Fire Protection Submittal Review

Project:	NW Harnett Elementary	**Reviewed by:**	ESD
Date:	April 11, 2022	**Optima #:**	20-0224
Item Reviewed:	NWHES Fire Pump Submittal		

Stamp:

OPTIMA ENGINEERING, P.A.
SHOP DRAWING REVIEW
REVIEW IS FOR GENERAL COMPLIANCE WITH THE INTENT OF THE CONTRACT DOCUMENTS. FIRE PROTECTION CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR CORRECTNESS, DIMENSIONS, DETAILS, QUANTITIES AND ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT, INCLUDING ELECTRICAL CHANGES, MAINTENANCE ACCESS, CLEARANCES, BUILDING ALTERATIONS, PIPING, REPLACEMENT OF OTHER SYSTEM COMPONENTS, ETC.

NO EXCEPTION TAKEN	X
APPROVED AS NOTED	
REVISE AND RESUBMIT	
REJECTED	

Comments:

None

1927 S. Tryon Street, Suite 300
Charlotte, NC 28203
(704) 338-1292

150 Fayetteville Street, Suite 520
Raleigh, NC 27601
(919) 926-2200

ENGINEERING

SUBMITTALS

PROJECT: ABL Fire for:
Northwest Harnett Co. ES

ENGINEER:

SUBMITTED FOR:

X	APPROVAL	DATE:
	MANUFACTURING	DATE:
	RECORD ONLY	DATE:

SUBMITTED BY:

PSI/CAROLINAS, INC.
263 CHURCH ST. NE
CONCORD, NC 28025
Email: psicar@charlotte.twcbc.com

TELE: 704.782.3543

FAX: 704.784.8329

PSI/Carolinas, Inc.

263 Church St. N
Concord, NC 28025
(704) 782-3543
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Email: psicar@charlotte.twcbc.com

SUBMITTAL DATA

REFERENCE: ABL Fire for:
Northwest Harnett County Elementary School

CONDITIONS: 500 GPM @ 40 PSI

LISTING: U.L. / F.M.

ELECTRIC DRIVEN FIRE PUMP

Fairbanks 4" X 4" 1591CF Vertical In-line Fire Pump
Electric Motor: 20 HP / 3550 RPM – 3/6/460 Volt - ODP - 1.15 SF
Standard Fittings to Include:
- 0 - 300 PSI Discharge Gage - Ashcroft
- VAC - 300 PSI Suction Gage - Ashcroft
- 3/4" Casing Relief Valve - Hamilton

FIRE PUMP CONTROLS

Eaton FT30-20D: Across the Line – 20 HP / 460Volt
Power transfer switch

JOCKEY PUMP & CONTROLS

Fairbanks Morse PVM1-5: 5 GPM @ 50 PSI, .5 HP – 3/60/460 Volt
Jockey Pump Control: Eaton XTJP-.5D

TESTING MEANS

4" Header & (2) NST Valves

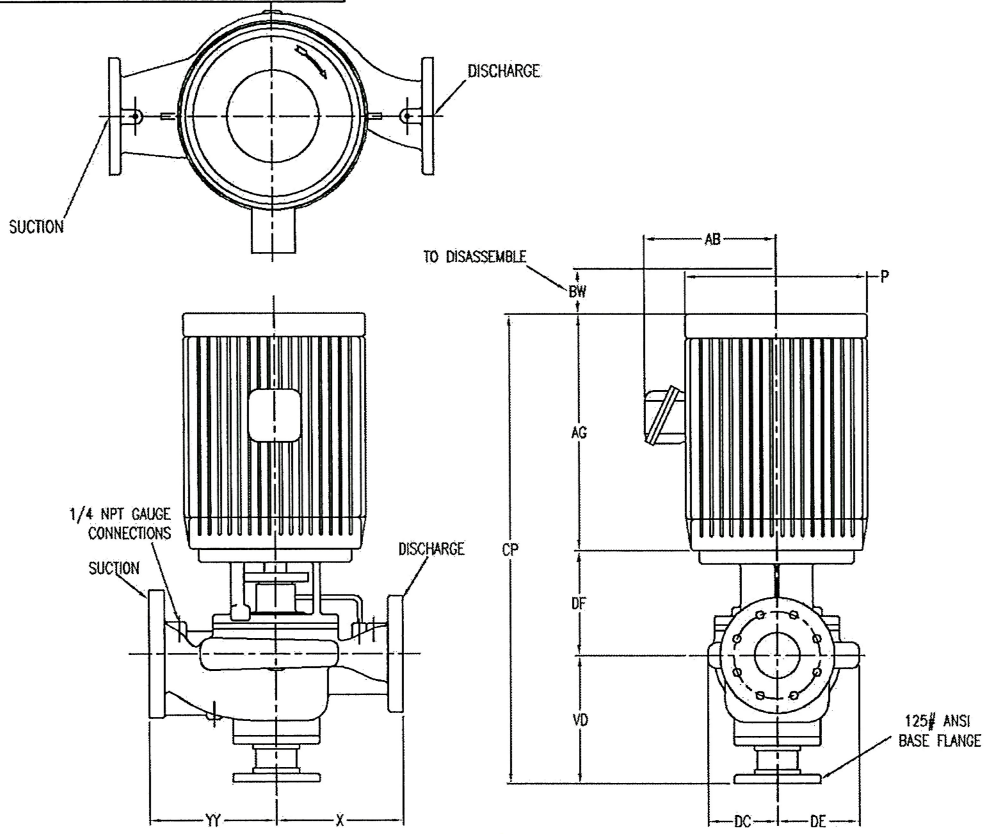
MISCELLANEOUS

6" X 4" Eccentric reducer
4" X 6" Concentric increaser

General Arrangement

⚠ WARNING

DO NOT OPERATE THIS MACHINE WITHOUT PROTECTIVE GUARD IN PLACE. ANY OPERATION OF THIS MACHINE WITHOUT PROTECTIVE GUARD CAN RESULT IN SEVERE BODILY INJURY.



X	YY	BW	VD	DF	DC
11.00	11.00	4.50	11.25	9.63	5.50

DE	AG	P	AB	CP	Base Flange Size
7.38	21.00	13.00	8.88	N/A	3.00

NOTES:

Not for construction, installation, or application purposes unless certified.

All dimensions are in inches

Dimensions may vary ± .38" (10mm) due to normal manufacturing tolerances.

See configuration for estimated total weight.

