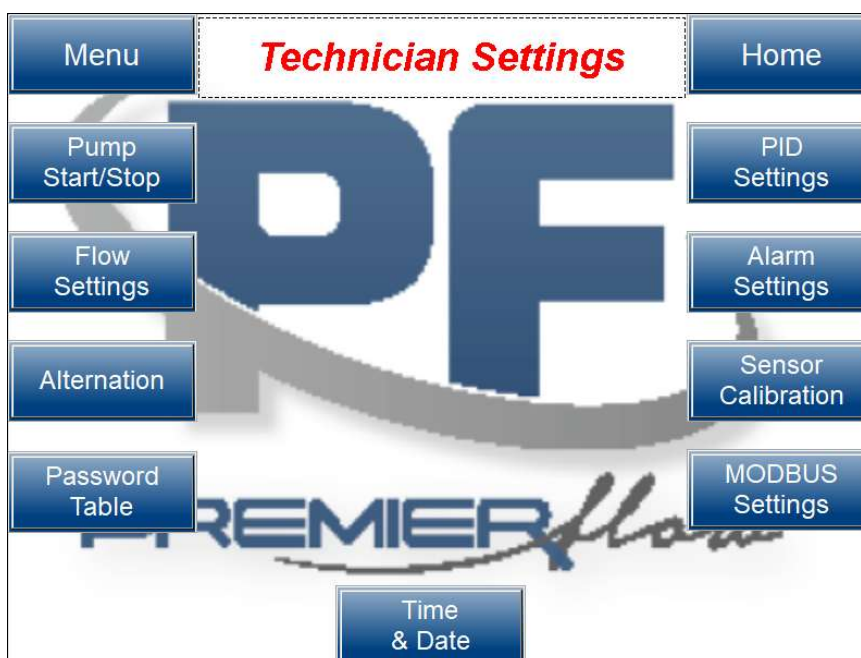
4.3 Menu Screens

Two menu screens are provided. The main menu screen is available to anyone touching the screen. The Technician menu screen requires a password to access and provides access to password protected system settings.

4.3.1 Main Menu



4.3.2 Technician Menu



4.4 Pump Start / Stop Settings

Pump Start/Stop Settings					
	Start Pressure (0-999 psig)	Stop Pressure (0-999 psig)	Start / Stop Flow (0-9,999 gpm)	Start Delay (0-999 sec)	Stop Delay (0-999 sec)
LEAD	123	123		123	123
LAG1	123	123	1234	123	123
LAG2	123	123	123	123	123
HI Service	123	123	123	123	123

Exercise HI Service Pump

Exercise Now

Max days between runs

123 days

Duration of Run

123.4 sec

Exercise Speed

123 %

Back

HH:MM:SS

mm/dd/yy

Menu

Screen provides overview of all pump start / stop settings including the exercise HI service pump routine. Touch any number to change the setting.

4.5 Fault (Alarm) Settings

Main Menu		Fault Settings			Return
	Activation	Reset	On Delay 0-999 Sec	Stop Delay 0-999 Sec	
Low Discharge (PSI)	123		123		
High Discharge (PSI)	123	Manual	123	123	
Low Suction (PSI)	1234	Manual	123	123	
High Level (FT)	123.4	Manual	123	123	
Float Switch Suction Bypass	No				
Pump Failure Delay			123		

Screen provides overview of all alarm settings. Touch any number to change the setting.

4.6 Pump Alternation

Three modes of pump alternation are provided. Two screens are provided for setup. The alternation mode is selected on the first screen. The second screen only applies to the Timed (Monthly/Weekly/Daily) alternation option.

4.6.1 Alternation Mode

Main Menu	Alternation		Return
Auto (Default)	Off		
Monthly/ Weekly/Daily	Off	M/W/D Setup Screen	
Manual	Off	Change Lead	
		Current Lead Pump	1

Touch the button shown as “Off” in the middle column to select an alternation mode. The options are “Auto,” “Monthly/Weekly/Daily” (Timed), and “Manual.”

Please refer to the Alternation section of the sequence of operation for additional details.

4.6.2 Timed Alternation Settings (M/W/D Setup Screen)

Main Menu		Monthly/Weekly/Daily Alternation		Return	
Monthly - (1st wk of mo.) Select Day	Off	Day of Wk. (Monday=1)	1		
Weekly Select Day	Off	Day Selected			
Daily Select Time of Day	Off	12	:	12	
		HH	:	MM	
		HH:MM:SS mm/dd/yy			

Touch the button shown as “Off” in the middle column to setup timed alternation mode. The options are “Monthly”, “Weekly”, and “Daily.”

- Daily alternation requires a time entry (24hr clock).
- Weekly alternation requires a time and day of week (1= Monday ... 7= Sunday).
- Monthly alternation also requires a time and day. Monthly alternation occurs the first week of each month on the corresponding weekday and time.

Please refer to the Alternation section of the sequence of operation for additional details.

4.7 Speed Control

The screenshot displays the 'Speed Control' interface. It features several input fields for speed settings, a table for error and response rates, and real-time system data.

Parameter	Value	Unit
Initial Jockey Speed	12.3	%
Initial Booster Speed	123.4	%
Initial Hi Serv Speed	123.4	%
Integration Time	12.3	sec
Power UP Start Delay	12.3	sec
No Flow Speed (Req Boost @ no flow)	12.3	%
Min Speed	12.3	%
Deadband (SP +)	12.3	psi

Error (psig)	Response (% Speed Chg)
12.3	Fine 12.3
12.3	Normal 12.3
12.3	Coarse 12.3

System	Value	Unit
Flow	12345	gpm
PV System	123	psig
SP System	123	psig
Output	123.4	%

Navigation buttons: Back, HH:MM:SS, mm/dd/yy, Main.

Settings on this screen control the system speed response. Upper left box has settings for the initial speed for the jockey, boosters and hi service pumps. When each of these pump start, these are the speed commands.

Jockey pump initial speed should be the speed required to produce the system pressure set point at no flow. The initial booster speed is the speed required to produce the same flow as the jockey at 100% speed. Hi serv initial speed setting is provided to provide a softer transition from booster pumps to the larger Hi Service pump.

- Integration time is the minimum time between speed changes. (typically 1s)
- Power up delay allows system to avoid start attempts during power outages / brown out on/off short cycles.
- No flow speed is the same as the jockey pump initial speed setting.
- Minimum speed is the lowest speed a pump is allowed to run. This setting should be less than all initial speed settings.
- Deadband is pressure range +/- the setpoint in which no speed changes are made.

- Error is the difference between the setpoint and actual pressure minus the deadband. Three error levels are provided. Typical settings are:
 - Error (Fine level) = 5 psi
 - Normal Error Level = 15 psi
 - Coarse Error Level = 25 psi
- Response is the speed change made each integration cycle for each error level. Typical settings are:
 - Fine response = 0.5 %.
 - Normal response = 3%.
 - Coarse response = 5%.

4.8 Sensor Calibration

Menu		Sensor Calibration		Return	
*Touch Each Number to Change					
Level Sensor Range (0-99 PSI)	123.4	Level Sensor Present			
Discharge Sensor Range (0-999 PSI)	123				
Number of Pumps Present (0-4)	1	Lead Pump Allowed to Stop			
Water Present Switch	No				
Maximum Output Speed (0-100%)	123				
Incoming Temperature Transmitter Range (f)	123	No Incoming Temperature Transmitter Present			
Outlet Temperature Transmitter Range (f)	123	No Outlet Temperature Transmitter Present			

Screen shows max range for each sensor. Touch number to change range for a respective sensor.



- 3Ø 230V:1.0HP~125HP
- 3Ø 460V:1.0HP~800HP
- 3Ø 575V:1.0HP~125HP

Significant Energy Savings With LS Drive Solutions

The H100+ Drive was developed to build an environment-friendly system that realizes significant energy savings in the commercial and industrial field of fans/pumps and water treatment applications based on leading drive solutions.



System Protection

To protect your pump and application, the following functions are provided for users: Soft Fill; start and stop slope adjustment; valve deceleration time setting; multi-motor control; and underload detection, pipe broken, pump clean



Optimized for HVAC and Water Treatment

User-friendly functions for convenient use of fans/pumps such as Fire mode, Lead lag, auxiliary motor PID compensation and load tuning.



