PUMPSENSE

UL Listed & FM Approved Pumps

Complete Pumping Solutions For Fire Protection Systems

- Horizontal Split Case Single Stage & Two Stage Electric Motor Driven Fire Pumps
- Horizontal Split Case Single Stage & Two Stage Diesel Engine Driven Fire Pumps
- End Suction Fire Pumps
- Packaged Fire Pumps Systems
- Ul 448 & Fm 1311 Approved For Fire Protection Service

PUMPSENSE FLUID ENGINEERING PVT. LTD
5/F, Hastings Court, Tower A, 96, Garden Reach Road, Kolkata - 700023

PUMPSENSE

PUMPSENSE

A Brief Introduction

History of PUMPSENSE goes back to 1995 when a group of professionals working in large international pumps companies decided to team together. At PUMPSENSE, we are united through which we can express ourselves fully and freely. Each one of us has an abiding interest in one aspect or the other of the pumps business – right from hydraulic design to applications engineering, product development to marketing. We also share a common conviction that with our skills, passion, and commitment, we can redefine the existing norms and standards of customer satisfaction. We wish to work, learn and create value in a nourishing and fulfilling environment for our customers, business associates and ourselves. PUMPSNESE exists to fulfill this collective dream, based on a core set of values which are our guiding philosophy in creating this organization.

PUMPSENSE

The Business of PUMPSENSE is to provide centrifugal pumps and related services. We will constantly strive to increase the delivered value to our customer by careful attention to details, by continuous improvement of our core capabilities and by our commitment to delight the customer at every point of contact. The quality of our products and services will reflect the improvement in quality of life that we are able to bring to our employees. We will provide them with an informal and liberal work environment, where they can constantly learn and grow. We recognize that our suppliers play a key role in the quality of our products and services. We will work closely with our suppliers so that they share our energy and focus to serve the customer with excellence. Above all, we will strive to create an organization where there are no barriers amongst customers, employees and suppliers and all of us work together to create value, to grow, to learn and to enhance the quality of our lives.

Certificates of Compliance

PUMPSENSE

FM APPROVED

Certificate of Compliance

This certificate is issued for the following:

Centrifugal Fire Pumps
(Axial Split-Case Type)

Models 6HF18, 6HF21, 8HF17 and 8HF21
(see ratings on page 2)

Prepared for:

Pumpsense Fluid Engineering Private Limited
96, Garden Reach Rd
5/F, Hastings Court, Tower A
Kolkata 700023
India

FM Approvals Class: 1311

Approval Identification: 3052348 Approval Granted: July 20, 2017

To verify the product continues to be Approved please refer to www.approvalguide.com.

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

David B. Fuller
VP - Manager of Fire Protection
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062 USA

FM Approvals
Member of the FM Global Group

FM APPROVED

Certificate of Compliance

This certificate is issued for the following:

Centrifugal Fire Pumps
(Axial Split-Case Type)

Models 4HF12, 4HF12L, 5HF11, 6HF12, 8HF13
(see ratings attached)

Prepared for:

Pumpsense Fluid Engineering Pvt Ltd.
96 Garden Reach Rd
5/F Hastings Court, Tower A
Kolkata 700023
India

FM Approvals Class: 1311 (January 2018)

Approval Identification: PR449206 Approval Granted: November 19, 2019

To verify the product continues to be Approved please refer to www.approvalguide.com.

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

David B. Fuller
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FM APPROVED

Certificate of Compliance

This certificate is issued for the following:

Centrifugal Fire Pumps
(Axial Split-Case Type)

Models 4HF10, 6HF10, 6HF14K, 8HF15, 8HF20
(see attached listing)

Prepared for:

Pumpsense Fluid Engineering Pvt Ltd
96 Garden Reach Rd
5/F Hastings Court, Tower A
Kolkata 700023
India

FM Approvals Class: 1311 (December 2020)

Approval Identification: PR460212 Approval Granted: December 21, 2021

To verify the product continues to be Approved please refer to www.approvalguide.com.