Pump Data	
Series	Inline
Model	4"-1591CF
Size	4x4x7
Flow	500.0 USgpm
Rated Pressure	40.00 psi.g
RPM	3560 rpm
Rotation	Right handed
Liquid Type	Water
Discharge Size	4.00 in
Suction Size	4.00 in
Impeller Diameter	5.62 in
Connection Type	125/125
Base Type	Pipe flange support
-	-
Pump Materials of Construction	
Pump	Bronze fitted with Cast Iron casing
Shaft	Carbon Steel
Motor Data	
Power	20.00 hp
Phase	3
Frequency	60 Hz
Volts	230/460 V
RPM	3560
Frame	254JP
Service Factor	1.15
Enclosure	ODP
Manufacturer	USEM
Site Information	
Elevation	300.0 ft
Temperature	77.00 deg F
Estimated Weights	
Pump	191.0 lb
Driver	217.0 lb

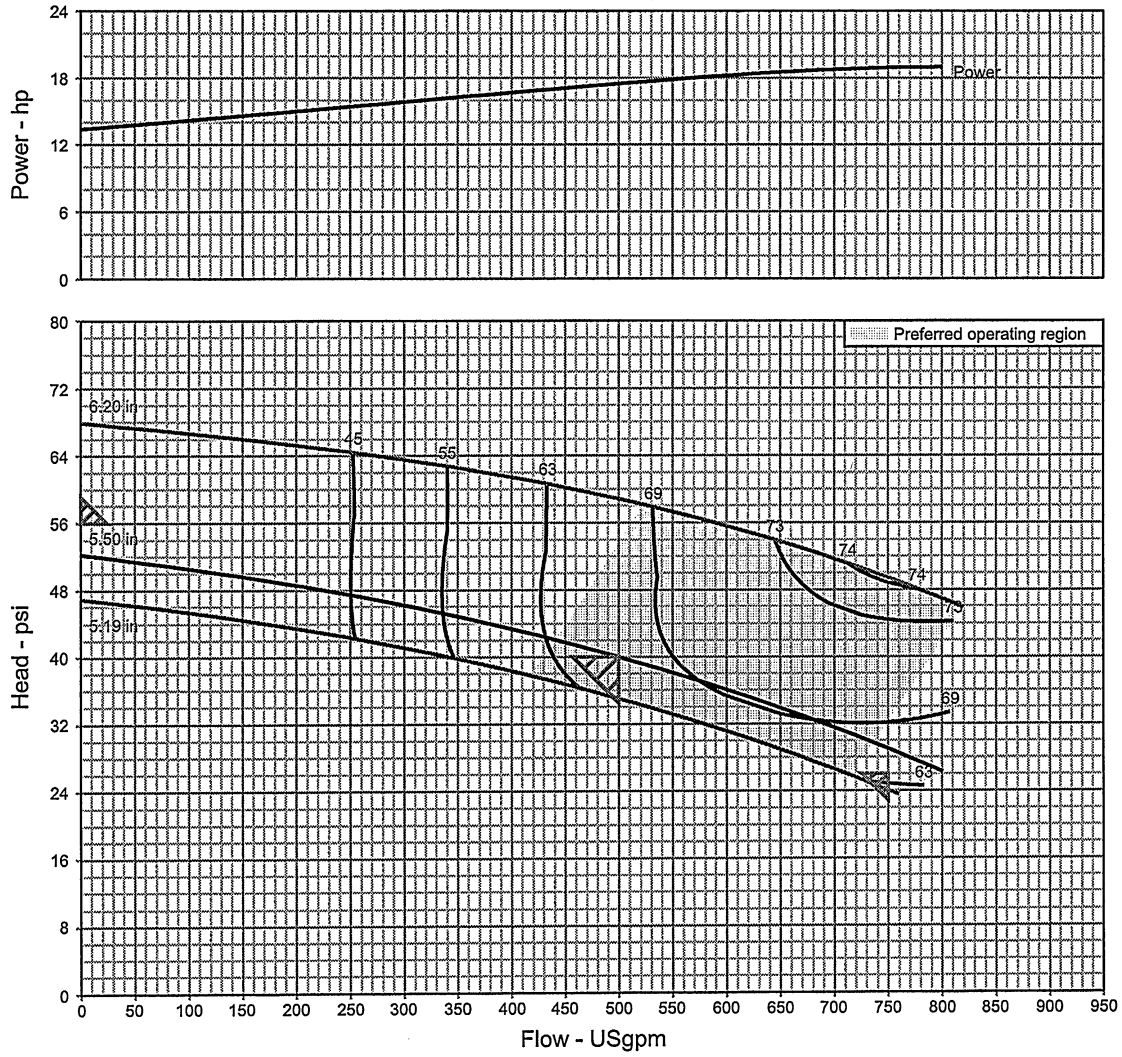
Quote Information			
Customer	PSI - CAROLINAS INC		
Customer Quote	1395487		
Job Name	NW Harnet County ES		
Market	-		
PENTAIR		Quote Item	001
		Quote Date	11 May 2021

PENTAIR

Customer : PSI - CAROLINAS INC
Project name : NW Harnet County ES

Pump Performance Curve

Encompass 2.0 - 21.4.1



Item number	: 001	Size	: 4"-1591CF
Service	:	Stages	: 1
Quantity	: 1	Driver type	: Motor
Quote number	: 21Q-0507	Frequency	: 60 Hz
Date last saved	: 11 May 2021 6:30 PM	Speed, rated	: 3560 rpm
Flow, rated	: 500.0 USgpm	Based on curve number	: 383-4X4X7C-3560
Differential head / pressure, rated	: 40.00 psi	Efficiency	: 66.74 %
		Max working pressure, allowable	: 175.0 psi.g
Flange rating (suction / discharge)	: 125/125	Shutoffhead, Typical	: 52.23 psi
		Max suction pressure, allowable	: 122.8 psi.g
Secondary Point (150% of rated flow)	: 750.0 USgpm	Suction pressure, max (user specified)	: 14.70 psi.a
Secondary Point (65% of rated head)	: 26.00 psi	Pump shutoff w/ suction pressure	: 52.23 psi.g
Max Shutoff per NFPA	: 56.00 psi	Power driver, minimum	: 20.00 hp

Curve performance is typical. Contact factory for guaranteed performance curve.