Applications

- Building • Metal • Pulp/paper • Coal mine
- Oil/gas and water treatment; (fan/pump, dryer)



Product Type & Model

LSLV 0008 H100 - 4 C O F N(PLUS)

LS Low Voltage Drive Series

Motor Capacity
0008: 0.75kW~5000: 500kW

Series Name

Input Voltage
2: 3Ø 200~240 (V)
4: 3Ø 380~480 (V)
5: 3Ø 525~600 (V)

Keypad Type
C: LCD Keypad

UL Type
O: UL Open
E: UL Type1

EMC Filter
F: Built-in EMC
N: Non EMC

Reactor
D: Built-in DC Reactor
N: Non DC Reactor
PLUS: Sub Series Name

Main Features

Features	Description	Benefits
HVAC-only Features	Multi Motor Control, PID operation, flow (flux) compensation, scheduling operation, lead-lag function	Optimized operation for HVAC applications
Fan/Pump Protection Features	Protective functions include Soft Fill; valve deceleration time setting; pump clean; pipe breakage level detection; Underload Detection; lubrication Fire Mode	Support for optimized fan/pump system performance; extended life of machinery with load; and reduced maintenance cost
Built-in EMC Filter	400V 5.5~30kW, 110~500kW built-in(C3) 400V 37~500kW built-in option (C3) ※ With a filter, 75~90kW meets the EMC standard	Reduced electromagnetic noise and additional space and cost for parts unnecessary
Various Field Networks	RS-485 and BACnet network support for general HVAC system; Modbus-RTU, Metasys N2 and LonWorks options	Connectable with all widely-used field networks; simple maintenance of option cards and easy mounting
Reduced Product Size and Side-by-Side Installation	The product size is reduced up to 60% of its original size; simple replacement of cooling fans; installation span between products is about 2mm	Reduced installation area; and when installing multiple motors, the control panel size is significantly reduced
DC Reactor	400V 37~500kW products have a built-in DC reactor	Improved power factor; and THD reduction
Global Standard Requirement	UL Plenum-Rated; obtained a certificate of new UL 61800-5-1 (improved quality of insulation distance)	Product reliability enhanced as it meets the new global standard

Control

Control Mode	V/F control, Slip compensation
Frequency Setting Resolution	Digital command: 0.01Hz Analog command: 0.06Hz (based on 60Hz)
Frequency Level	1% of the peak output frequency
V/F Pattern	Linear, square torque reduction, user V/F
Overload Tolerance	0.75~90kW rated current: 120% 1min 110~500kW rated current: 110% 1min
Torque Boost	Passive torque boost; auto torque boost

Operation

Operation Mode	Keypad, Terminal block, Communication network options		
Frequency Setting	Analog method: -10 ~ 10V, 0 ~ 10V, 0 ~ 20mA Digital method: keypad, pulse train input		
Operation Function	PID control; 3-wire operation; frequency limit; secondary function; forward/backward rotation prohibited; power switch; speed search; power brake; leakage-reduced operation; up-down operation; DC braking; frequency jump; slip compensation; auto restart; auto tuning; energy buffering operation; flux braking; energy saving operation		
Input	Multifunctional Terminal (7 inputs)	PNP(Source), NPN(Sink) options According to the parameter setting of IN-65~71 codes, the following functions can be set. Forward operation; reset; emergency trip; switching frequency – high/middle/low; DC braking upon stop; frequency increase; 3-wire operation; acceleration or deceleration stop; MMC interlock; backward operation; external trip; job operation; acceleration/deceleration by stage – high/middle/low; second motor option; frequency decline; analogue command fixed frequency; switching to the general operation during PID operation; Pre Heat; pump cleaning; RTC (time event function)	
	Pulse Train	0~32kHz, Low Level: 0~0.8V, High Level: 3.5~12V	
Output	Multifunctional Open Collector Terminal		DC26V, 50mA or below
	Fault Relay Terminal	Fault output and drive operation mode output	N.O.: AC 250V, 2A or below; DC 30V, 3A or below N.C.: AC 250V, 1A or below; DC 30V, 1A or below
	Multifunctional Relay Terminal		AC250V, 5A or below, DC30V, 5A or below
	Analog Output	0~12Vdc(0~20mA): Frequency, output current, output voltage, DC voltage options	
	Pulse Train	Up to 32kHz, 0~12V	

H100+

Fan & Pump Drive

Three Phase 200 ~ 240 VAC (-15% ~ +10%)

UL Three Phase Ratings				UL Single Phase Ratings		Model Number	Order Code	Dimensions(in) W X H X D	Approx. Weight (lbs.)	
Normal Duty(VT) 120%(~125HP) / 110%(150~800HP) for 60 seconds		Heavy Duty(VT)120% for 60 seconds		Normal Duty(VT) Single Phase Output						
HP	Output Current	HP	Output Current	HP	Amps					
1	5	0.5	2.5	0.5	2.9	LSLV0008H100-2CONN(PLUS_NEW)	67300001PL	6.3 X 9.1 X 7.1	7.3	
2	8	1	5	1	4.4	LSLV0015H100-2CONN(PLUS_NEW)	67300002PL			
3	12	2	8	1.5	6.4	LSLV0022H100-2CONN(PLUS_NEW)	67300003PL			
5	16	3	11	2	8.4	LSLV0037H100-2CONN(PLUS_NEW)	67300004PL			
7.5	22	5	17	3	11	LSLV0055H100-2CONN(PLUS_NEW)	67300005PL			
10	30	7.5	24	5	16	LSLV0075H100-2CONN(PLUS_NEW)	67300006PL			
15	42	10	32	5	23	LSLV0110H100-2CONN(PLUS_NEW)	67300007PL			
20	56	15	46	7.5	30	LSLV0150H100-2CONN(PLUS_NEW)	67300008PL	7.1 X 11.4 X 8.1	10.1	
25	69	20	60	10	37	LSLV0185H100-2CONN(PLUS_NEW)	67300009PL	8.7 X 13.8 X 8.8	15.6	
30	82	25	68	15	45	LSLV0220H100-2COND(PLUS_NEW)	67360010PL	10.8 X 17.7 X 11.2	55.8	
30	82	25	68	15	45	LSLV0220H100-2COFD(PLUS_NEW)	67360011PL			
40	110	30	81	20	58	LSLV0300H100-2COND(PLUS_NEW)	67360012PL	12.8 X 20.1 X 11.2	72.5	
40	110	30	81	20	58	LSLV0300H100-2COFD(PLUS_NEW)	67360013PL			
50	142	40	106	25	78	LSLV0370H100-2COFD(PLUS_NEW)	67360014PL	12.8 X 21.7 X 12.2	86.4	
60	169	50	136	30	92	LSLV0450H100-2COFD(PLUS_NEW)	67360015PL			
75	223	60	169	40	122	LSLV0550H100-2COFD(PLUS_NEW)	67360016PL	11.8 X 27.8 X 15.2	118.2	
100	264	75	195	50	145	LSLV0750H100-2COFD(PLUS_NEW)	67360017PL			
125	325	100	255	60	178	LSLV0900H100-2COFD(PLUS_NEW)	67360018PL	15.0 X 27.8 X 15.6	159.2	

Three Phase 380 ~ 480 VAC (-15% ~ +10%)