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

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Certificates of Compliance

PUMPSENSE

CERTIFICATE OF COMPLIANCE

Certificate Number	EX28544
Report Reference	EX28544-20210514
Date	2021-May-25
Issued to:	PUMPSENSE FLUID ENGINEERING PVT LTD 5F, TOWER-A, HASTINGS COURT 96, GARDEN REACH ROAD KOLKATA West Bengal, 700023 IN
This is to certify that representative samples of	CENTRIFUGAL FIRE PUMPS, END SUCTION See Addendum Page for Product Designation(s).
	Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	UL 448 - Standard for Pumps for Fire-Protection Service
Additional Information:	See the UL Online Certifications Directory at https://iq.ulprospector.com for additional information

This Certificate of Compliance does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

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/

CERTIFICATE OF COMPLIANCE

Certificate Number	EX28544
Report Reference	EX28544-20210514
Date	2021-May-25

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements

Centrifugal Fire Pumps, End Suction
Models: EF 80-310, EF100-310

Bruce Mahrenholz, Director North American Certification Program

UL LLC

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CERTIFICATE OF COMPLIANCE

Certificate Number	EX27294
Report Reference	EX27294-20161205
Date	2021-March-23
Issued to:	PUMPSENSE FLUID ENGINEERING PVT LTD 5F, TOWER-A, HASTINGS COURT 96, GARDEN REACH ROAD KOLKATA West Bengal, 700023 IN
This is to certify that representative samples of	CENTRIFUGAL FIRE PUMPS, SPLIT CASE See Addendum Page for Product Designation(s).
	Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	UL 448 - Standard for Pumps for Fire-Protection Service
Additional Information:	See the UL Online Certifications Directory at https://iq.ulprospector.com for additional information

This Certificate of Compliance does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.

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CERTIFICATE OF COMPLIANCE

Certificate Number	EX27294
Report Reference	EX27294-20161205
Date	2021-March-23

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements

Product Designation(s).:

USL - Centrifugal Fire Pumps, Split Case

All models are intended for installation with the shaft in the horizontal position.

Fire Pumps : Multistage
Model Designation: 3HFT11, 6HFTD12L

Fire Pumps: Single Stage
4HF12L, 4HF10, 4HF13, 4HF12, 5HF11, 6HF14K, 6HF10, 6HF20, 6HF12, 8HF13, 8HF20, 8HF22, 8HF15

Bruce Mahrenholz, Director North American Certification Program

UL LLC

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PUMPSENSE UL Listed Centrifugal Fire Pumps (UL 448) Split-Case, Single Stage

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Rated Capacity (usgpm)	Rated Net Pressure Range (psi)	Approx. Speed (rpm)	Model Designation
300	53-100	2800	4HF10
300	59-112	2950	4HF10
300	62-116	3000	4HF10
300	76-141	3300	4HF10
300	89-163	3550	4HF10
300	88-139	2600	4HF12L
300	104-161	2800	4HF12L
300	116-180	2950	4HF12L
300	120-186	3000	4HF12L
400	50-98	2800	4HF10
400	56-109	2950	4HF10
400	59-113	3000	4HF10
400	72-138	3300	4HF10
400	85-161	3550	4HF10
400	84-134	2600	4HF12L
400	99-157	2800	4HF12L
400	111-175	2950	4HF12L
400	115-182	3000	4HF12L
400	49-94	2800	5HF10
400	54-102	2900	5HF10
400	56-105	2950	5HF10
400	58-109	3000	5HF10
400	71-133	3300	5HF10
400	84-155	3550	5HF10
450	49-95	2800	4HF10
450	55-107	2950	4HF10
450	57-111	3000	4HF10
450	70-136	3300	4HF10
450	83-159	3550	4HF10
450	81-132	2600	4HF12L
450	96-155	2800	4HF12L
450	108-173	2950	4HF12L
450	113-179	3000	4HF12L
450	47-92	2800	5HF10
450	51-100	2900	5HF10
450	54-103	2950	5HF10
450	56-107	3000	5HF10
450	70-131	3300	5HF10
450	82-153	3550	5HF10
500	46-93	2800	4HF10
500	53-105	2950	4HF10
500	55-108	3000	4HF10
500	69-134	3300	4HF10
500	81-157	3550	4HF10
500	78-129	2600	4HF12L