Electrical Data

Northwest Harnett County Elementary School

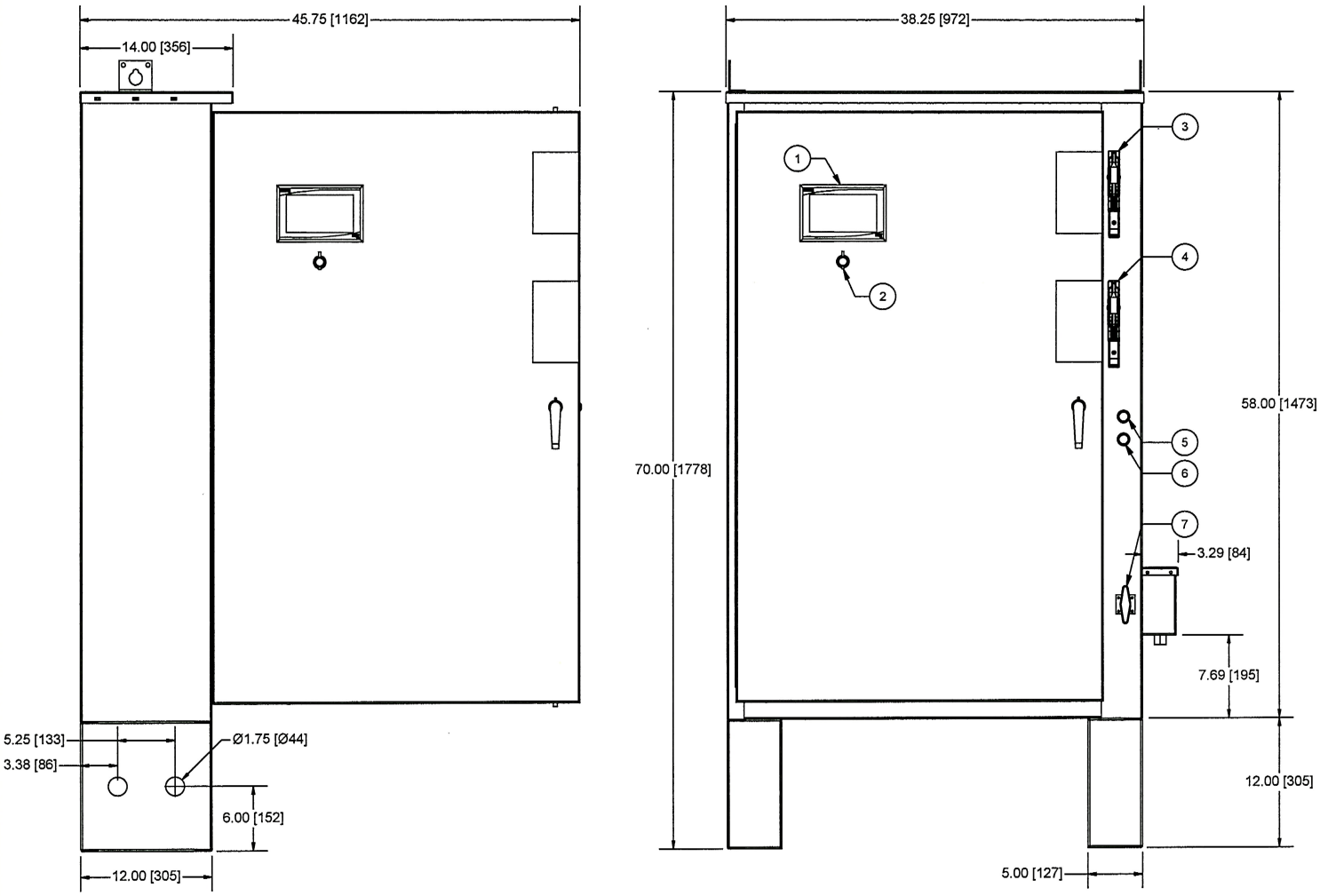
Fire Pump:

20 HP / 3600 RPM
3ph/60hz/460V
FLA 25
LRA 145
KVA Code G

Jockey Pump:

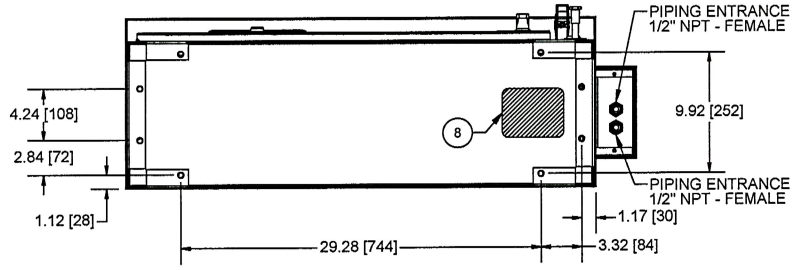
.5 HP / 3600 RPM
3ph/60hz/460V
FLA 1
LRA 6
KVA Code J

EPCT FIRE - FT30 SMALL HP
DIMENSIONAL DRAWING - TYPE 2, ~~3, 3R, 4, 4X, 12~~



1 - EPCT TOUCHSCREEN
2 - EXTERNAL USB PORT
3 - SOURCE 1 POWER SWITCH
4 - SOURCE 2 POWER SWITCH
5 - START PUSHBUTTON
6 - STOP PUSHBUTTON
7 - MSH (EMERGENCY START HANDLE)
8 - RECOMMENDED CABLE ACCESS (BOTTOM ONLY)

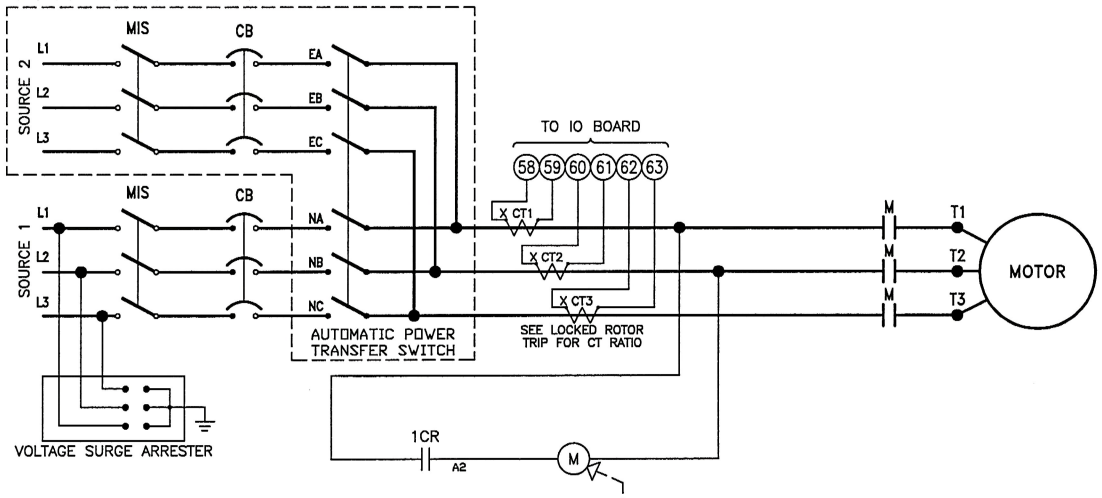
NOTES:
1 - DIMENSIONS: in [mm]
2 - ALL ENCLOSURES FINISHED IN RED
3 - STANDARD ENCLOSURE: TYPE (NEMA) 2



Motor HP	Line voltage	Withstand rating			Approximate weight
		Standard	Intermediate	High	Lbs. (Kg)
5 - 40	200 - 208V	100,000	150,000	200,000	315 (143)
5 - 50	220 - 240V				
5 - 75	380 - 415V				
5 - 100	440 - 480V				
5 - 100	550 - 600V	25,000	100,000		