UL Three Phase Ratings				UL Single Phase Ratings		Model Number	Order Code	Dimensions(in) W X H X D	Approx. Weight (lbs.)	
Normal Duty(VT) 120%(~125HP) / 110%(150~800HP) for 60 seconds		Heavy Duty(VT)120% for 60 seconds		Normal Duty(VT) Single Phase Output						
HP	Output Current	HP	Output Current	HP	Amps					
1	2.5	0.5	1.3	0.5	1.6	LSLV0008H100-4COFN(PLUS_NEW)	67310025PL	6.3 X 9.1 X 7.1	7.3	
2	4	1	2.5	1	2.4	LSLV0015H100-4COFN(PLUS_NEW)	67310026PL			
3	6	2	4.0	1.5	3.5	LSLV0022H100-4COFN(PLUS_NEW)	67310027PL			
5	8	3	5.5	2	4.6	LSLV0037H100-4COFN(PLUS_NEW)	67310028PL			
7.5	12	5	8	3	6.8	LSLV0055H100-4COFN(PLUS_NEW)	67310029PL			
10	16	7.5	12	5	9.2	LSLV0075H100-4COFN(PLUS_NEW)	67310030PL			
15	24	10	15	7.5	14	LSLV0110H100-4COFN(PLUS_NEW)	67310031PL		7.5	
20	30	15	22	10	17	LSLV0150H100-4COFN(PLUS_NEW)	67310032PL	7.1 X 11.4 X 8.1	10.1	
25	38	20	28	10	22	LSLV0185H100-4COFN(PLUS_NEW)	67310033PL		10.6	
30	45	25	35	15	26	LSLV0220H100-4COFN(PLUS_NEW)	67310034PL	8.7 X 13.8 X 8.8	16.5	
40	61	30	41	20	36	LSLV0300H100-4COFN(PLUS_NEW)	67310035PL			
50	75	40	55	25	39	LSLV0370H100-4COFD(PLUS_NEW)	67310012PL 67310036PL	10.8 x 17.7 x 11.2	57.3	
60	91	50	67	30	47	LSLV0450H100-4COFD(PLUS_NEW)	67310013PL 67310037PL			
75	107	60	81	40	55	LSLV0550H100-4COFD(PLUS_NEW)	67310014PL 67310038PL	12.8 x 20.1 x 11.2	77.2	
100	142	75	106	50	73	LSLV0750H100-4COFD(PLUS_NEW)	67310015PL			
125	169	100	136	60	86	LSLV0900H100-4COFD(PLUS_NEW)	67310016PL	12.8 x 21.7 x 12.2	94.8	
150	223	125	169	60	93	LSLV1100H100-4COFD(PLUS_NEW)	67310041PL			
200	264	150	195	75	101	LSLV1320H100-4COFD(PLUS_NEW)	67310042PL	11.8 x 27.8 x 15.2	123	
250	325	200	255	100	137	LSLV1600H100-4COFD(PLUS_NEW)	67310043PL			
300	370	250	303	125	137	LSLV1850H100-4COFD(PLUS_NEW)	67310044PL	15.0 x 27.8 x 15.6	164.7	
350	432	250	345	150	181	LSLV2200H100-4COFD(PLUS_NEW)	67310045PL			
400	481	300	375	150	218	LSLV2500H100-4COFD(PLUS_NEW)	67310046PL	17.3 x 36.3 x 17.3	264.6	
500	613	400	478	150	232	LSLV3150H100-4COFD(PLUS_NEW)	67310047PL			
550	683	450	541	200	245	LSLV3550H100-4COFD(PLUS_NEW)	67310048PL	23.6 x 39.4 x 19.7	409.0	
650	770	500	591	250	280	LSLV4000H100-4COFD(PLUS_NEW)	67310049PL			
800	962	650	740	350	361	LSLV5000H100-4COFD(PLUS_NEW)	67310050PL	30.6 x 41.5 x 19.7	584.2	

	Conduit Connection Box NEMA1 Enclosure	Flange Mount Kit Heat Sink Out the Back	Additional Data			Disconnect Switch Option	
	Order Code	Order Code	Keypad	Reactor	Filter	Model Number	Order Code
	64160002	64150016	Built-in LCD keypad	NO	NO	MMS-32H,8A & HANDLE,MEH32R,115,UL	64160028
						MMS-32H,13A & HANDLE,MEH32R,115,UL	64160029
						MMS-32H,17A & HANDLE,MEH32R,115,UL	64160030
						MMS-32H,22A & HANDLE,MEH32R,115,UL	64160031
						MMS-32H,32A & HANDLE,MEH32R,115,UL	64160032
						MMS-32H,40A & HANDLE,MEH32R,115,UL	64160033
						MMS-63H,50A & HANDLE,MEH63,115,UL	64160034
	64160003	64150017	Built-in LCD keypad	YES	Built-in EMC filter	MMS-100H,75A & HANDLE,MEH100,115,UL	64160035
	64160004	64150018				MMS-100H,90A & HANDLE,MEH100,115,UL	64160036
	64150010	64150019					
	64150011	64150020					
	64150012	64150021					
	64160020	64160015					
	64160021	64160016					

	Conduit Connection Box NEMA1 Enclosure	Flange Mount Kit Heat Sink Out the Back	Additional Data			Disconnect Switch Option	
	Order Code	Order Code	Keypad	Reactor	Filter	Model Number	Order Code
	64160002	64150016	Built-in LCD keypad	NO	Built-in EMC Filter	UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160037
						UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160038
						UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160039
						UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160040
						UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160041
						UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160042
						UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160043
	64160003	64150017	Built-in LCD keypad	Built-in DC Reactor	Built-in EMC Filter	UTS150LT FTU 40A 3P & HANDLE,REH2-S-12,UTS250	64160044
	64160004	64150018				UTS150LT FTU 50A 3P & HANDLE,REH2-S-12,UTS250	64160045
	64150010	64150019				UTS150LT FTU 60A 3P & HANDLE,REH2-S-12,UTS250	64160046
	64150011	64150020				UTS150LT FTU 80A 3P & HANDLE,REH2-S-12,UTS250	64160047
	64150012	64150021				UTS150LT FTU 100A 3P & HANDLE,REH2-S-12,UTS250	64160048
	64160020	64160015				UTS150LT ATU 125A 3P & HANDLE,REH2-S-12,UTS250	64160049
	64160021	64160016				UTS150LT ATU 150A 3P & HANDLE,REH2-S-12,UTS250	64160050
	64160022	64160017	Built-in LCD keypad	Built-in DC Reactor	NO	UTS250LT FTU 175A 3P & HANDLE,REH2-S-12,UTS250	64160051
	64160023	64160018				UTS250LT FTU 225A 3P & HANDLE,REH2-S-12,UTS250	64160052
	64160024	64160019					
					Built-in EMC Filter	NONE	

Three Phase 525 ~ 600 VAC (-15% ~ +10%)

UL Three Phase Ratings				Model Number	Order Code	Dimensions(in) W X H X D	Approx. Weight (lbs.)	
Normal Duty(VT)110% for 60 seconds		Heavy Duty(VT)120% for 60 seconds						
HP	Output Current (Amps)	HP	Output Current					
7.5	9	5	6.6	LSLV0055H100-5CEND(PLUS)	67320005PL	7.1X18.9X8.1	20.9	
10	12	7.5	9	LSLV0075H100-5CEND(PLUS)	67320006PL		21.2	
15	17	10	12	LSLV0110H100-5CEND(PLUS)	67320007PL		21.9	
20	23	15	17	LSLV0150H100-5CEND(PLUS)	67320008PL		22.1	
25	27	20	23	LSLV0185H100-5CEND(PLUS)	67320009PL		22.4	
30	34	25	27	LSLV0220H100-5CEND(PLUS)	67320010PL	8.7X21.7X8.8	31.5	
40	43	30	34	LSLV0300H100-5CEND(PLUS)	67320011PL		32.3	
50	55	40	43	LSLV0370H100-5COND(PLUS)	67320012PL	10.8X17.7X11.2	55.1	
60	64	50	55	LSLV0450H100-5COND(PLUS)	67320013PL	12.8X20.1X11.2	74.1	
75	80	60	64	LSLV0550H100-5COND(PLUS)	67320014PL		74.3	
100	104	75	80	LSLV0750H100-5COND(PLUS)	67320015PL	12.8X21.7X12.2	96.1	
125	128	100	104	LSLV0900H100-5COND(PLUS)	67320016PL		96.4	