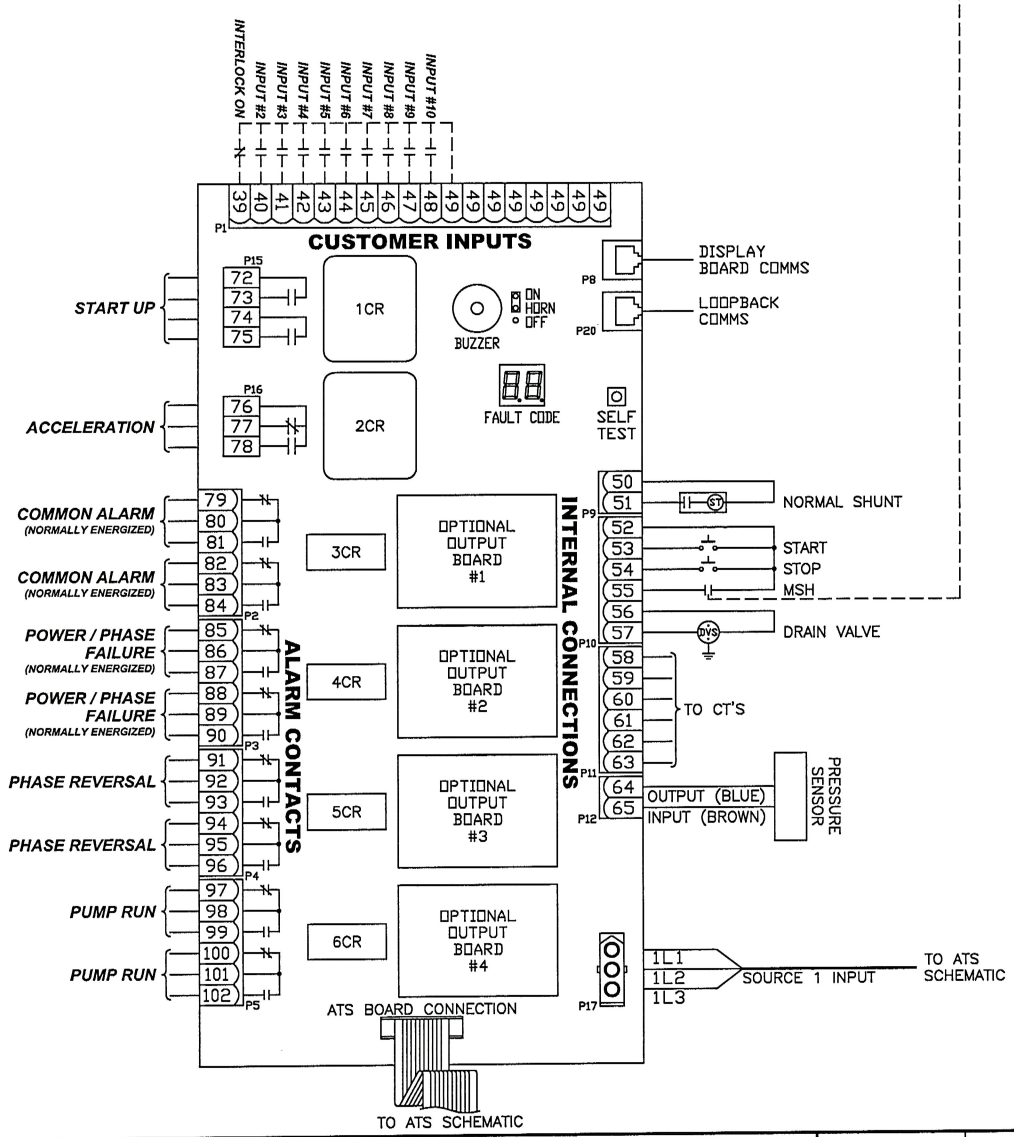
REVISION	DATE	DRAWING NO.
002	04/10/20	CE16491H02

EPCT FIRE - FT30 THREE PHASE WIRING SCHEMATIC



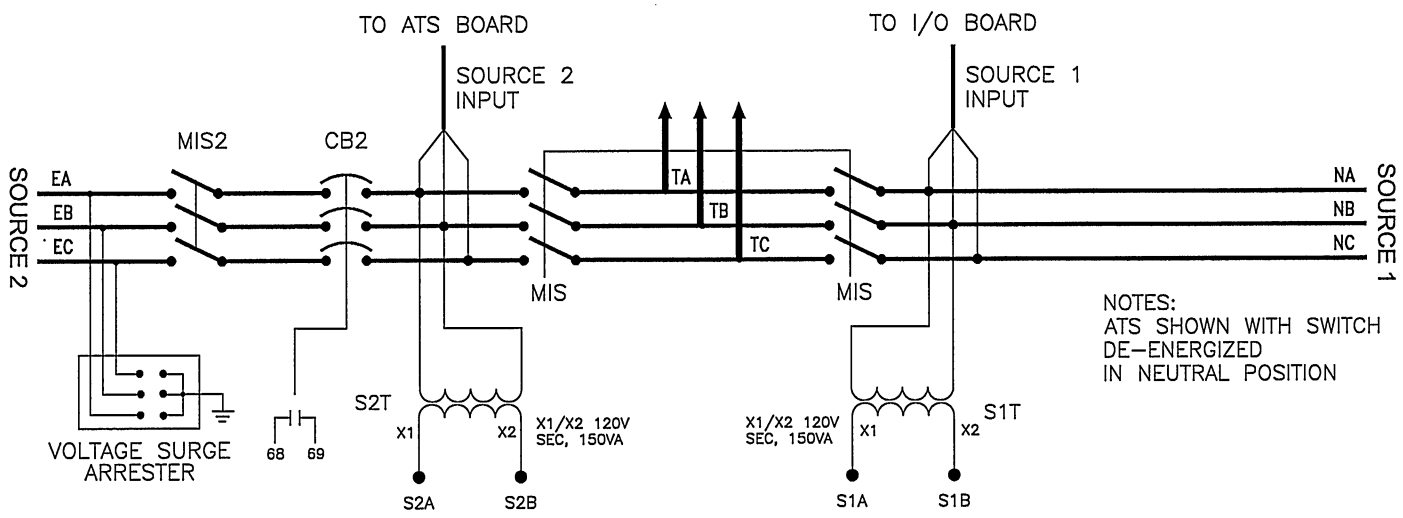
NOTES:
1. POWER/PHASE FAILURE AND COMMON ALARM RELAYS ARE ENERGIZED UNDER NORMAL CONDITIONS.
2. ALL RELAY CONTACTS ARE SHOWN IN NO POWER CONDITION.

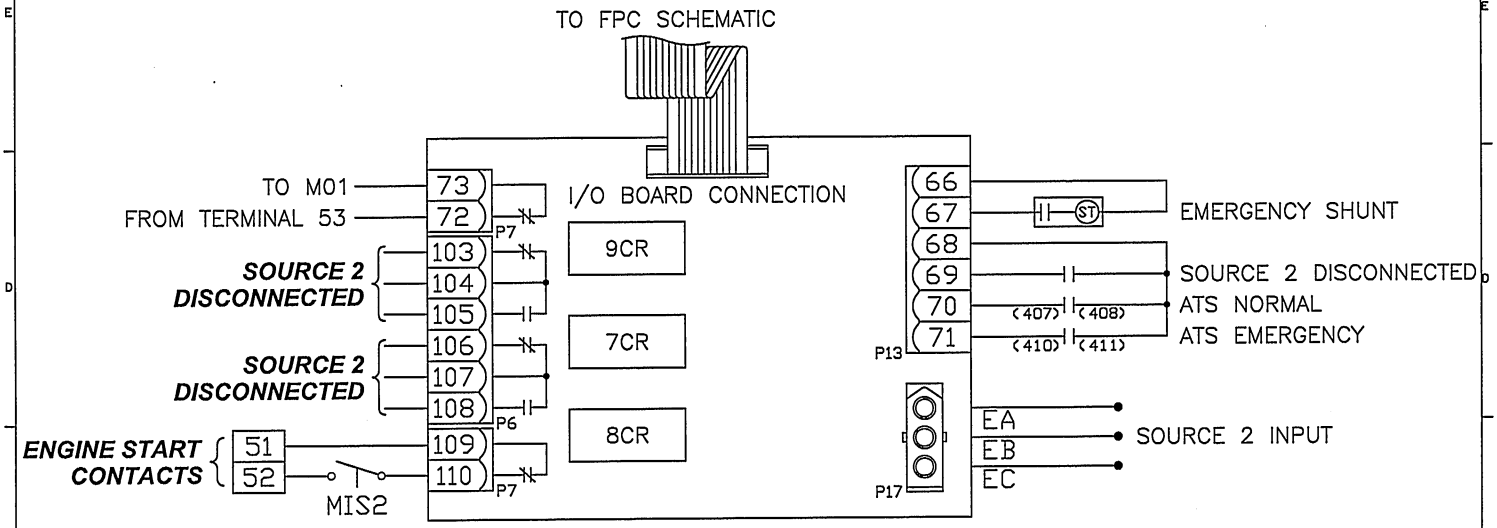
LEGEND:
CB - CIRCUIT BREAKER
CT - CURRENT TRANSFORMER
M - RUN CONTACTOR
MIS - MAIN ISOLATING SWITCH
MSH - MANUAL START HANDLE (EMERGENCY) MICRO SWITCH