Remote Cable with Keypad

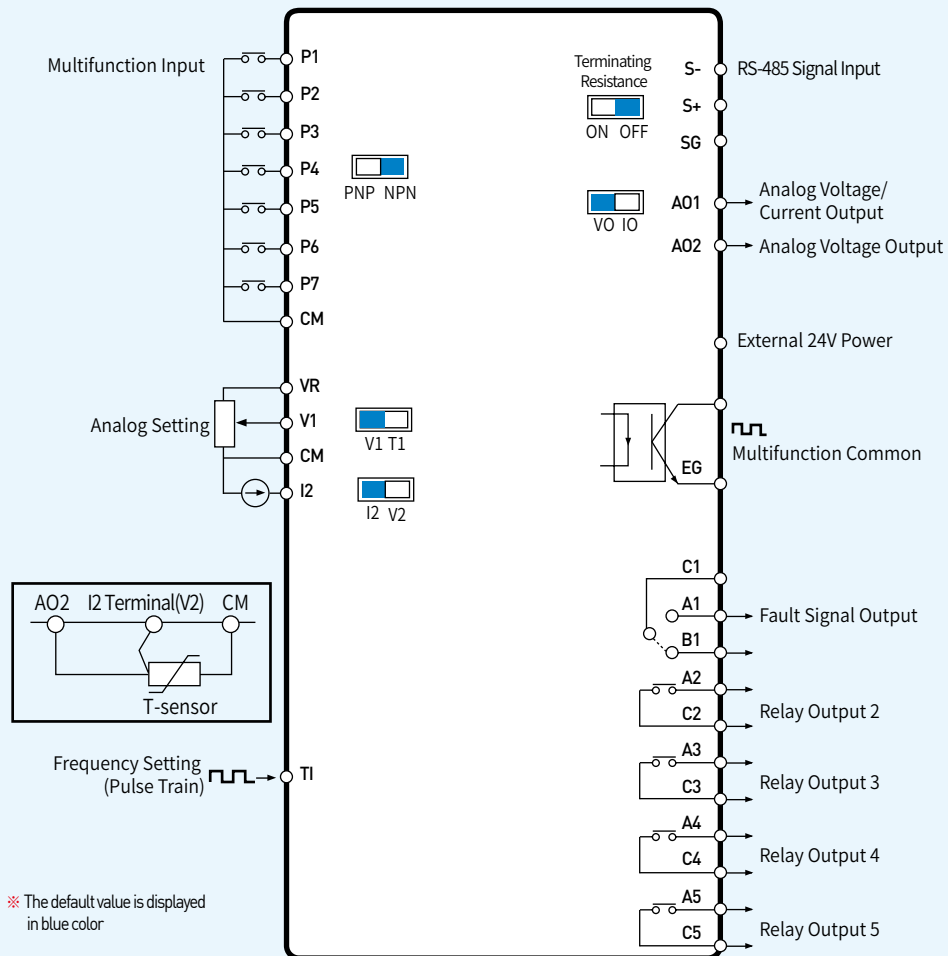
Length	Model Number	Order Code
6.6 ft	REMOTE 2M (LSLV-H100)	64110009PL
9.8 ft	REMOTE 3M (LSLV-H100)	64110010PL

Option

	Model Number	Order Code
LCD Keypad	OPTION (H100+ LCD LOADER), LCEN-H100PLUS	64160057PL
USB-RJ45 Cable	USB-RJ45 Cable for LSLV-H100	46310162
Extension I/O	Extension I/O for LSLV-H100	64160005
Lonwork	LonWorks for LSLV-H100	64160001
Ethernet IP & Modbus TCP	Ethernet IP & Modbus TCP for H100+ Series	64160056
BACnet IP, Ethernet IP & Modbus TCP	Ethernet IP & Modbus TCP for H100+ Series	64160058

	Conduit Connection Box NEMA1 Enclosure	Flange Mount Kit Heat Sink Out the Back	Additional Data			Disconnect Switch Option
	Order Code	Order Code	Keypad	Reactor	Filter	OrderCode
	Comes with conduit box as a standard	Not applicable	Built-in LCD keypad	Built into conduit option	Yes	None
	64150010	64150019		Yes		
	64150011	64150020				
	64150012	64150021			No	

Wiring



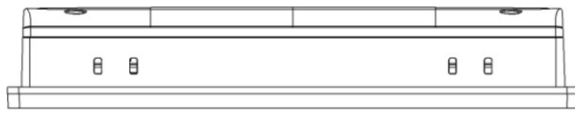
7.0" Touchscreen HMI with IIoT Features



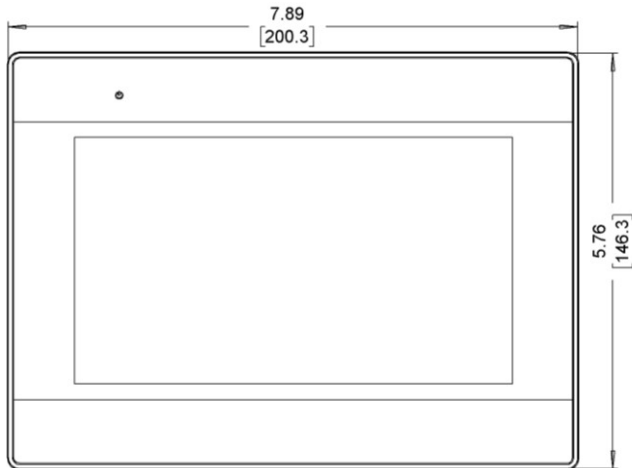
- High Speed Screen Update
- Dual Ethernet Ports
- Built-in Edge Gateway Function
- Enhanced Graphics & Security
- Email Alarm Notification and Recipe Functionality
- PDF Reader



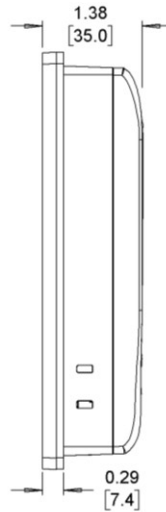
System	CPU	Quad-Core RISC, 1.5 GHz
	Memory (RAM)	1 GB
	Memory (Flash)	4 GB
	RTC	Built-in
I/O Ports	Serial	1 x DE9P COM1: RS-232, COM3: RS-232* 1 x DE9S COM2: RS-485 2 or 4 wire, COM3: RS-485 2 wires
	LAN	2 x 10/100 Base-T RJ-45
	CANbus	N/A
	USB Host	1 x USB 2.0
	USB Client	N/A
	Audio	N/A
	Video	N/A
	Wi-Fi	N/A
	HDMI®	N/A
	SD Card Slot	N/A
	Display Type	7" TFT LCD
Display	Size (W x H)	6.02 x 3.39 inches [153 x 86 mm]
	Max. Resolution	800 x 480
	Max. Colors	16.7 M
	Luminance (cd/m²)	400
	View Angle (H°/V°)	160/140
	Contrast Ratio	800:1
	Backlight Lifetime (Hours)	30,000+
	Type	4-wire resistive touch
Touch Screen	Active Area Accuracy	Length (X) ±2%, width (Y) ±2%
	Input Voltage	24 ± 20% VDC
Electrical	Input Current	820mA @ 24 VDC
	Input Power	19.7 W
	Power Isolation	Built-in
	Isolation Resistance	Exceed 50 MΩ at 500 VDC
Mechanical	Enclosure	Plastic Front, Aluminum Rear, charcoal grey
	PCB Coating	Yes
	Dimensions (W x H x D)	7.89 x 5.76 x 1.38 inches [200.3 x 146.3 x 35 mm]
	Panel Cutout (W x H)	7.56 x 5.43 inches [192.0 x 138.0 mm]
	Net Weight	Approx. 1.32 lbs. [0.6 kg]
	Mounting	Panel mounting
Environmental	Operating Temperature	32° ~ 131°F [0° ~ 55°C]
	Storage Temperature	-4° ~ 140°F [-20° ~ 60°C]
	Relative Humidity	10% ~ 90% (non-condensing)
	Altitude (Air Pressure)	Below 3,000 meters (70.1 kPa)
	Vibration Endurance	10 to 25 Hz (X, Y, Z direction, 2G, 30 minutes)
	Rating	UL Type 4X (indoor use only), NEMA 4, IP66 compliant front panel
	Certifications	cULus, CE, RoHS
Software	EBPro (v6.05.02 or later), EasyAccess 2.0 (optional), CODESYS (optional), IIoT Ready, MQTT, Sparkplug B, VNC, CMTViewer, WebView	
Notes	*Only Tx and Rx may be used for COM1 RS-232 while COM3 RS-232 is in use. CODESYS® is a trademark of CODESYS GmbH. Specifications subject to change without notice	



Top View

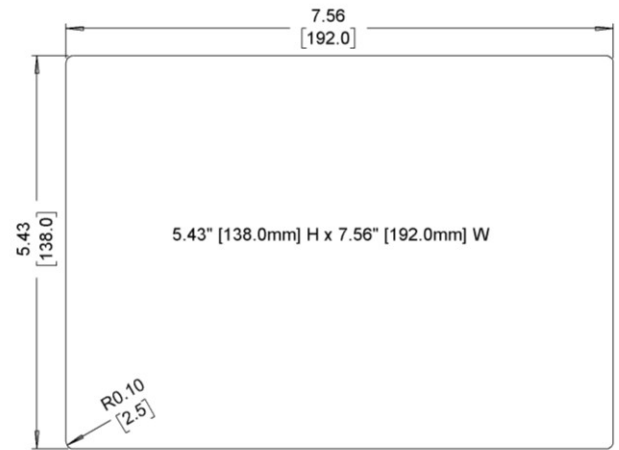


Front View

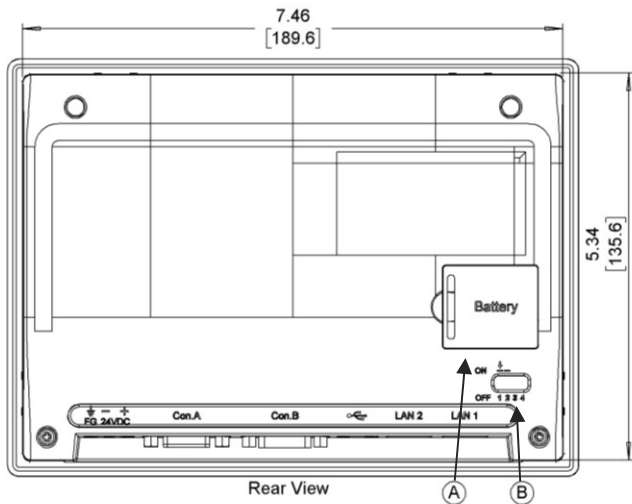


Side View

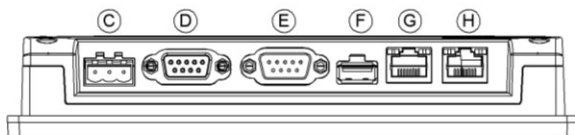
Dimensions are in inches [mm]



Cutout Dimensions



Rear View



Bottom View

- A Battery Compartment
- B DIP Switches
- C Power Connector
- D COM Port DE9S
- E COM Port DE9P
- F USB 2.0 Host Port
- G Ethernet Port
- H Ethernet Port

Why Buy A Maple HMI

In addition to our powerful and affordable hardware, we'll also continue to support your company long after a sale. Wide product selection, large in-stock inventory, outstanding product warranty, free technical support and software, and in-house repairs with quick turnaround times, Maple Systems has your business covered.



Add Remote IO for PLC Functionality

Select Maple Advanced and High-Performance HMIs have a sleek hardware platform that runs both an HMI application created with our free HMI software and PLC logic programmed with CODESYS; each on its own dedicated processor. Unlike the typical multicore set up, where the operating system scheduler is responsible for allocating tasks to each processor, these HMIs have a hard separation between cores. One core is dedicated to the HMI application, the other to executing PLC logic of the CODESYS project. This ensures taxing graphics processing operations will not interfere with deterministic real time control tasks executing on the other processor.

After selecting your HMI, choose from a suite of easy to use [powerful I/O modules](#) to connect to your field equipment. We offer a complete set of I/O modules which can be combined with one of our communication couplers to create a remote I/O block.

Remote Access and the IIoT

[Remote access](#) is the ability to access an HMI or connected device, from another device, at any time, and from anywhere. With our [free HMI software](#) and supported hardware solutions, you have the freedom to access the HMI, and all its data and applications, from another device and control it as if you were standing in front of it. Our Advanced and High-Performance HMIs support [cMT Viewer](#), [WebView](#), Web Streaming, and [EasyAccess 2.0](#) and are designed to make accessing your HMI and data fast and streamlined.

Let us serve as your guide, making it an easy process to join the next evolution of automated control. Our Advanced and High-Performance HMIs can act as an access point enabling operating equipment on the plant floor to connect to information technologies of the Industrial Internet of Things (IIoT). With our IIoT solutions, that are already included in the EBPro software, we can help you achieve better access to invaluable data and open a world of possibilities for your business. Read more about our [IIoT solutions](#).

Build your SCADA

We offer all the components you need to create your own unique level of supervisory data acquisition and control, from the simplest stand-alone machine to sophisticated multi-device networked production line(s), all the way to enterprise-level operations and IIoT functionalities leveraging cloud connectivity.

Our products can help you standardize communications between devices, gluing different systems together for one source to your SCADA. No need to redesign your entire application. Keep the components that are already working for you, just add Maple Systems components to grow your abilities to supervise, control, and acquire data.

Incredible Functionality Out of the Box

- Easily and quickly create the project with functional objects including numeric object, lamp object, combo-button, alarms, and recipes
- Pick and place objects, pictures, and shapes
- Import/export recipes
- Create trend display, graphs, XY plots, and pie charts
- Add passwords and security levels
- Assign communication (PLC) drivers easily and more with our Free HMI software

Additionally our HMIs support remote access solutions with VNC, MQTT, and OPC UA. For additional features see our High-Performance HMI series.



User Friendly HMI Configuration Software

Because designing the layout of screens and user-interface (UI) of the HMI is typically where most of the development time is spent, we've made our Free HMI configuration software easy to use.

- Import tags feature
- Tools to diagnose and monitor PLC to HMI connection
- Debugging tools
- Pre-built libraries
- Off-line and on-line simulation

These are just a few of the ways our software makes creating your project easier. We also have controller information sheets, cable drawings, sample projects, Getting Started Guides, and videos/tutorials available in our [support center](#) 24/7.



Programmable Logic Controller (PLC) Connectivity

With over 300 PLC & Controller communication protocols, these HMIs will easily integrate with your preferred PLC brands, including:

Allen-Bradley
Siemens
Omron
Emerson
GE
Panasonic
Mitsubishi
[...and many more](#)

Allen-Bradley **ABB** babcock™

BALDOR *Danfoss* SIEMENS

MITSUBISHI **Parker**

TOSHIBA YASKAWA **Koyo**

Matsushita

Panel Mount HMI Feature Overview

With few exceptions, all our Standard HMIs support (this covers all the HMI prefix models, ex: HMI5043L/LB, HMI5070L/LB):	With few exceptions, all our Advanced HMIs support (this covers all the cMT2xxx series):	With few exceptions, all our High Performance HMIs support (this covers all the cMT3xxx series HMIs):
Alarm & Event Messages	Alarm & Event Messages	Alarm & Event Messages
Animation - Flow Block	Animation - Flow Block	Animation - Flow Block
ASCII Characters	ASCII Characters	ASCII Characters
Bar Graphs	Bar Graphs	Bar Graphs
Combo Button	Combo Button	Combo Button
Data Logging and Sampling	Data Logging and Sampling	Data Logging and Sampling
Date / Time	Date / Time	Date / Time
Dynamic Drawing	Dynamic Drawing	Dynamic Drawing
Dynamic Scale	Dynamic Scale	Dynamic Scale
EasyAccess 2.0	EasyAccess 2.1	EasyAccess 2.0
EasyWatch	EasyWatch	EasyWatch
Enhanced Security Mode	Enhanced Security Mode	Enhanced Security Mode
Event Alarm Log	Event Alarm Log	Event Alarm Log
File Browser	File Browser	File Browser
Grid Display	Grid Display	Grid Display
Languages (Up to 24)	Languages (Up to 24)	Languages (Up to 24)
Libraries	Libraries	Libraries
Macros	Macros	Macros
Meters & Gauges	Meters & Gauges	Meters & Gauges
Modbus	Modbus	Modbus
Objects (Grouping, Layering, Aligning, Flip)	Objects (Grouping, Layering, Aligning, Flip)	Objects (Grouping, Layering, Aligning, Flip)
Off-line / On-line Simulation	Off-line / On-line Simulation	Off-line / On-line Simulation
OPC UA Client	OPC UA Client	OPC UA Client
Operation Log	Operation Log	Operation Log
Pass-Through Mode	Pass-Through Mode	Pass-Through Mode
Picture Object	Picture Object	Picture Object
Picture Viewer	Picture Viewer	Picture Viewer
Pie Chart	Pie Chart	Pie Chart
PLC Tag Embedded in Project	PLC Tag Embedded in Project	PLC Tag Embedded in Project
Project Password	Project Password	Project Password
Recipes	Recipes	Recipes
Remote Access	Remote Access	Remote Access
Scheduler	Scheduler	Scheduler
Security Levels (Enhanced)	Security Levels (Enhanced)	Security Levels (Enhanced)
System Setting Editor	System Setting Editor	System Setting Editor
Table	Table	Table
Text Object	Text Object	Text Object
Timer Object	Timer Object	Timer Object
Trend Display (Graphs)	Trend Display (Graphs)	Trend Display (Graphs)
User-Defined Start-Up Screen	User-Defined Start-Up Screen	User-Defined Start-Up Screen
Utility Manager	Utility Manager	Utility Manager
VNC Server	VNC Server	VNC Server
XY Plot	XY Plot	XY Plot
Email (1)	Email	Email
Macro Windows Open / Cycle / Close (1)	Macro Windows Open / Cycle / Close	Macro Windows Open / Cycle / Close
MQTT (1)	MQTT	MQTT
String Table (1)	String Table	String Table
Time Synchronization (1)	Time Synchronization	Time Synchronization
USB Tethering (1)	USB Tethering	USB Tethering
VNC Viewer (1)	VNC Viewer	VNC Viewer
	IP Camera	IP Camera
	USB Camera	USB Camera
	Animation (Objects, Word Lamp, GIFs, Moving Shape)	Animation (Objects, Word Lamp, GIFs, Moving Shape)
	BACnet	BACnet
	CANbus	CANbus
	cMT Diagnoser	cMT Diagnoser
	cMT Viewer Support	cMT Viewer Support
	CODESYS (2)	CODESYS (2)
	Media Player	Media Player
	MQTT - Advanced JSON	MQTT - Advanced JSON
	MQTT - AWS IoT, Sparkplug B, Azure IoT Hub, Google Cloud IoT Core	MQTT - AWS IoT, Sparkplug B, Azure IoT Hub, Google Cloud IoT Core
	PDF Reader	PDF Reader
	Web Streaming	Web Streaming
	WebView	WebView
		Barcode Scanner (Android Camera)
		Database Server
		File Transfer Protocol (FTP)
		OPC UA Server
		PLC Web Browser
		SQL Database Server Integration