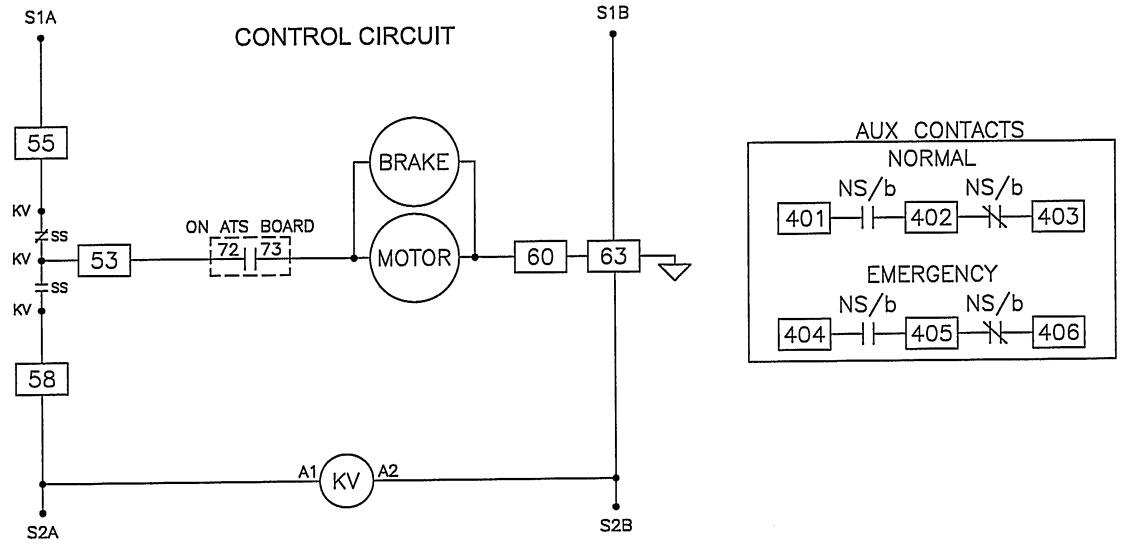


REVISION	DATE	DRAWING NO.
001	09/25/18	CE16492H06

EPCT FIRE - ATS THREE PHASE WIRING SCHEMATIC







REVISION	DATE	DRAWING NO.
001	09/25/18	CE16492H19

EPCT FIRE - FD/FT30 THREE PHASE FIELD CONNECTIONS

Line Terminals Connections

	Line Voltage					Line Lugs (QTY.) & Cable Size per Ø	Service Ground Lugs (QTY.) & Cable Size per Ø
	200-208	220-240	380-415	440-480	575-600		
Max HP	25	30	40	60	75	(1) #14 - 1/0 (CU/AL)	(1) #14 - 2/0 (CU/AL)
	40	50	75	100	100	(1) #4 - 4/0 (CU)	(1) #4 - 350MCM (CU/AL)
	75	75	150	200	200	(1) #3 - 350MCM (CU/AL)	(1) #4 - 350MCM (CU/AL)
	100	125	200	250	300	(2) 3/0 - 250MCM (CU/AL)	(2) 1/0 - 750MCM (CU/AL)
	150	200	300	400	500	(2) 250 - 350MCM (CU/AL)	(2) 1/0 - 750MCM (CU/AL)

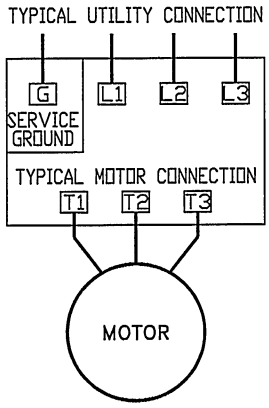
Load Terminals Connections

	Line Voltage					Single Run Cable Sizes	Double Run Cable Sizes
	200-208	220-240	380-415	440-480	575-600		
Max HP	10	10	15	20	25	#14 - #8 (CU/AL)	#14 - #8 (CU/AL)
	20	25	30	50	60	#14 - #1 (CU/AL)	#14 - #2 (CU/AL)
	40	60	75	125	100	#8 - 3/0 (CU/AL)	#8 - 2/0 (CU/AL)
	75	100	150	200	200	#2 - 750MCM (CU/AL)	1/0 - 250MCM (CU/AL)
	150	200	300	400	500	1/0 - 500MCM (CU/AL)	1/0 - 500MCM (CU/AL)

For ambient temperatures exceeding 30C (86F), the temperature rating of motor conductors is recommended to be a minimum of 90C (194F)

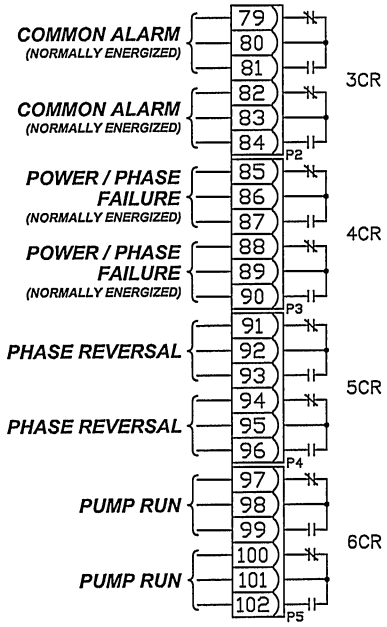
For proper cable size, refer to the National Electric Code (NEC - NFPA70)

CONTROLLER CONNECTIONS

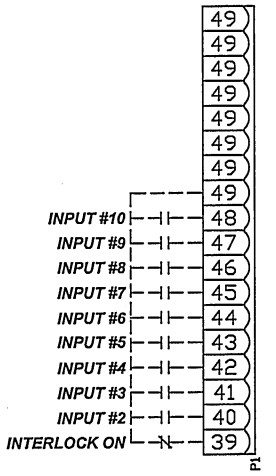


NOTES:
1. MOTOR CONNECTIONS VARY. REFER TO THE SPECIFIC MOTOR CONNECTION DIAGRAM.
2. OBSERVE PROPER PHASE ROTATION A-L1, B-L2, C-L3.
3. CABLE SIZE TO BE 125% OF FULL LOAD CURRENT. REFER TO NEC (NFPA 70)