This table is for illustration only and subject to change. Always check the software to see if a feature is supported in your specific hardware.

(1) Not supported in the B Series

(2) Not supported on the cMT2166X



Industrial Pressure Transmitter

Model 220TST



Applications

- Industrial Environments
- Process Automation
- Hydraulic Systems
- Pump System Control
- Testing Technologies
- Commercial / HVAC

Features

- Ranges from 30" Hg to 0 thru 0 to 20,000 psi
- 4-20mA and 0-10Vdc Standard Industrial Output Signals
- Fully welded "Dry Measuring Cell", requires no internal transmission fluid or seals
- 17-4 PH stainless steel wetted parts
- 304 stainless steel body
- Industry standard electrical connections including DIN 175301-803A, C and Shielded Cable
- Highly flexible modular design
- Protection Class IP65/NEMA 4X (Shielded Cable Connection IP67/NEMA 6)

DESCRIPTION

The **TRERICE 220TST** Pressure Transmitter is the ideal choice for demanding industrial, test & measurement and process control applications. Thanks to the stainless steel/thin-film sensor element being directly welded to the process connection, the 220TST requires no internal transmission media or seals insuring a high degree of reliability and stability. Stainless steel wetted parts provide long-term durability even in the harshest environments.

In addition, the modular design of the **220TST** Pressure Transmitter allows for a wide variety of electrical connections, output signals and process connections to be specified to meet the requirements of any application.

12950 W. Eight Mile Road • Oak Park • MI 48237-3288

Tel: 1.888.TRERICE • Fax: 1.248.399.7246

Website: www.TRERICE.com E-mail: sales@TRERICE.com

Transmitter-2

SPECIFICATIONS

Model	220TST • Standard Transmitter			
Sensor Element	Stainless steel membrane / poly-Si on SiO ₂ thin film resistors			
Process Connection	1/4 NPT male			
Materials of Construction	Housing: 304 stainless steel Wetted Parts: 17-4 PH stainless steel			
Accuracy	0.5% Full Scale (Terminal Point Method) / 0.35% Full Scale (BFSL) Includes: Non-Linearity, Hysteresis and Non-Repeatability.			
Operating Temperature Ranges	Medium: -40/+257°F (-40/+125°C) Ambient: -40/+221°F (-40/+105°C)			
Temperature Error Band	Temperature compensated to within 1% between -4°F and 185°F (-20°C and 85°C). Best accuracy of ≤0.5% at 77°F (25°C).			
Humidity	95% RH Non-condensing 0-100% RH with Shielded Cable Connection (E3)			
Electrical Connection	90° Angle “Standard” Connector / DIN 175301-803 (A) 90° Angle “Mini” Connector / DIN 175301-803 (C) Shielded Cable (3 Ft)			
Output Signal	4-20mA (2 wire) and 0-10Vdc (3 wire)			
Overpressure Limit	Ranges ≤ 5000 psi		1.5 x FS	
	Burst pressure		> 3 x FS	
	10,000-20,000 psi		1.2 x FS	
	Burst pressure		> 1.5 x FS	
Response Time (10-90%)	< 1 ms			
Power Supply	Output Signal:	Minimum	Maximum	Recommended
	4-20mA:	10Vdc	32Vdc	24Vdc
	0-10Vdc:	12Vdc	32Vdc	24Vdc
Load Resistance	4-20 mA: Vdc Supply-10Vdc /0.02A = Ohm resistance (maximum) 0-10 Vdc: ≥ 5 kOhm (minimum)			
Circuit protection	Protected against reverse polarity and short circuits			
CE conformity	EC Directive 89/336/EWG			
Ingress Protection Rating	90° Angle Connector: IP65 / NEMA 4X Shielded Cable: IP67 / NEMA 6			
Approx. Shipping Weight	0.2 lbs (0.09kg)			

How To Order

Example: 220TST 02 C A 0/100 E1 3

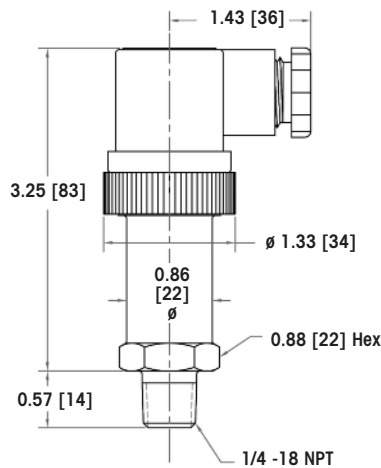
Model	Process Connection	Accuracy	Units of Measure	Range Code	Electrical Connection	Output Signal
220TST	02 1/4 NPT	C 0.5% FS (0.35% BFSL)	A psi	See Standard Ranges	E1 DIN 175301-803 (A) "std"	3 4-20mA (2-wire)
					E2 DIN 175301-803 (C) "mini"	2 0-10 Vdc (3-wire)
					E3 Shielded Cable (3 Feet)	

Other electrical connections, output signals and process connections available. Please consult factory.

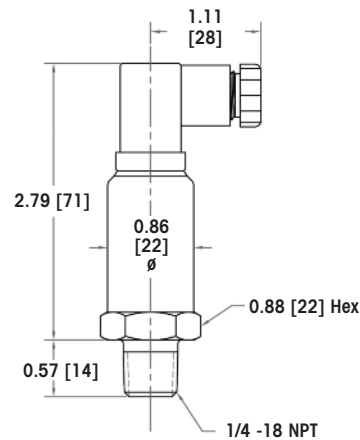
Configurations & Dimensions



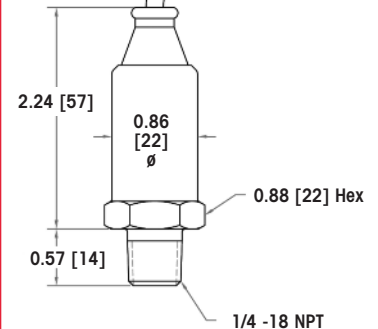
E1 90° Angle "std" Connector
DIN 175301-803 (A)



E2 90° Angle "mini" Connector
DIN 175301-803 (C)



E3 Shielded Cable
(3 Feet)



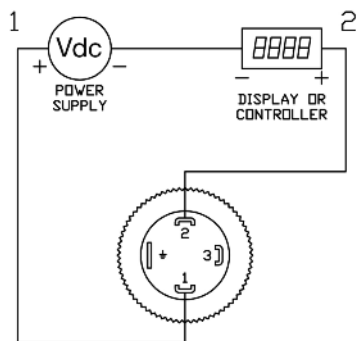
Standard Ranges

Range Code	Specific Range (psi)	Overpressure Limit	Burst Pressure
30/0	30"Hg to 0	23 psi	45 psi
30/15	30"Hg to 15 psi	45 psi	90 psi
30/30	30"Hg to 30 psi	68 psi	135 psi
30/60	30"Hg to 60 psi	113 psi	225 psi
30/100	30"Hg to 100 psi	173 psi	345 psi
30/150	30"Hg to 150 psi	248 psi	495 psi
30/300	30"Hg to 300 psi	473 psi	945 psi
0/15	0 to 15 psi	23 psi	45 psi
0/30	0 to 30 psi	45 psi	90 psi
0/60	0 to 60 psi	90 psi	180 psi
0/100	0 to 100 psi	150 psi	300 psi
0/160	0 to 160 psi	240 psi	480 psi
0/200	0 to 200 psi	300 psi	600 psi
0/300	0 to 300 psi	450 psi	900 psi
0/400	0 to 400 psi	600 psi	1200 psi
0/600	0 to 600 psi	900 psi	1800 psi
0/1000	0 to 1000 psi	1500 psi	3000 psi
0/1500	0 to 1500 psi	2250 psi	4500 psi
0/2000	0 to 2000 psi	3000 psi	6000 psi
0/3000	0 to 3000 psi	4500 psi	9000 psi
0/5000	0 to 5000 psi	7500 psi	15000 psi
0/10000	0 to 10000 psi	12000 psi	15000 psi
0/15000	0 to 15000 psi	18000 psi	22500 psi
0/20000	0 to 20000 psi	24000 psi	30000 psi

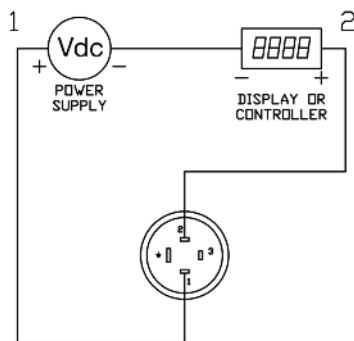
Electrical Connections Wiring Diagram

2- Wire Circuits (4 20mA)

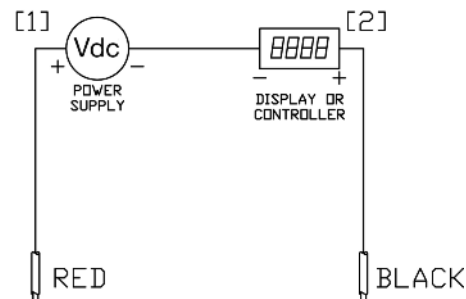
DIN 175301-803 (A)



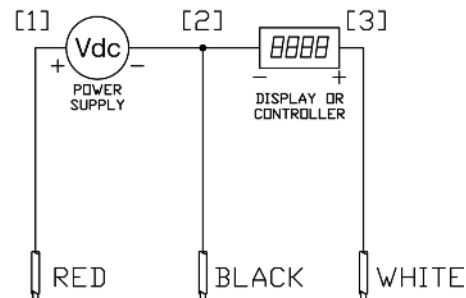
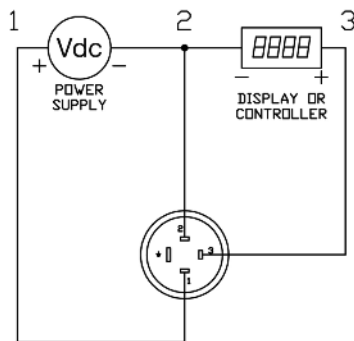
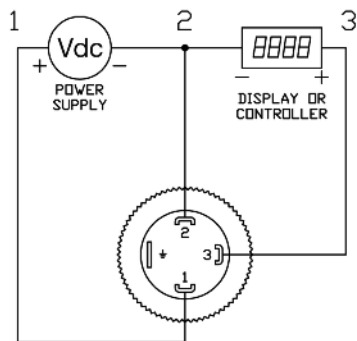
DIN 175301-803 (C)



Shielded Cable



3- Wire Circuits (0-10Vdc)



H.O. TRERICE Company

From its start in 1923 in Detroit, the H.O. Trerice Company has remained true to the commitment of its founder - QUALITY in both PRODUCT and SERVICE. This commitment has solidly established Trerice as a worldwide leader in the manufacture of specialized engineered products for industrial temperature and pressure measurement and control.

When your requirements demand quality instrumentation and controls, the broad line of Trerice products are ready for your application. Contact us today for detailed information on your particular areas of interest.