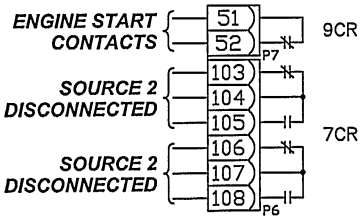
ALARM CONTACTS

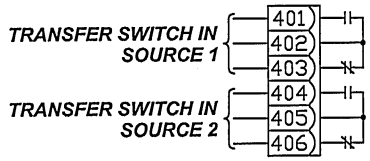


CUSTOMER INPUTS



TRANSFER SWTICH CONNECTIONS ~~(IF EQUIPPED)~~

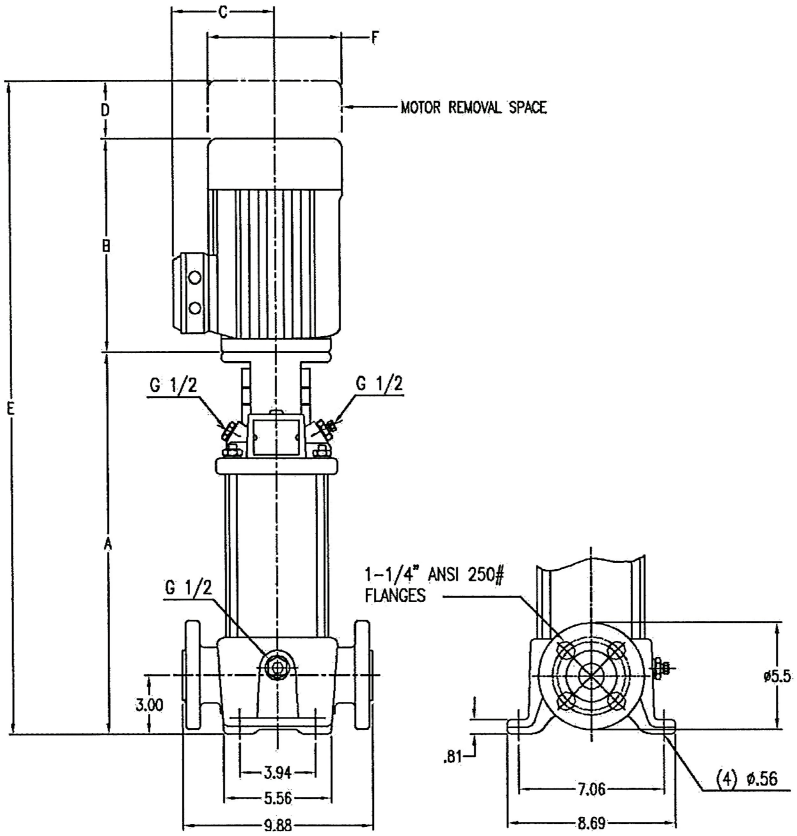




NOTES:
1. ENGINE START CONTACTS ARE TO BE CONNECTED TO THE REMOTE START CONTACTS ON THE GENERATOR/ENGINE.
2. CONTACTS SHOWN IN A DE-ENERGIZED, NEUTRAL POSITION

REVISION	DATE	DRAWING NO.
002	02/16/21	CE16493H03

General Arrangement



A	B	C	D	E	F
12.40	10.20	6.60	2.10	24.60	6.60

NOTES:

All dimensions are in inches.

Dimensions may vary ± 1/4" (6mm) due to normal manufacturing tolerances

-

-

Pump Data	
Model	PVM1-5
Stages	5
Flow	5.00 USgpm
Head	50.00 psi
Rotation	Right Hand
Suc/Disch Size	0.00 in
Connection Suc/Disch	1.25" ANSI 250# flg w/ 1.25" NPT female

Motor Data	
Power	0.50 hp
Phase	3
Frequency	60 Hz
Voltage	230/460
Speed	3500
Frame Size	56CZ
Efficiency	premium
Enclosure	TEFC

Pump Materials of Construction	
Pump Material	Cast Iron
Elastomer	-

Estimated Weights	
Pump	77.00 lb
Motor	0.00 lb

Additional Options

Quote Information	
Customer	PSI - CAROLINAS INC
Customer Quote	1395487
Job Name	NW Harnet County ES
Market	-