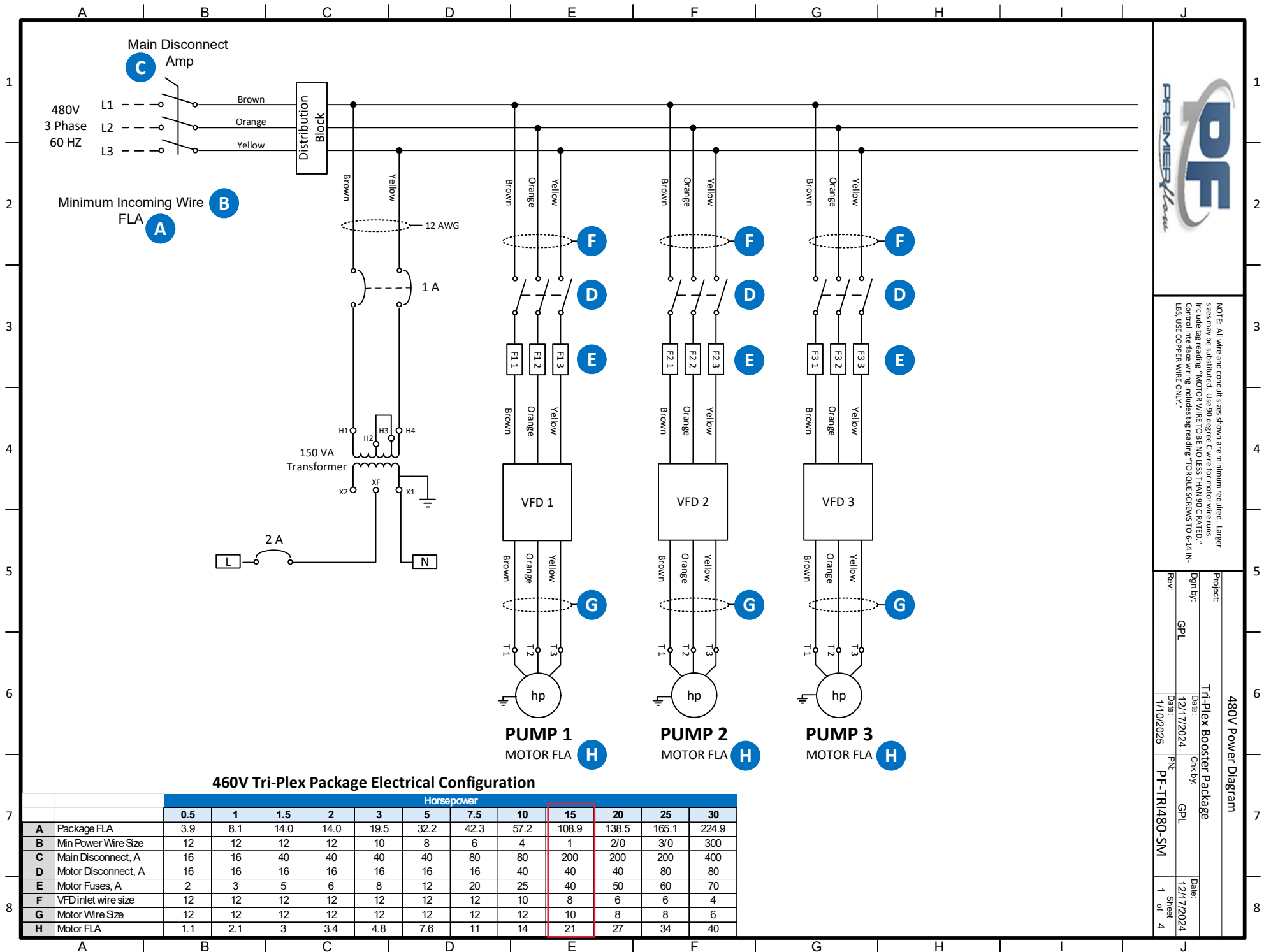


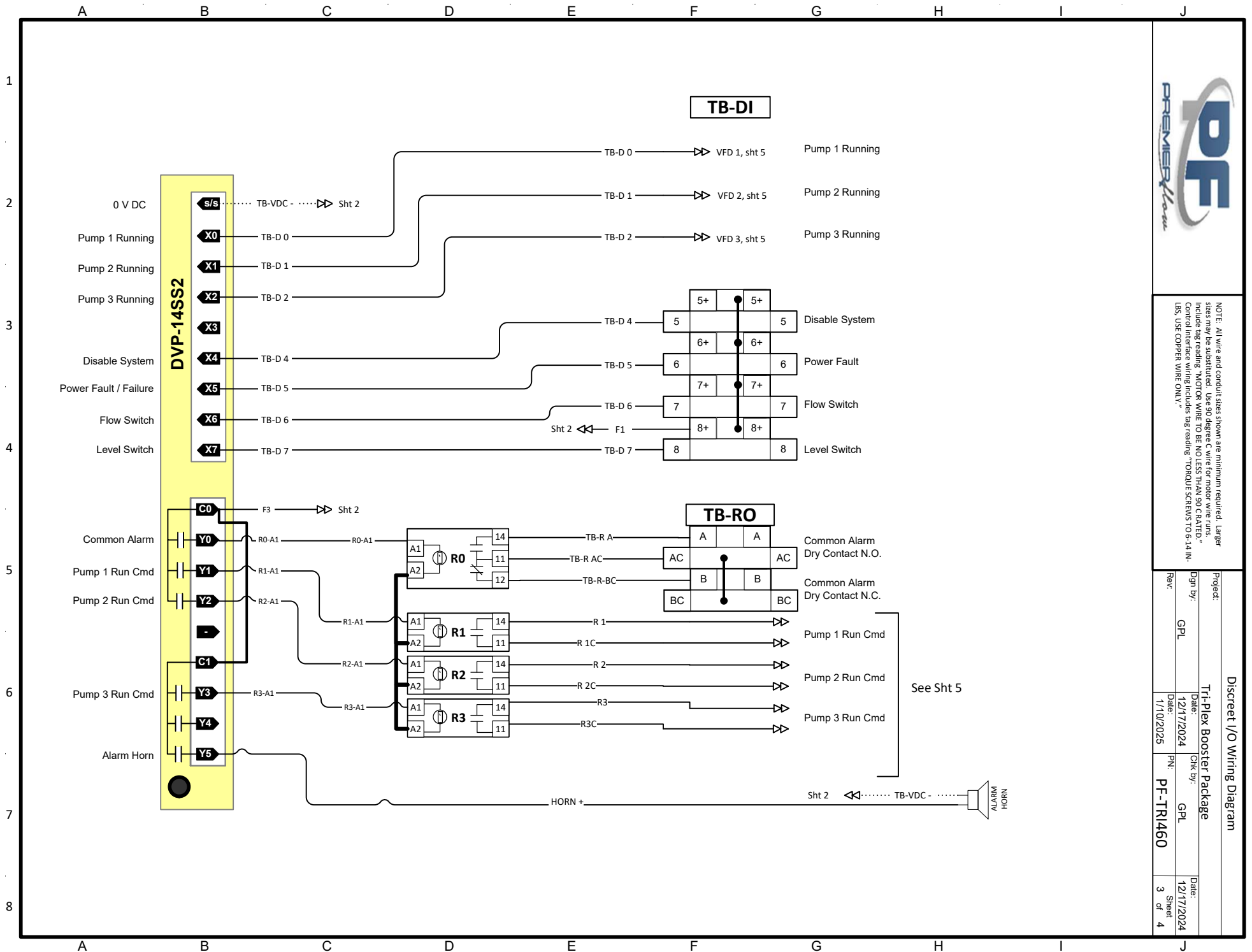
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Website: www.TRERICE.com E-mail: sales@TRERICE.com

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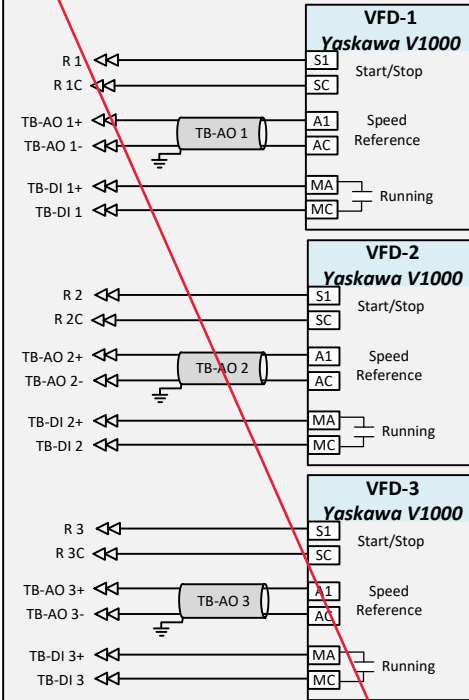
NOTE: All wire and conduit sizes shown are minimum required. Larger sizes may be substituted. Use 90 degree c wire for motor wire runs. Include tag reading, "MOTOR WIRE TO BE NO LESS THAN 90 C RATED." Control interface wiring includes tag reading, "TORQUE SCREWS TO 6-14 IN.-LBS. USE COPPER WIRE ONLY."

VFD Wiring and Customer Dry Contacts

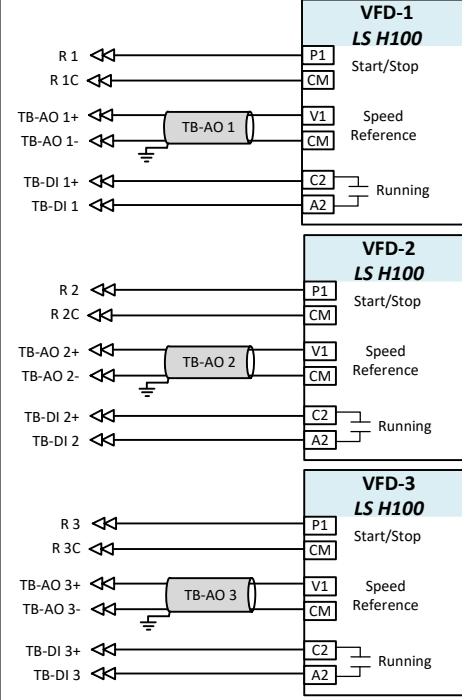
Tri-Plex Booster Package

Project:	Date:	Chk by:	Date:
Dgn by: GPL	12/17/2024	GPL	12/17/2024
Rev: 0	Date: 1/10/2025	Rev: PF-TRI460	Sheet 5 of 5

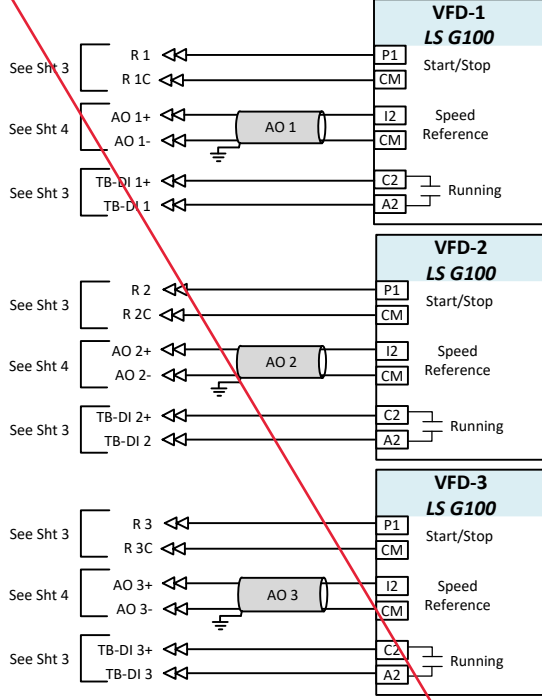
Yaskawa V1000 - Option



Pumps Greater Than 10 hp



Pumps 10 hp and Less



Terminals For Customer Use