PENTAIR

Quote Item	001
Quote Date	11 May 2021

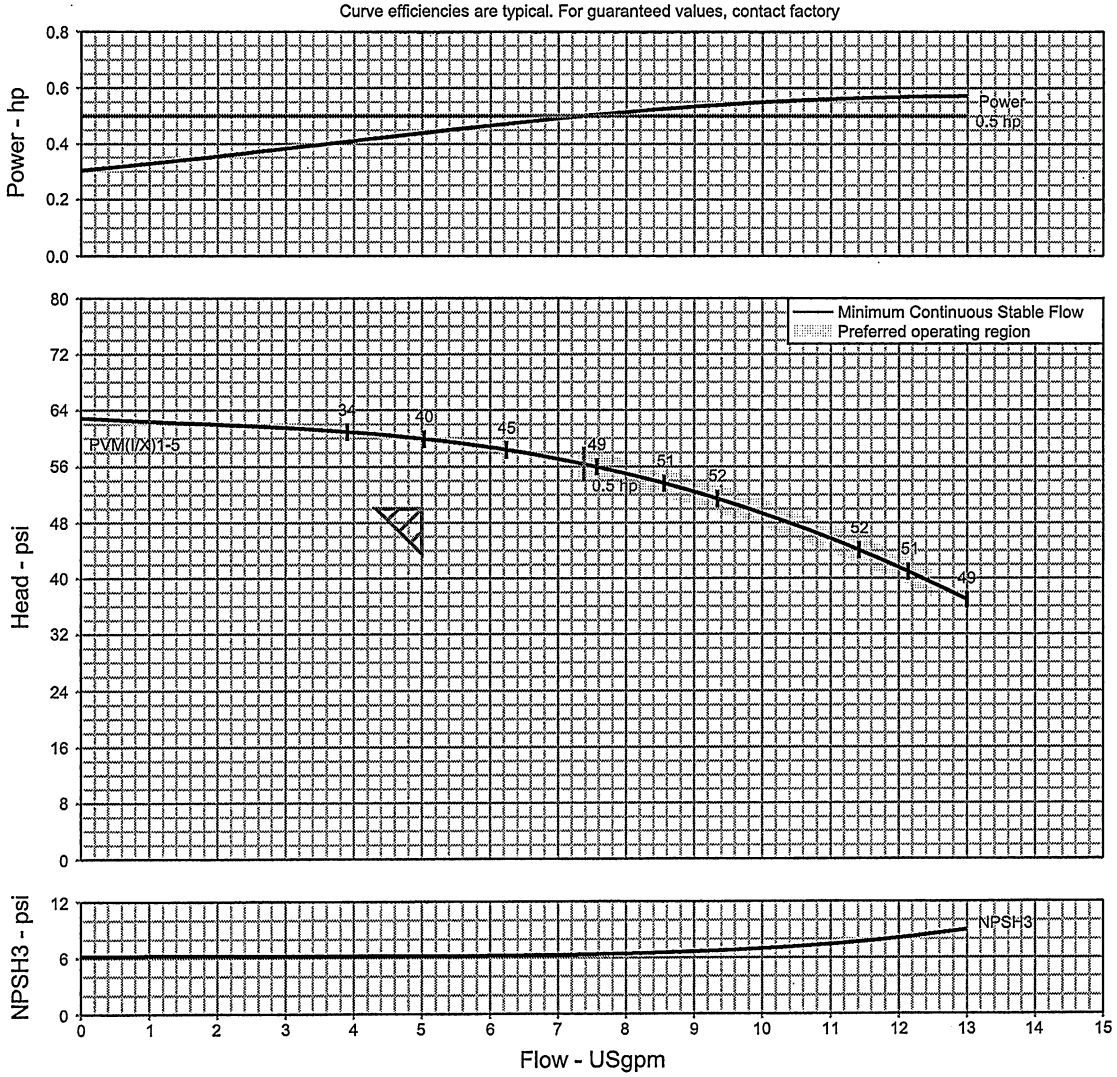
PENTAIR

Customer : PSI - CAROLINAS INC
Project name : NW Harnet County ES

Jockey Pump Curve

Encompass 2.0 - 21.4.1

Curve efficiencies are typical. For guaranteed values, contact factory

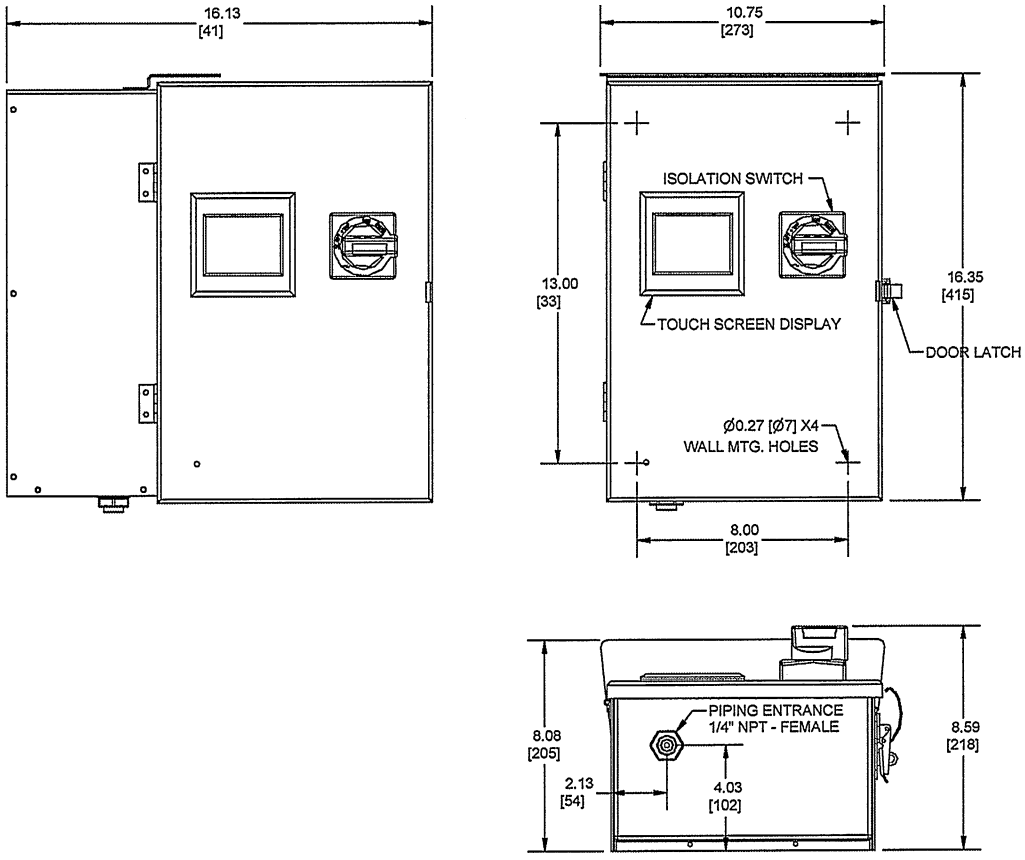


Item number	: 001	Size	: PVM(X)1-5
Service	:	Stages	: 5
Quantity	: 1	Speed, rated	: 3500 rpm
Quote number	: 21Q-0507	Based on curve number	: PVM(X)1-5
Date last saved	: 11 May 2021 6:30 PM	Efficiency	: 39.85 %
Flow, rated	: 5.00 USgpm	Power, rated	: 0.44 hp
Differential head / pressure, rated	: 50.00 psi	NPSH required	: 6.21 psi
		Viscosity	: 30.26 SSU
Fluid density, rated / max	: 0.998 / 0.998 kg/dm3	Cq/Ch/Ce/Cn [ANSI/HI 1.1-1.5-1994]	: 1.00 / 1.00 / 1.00 / 1.00

Technical Data MD081001EN
Standard Enclosure - Type NEMA 2
Effective June 2015

Dimensions
Jockey Pump Controllers

JOCKEY Touch™



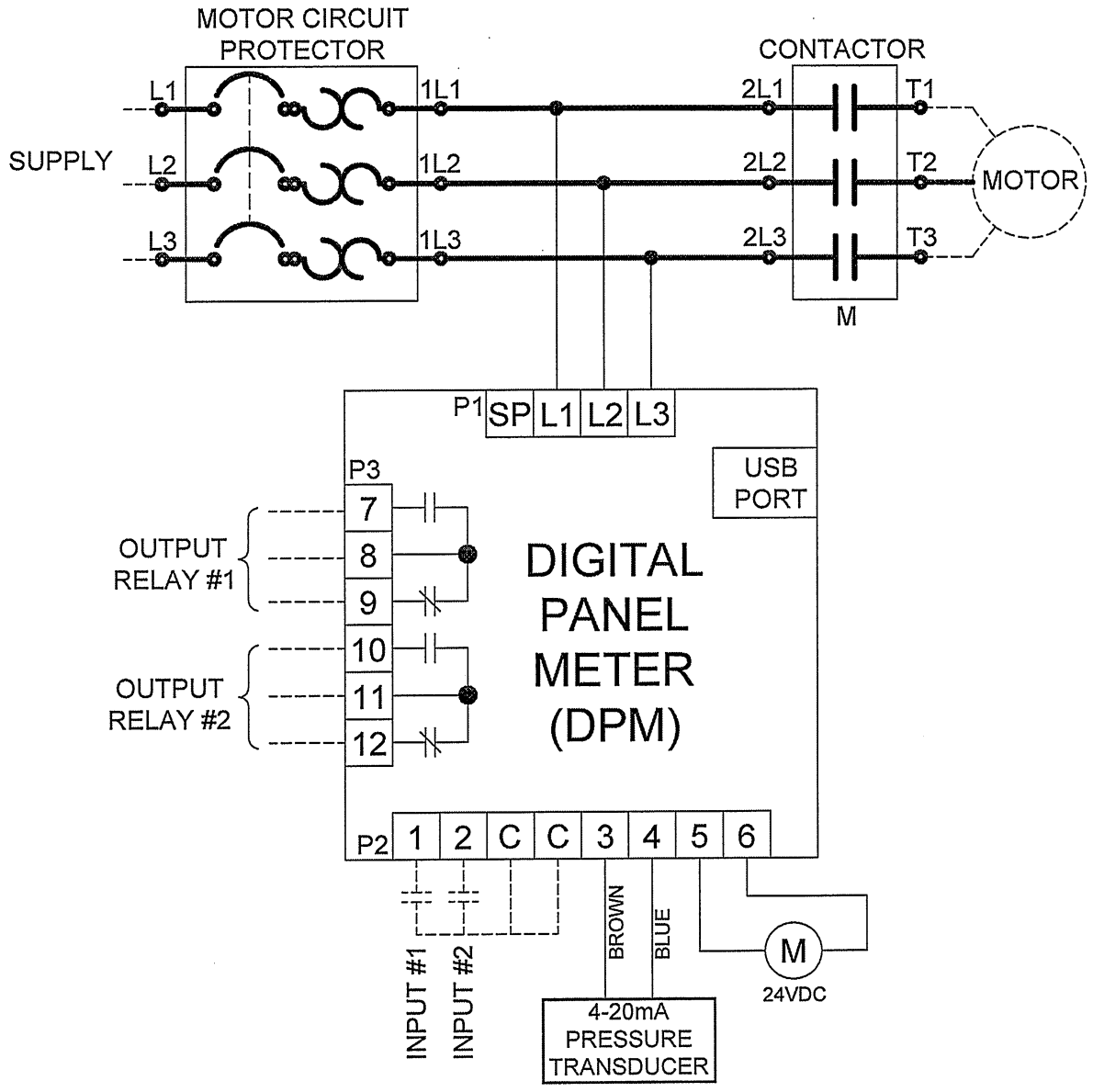
200-208V		220-240V		380-415V		440-480V		550-600V	
Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)
0.33 - 0.75	50	0.33 - 0.75	50	0.33 - 1.5	50	0.33 - 2	50	0.33 - 7.5	50
1 - 2	65	1 - 3	65	2 - 5	65	3 - 5	65	10 - 30	10 *
3 - 4	42	4 - 5	42	7.5	42	7.5 - 10	42		
5 - 10	18	7.5 - 10	18	10 - 15	18	15 - 20	18		

120V 1ph		208V 1ph		240V 1ph		Approx. Weight
Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Motor Hp	Withstand Rating (kA)	Lbs (Kg)
0.33 - 0.5	65	0.33 - 1	65	0.33	50	18 (8)
0.75 - 1	42	1.5 - 2	42	0.5 - 1.5	65	
1.5 - 2	18	3 - 4	18	2	42	
				3 - 5	18	

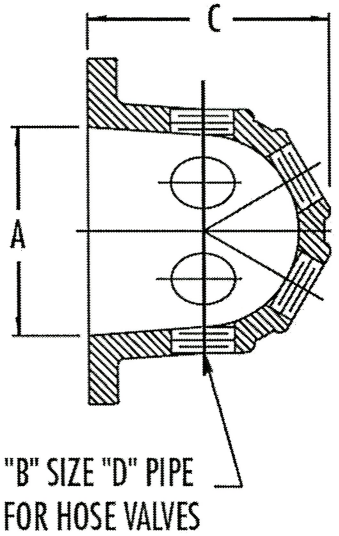
NOTES:
1. * Upstream circuit breaker required to maintain kA rating.
2. All enclosures finished in FirePump red.
3. Cable Entrance either top or bottom.
4. Standard Enclosure type NEMA 2

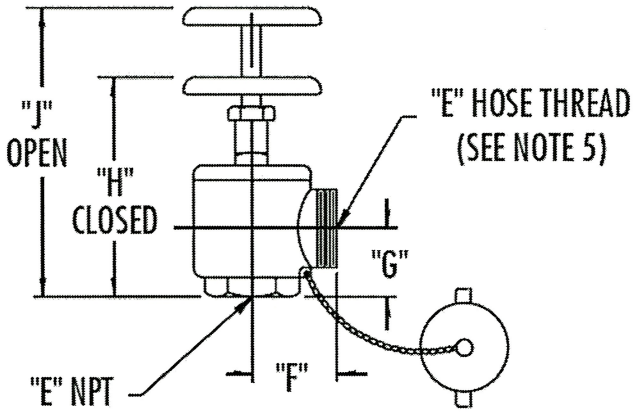
EATON
Powering Business Worldwide

JOCKEY Touch™



General Arrangement





A	B	C	D
4.00	2.00	8.50	2.50

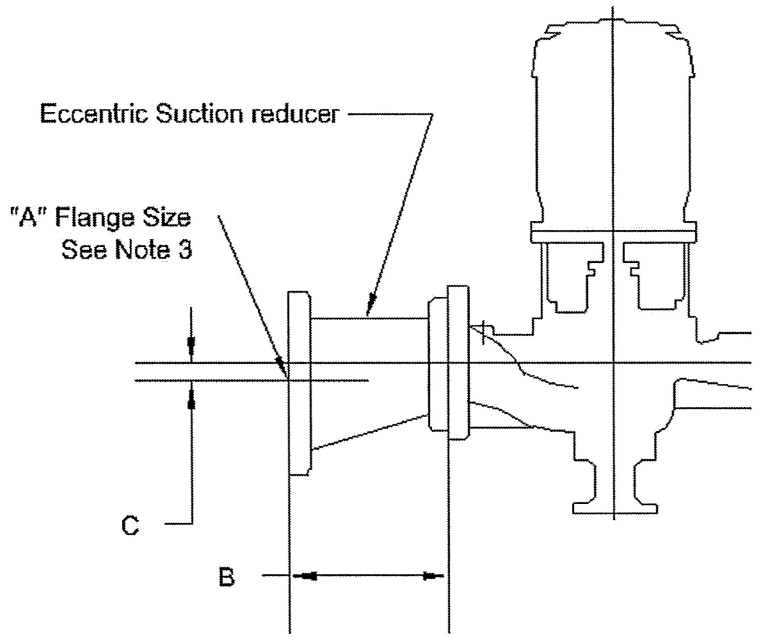
E	F	G	H	J
2.50	3.50	2.75	9.50	11.00

NOTES:

1. Dimensions are in inches (mm) and may vary ±1/4 (6).
2. Components shown are shipped loose for field installation and assembly.
3. Manifold supply size "A" and the number of hose valves ("B") meets or exceeds the minimums specified by N.F.P.A. 20 for the pump ratings indicated.
4. Manifolds for 3000 through 5000 GPM ratings consist of multiple sections and may require support (by others).
5. 1-1/2" Hose valves furnished with 1-1/2" National Standard Fire Hose Thread: 1.9900 (50.55) O.D. (max.) , 6 threads per inch. 2-1/2" Hose valves are furnished with 2-1/2" National Standard Fire Hose Thread: 3.0686 (77.94) O.D. (max.), 7-1/2 threads per inch. Refer to factory for other thread conventions or adaptors.

Quote Information			
Customer	PSI - CAROLINAS INC		
Customer Quote	1395487		
Job Name	NW Harnet County ES		
Market	-		
PENTAIR		Quote Item	001
		Quote Date	11 May 2021

General Arrangement



Suction Size	A	B	C	Suction Reducer Flange Rating
6x4	6.00	9.00	1.00	125 lb

NOTES:

1. Dimensions are in inches (mm) and may vary ± 1/4".
2. Dimensions applicable to both Class 125 & Class 250 fittings.
3. Illustrations show the intended installation positions and orientation of each fitting: Eccentric Suction Reducers are to be installed with the straight side to the top to prevent air entrapment.
4. Proper pipe supports are required to prevent strain on pump casing.
5. Fittings shown are intended to adapt the fire pump suction and discharge flanges to the actual system manifold pipe sizes. Refer to NFPA 20 for the minimum system manifold size for each flow rating (GPM), but in no case should the system suction pipe be a smaller pipe size than that of the pump suction flange.

Quote Information			
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Customer Quote	1395487		
Job Name	NW Harnet County ES		
Market	-		
PENTAIR		Quote Item	001
		Quote Date	11 May 2021