PUMPSENSE UL Listed Centrifugal Fire Pumps (UL 448) Split-Case, Single Stage

PUMPSENSE

Rated Capacity (usgpm)	Rated Net Pressure Range (psi)	Approx. Speed (rpm)	Model Designation
500	93-152	2800	4HF12L
500	105-171	2950	4HF12L
500	109-177	3000	4HF12L
500	130-176	2600	4HF13
500	153-206	2800	4HF13
500	171-230	2950	4HF13
500	177-238	3000	4HF13
500	45-89	2800	5HF10
500	49-97	2900	5HF10
500	51-101	2950	5HF10
500	53-105	3000	5HF10
500	68-130	3300	5HF10
500	80-152	3550	5HF10
750	79-124	2600	4HF12
750	96-149	2800	4HF12
750	106-169	2950	4HF12
750	109-176	3000	4HF12
750	114-162	2600	4HF13
750	137-192	2800	4HF13
750	155-215	2950	4HF13
750	162-224	3000	4HF13
750	62-89	2800	5HF10H
750	68-96	2900	5HF10H
750	70-100	2950	5HF10H
750	73-104	3000	5HF10H
750	89-127	3300	5HF10H
750	104-149	3550	5HF10H
750	62-89	2800	4HF10H
750	67-96	2900	4HF10H
750	70-100	2950	4HF10H
750	73-104	3000	4HF10H
750	91-128	3300	4HF10H
750	107-150	3550	4HF10H
1000	82-124	2600	5HF11
1000	97-147	2800	5HF11
1000	109-165	2950	5HF11
1000	113-171	3000	5HF11
1000	78-105	2800	6HF10
1000	87-117	2950	6HF10
1000	90-121	3000	6HF10
1000	106-145	3300	6HF10
1000	124-169	3550	6HF10
1000	127-175	2600	6HF14K
1000	151-206	2800	6HF14K
1000	169-230	2950	6HF14K
1000	175-239	3000	6HF14K

PUMPSENSE UL Listed Centrifugal Fire Pumps (UL 448) Split-Case, Single Stage

PUMPSENSE

Rated Capacity (usgpm)	Rated Net Pressure Range (psi)	Approx. Speed (rpm)	Model Designation
1250	74-101	2800	6HF10
1250	83-113	2950	6HF10
1250	86-117	3000	6HF10
1250	103-141	3300	6HF10
1250	120-165	3550	6HF10
1250	109-173	2950	6HF12
1250	113-180	3000	6HF12
1250	77-118	1480	6HF20
1250	80-122	1500	6HF20
1250	113-173	1760	6HF20
1250	119-182	1800	6HF20
1500	98-136	3300	6HF10
1500	116-160	3550	6HF10
1500	103-168	2970	6HF12
1500	106-172	3000	6HF12
1500	76-117	1500	6HF20
1500	109-167	1760	6HF20
1500	115-175	1800	6HF20
2000	120-148	2800	8HF13
2000	136-167	2950	8HF13
2000	141-173	3000	8HF13
2000	82-122	2100	8HF15
2000	106-155	2350	8HF15
2000	78-119	1480	8HF20
2000	80-122	1500	8HF20
2000	115-172	1760	8HF20
2000	121-181	1800	8HF20
2000	119-150	1480	8HF22
2000	123-154	1500	8HF22
2500	99-152	2350	8HF15
2500	141-164	2800	8HF15
2500	160-185	2950	8HF15
2500	72-112	1480	8HF20
2500	74-115	1500	8HF20
2500	110-166	1760	8HF20
2500	115-175	1800	8HF20
2500	114-144	1480	8HF22
2500	117-149	1500	8HF22
3000	132-155	2800	8HF15
3000	149-176	2950	8HF15
3000	104-162	1780	8HF20
3000	107-166	1800	8HF20

PUMPSENSE UL Listed Centrifugal Fire Pumps (UL 448) Split-Case, Multi Stage

PUMPSENSE

Rated Capacity (usgpm)	Rated Net Pressure Range (psi)	Approx. Speed (rpm)	Model Designation
400	190-320	2900	3HFT11
400	194–327	2930	3HFT11
500	183–314	2900	3HFT11
500	187–320	2930	3HFT11
1000	179-262	2600	6HFTD12L
1000	210-306	2800	6HFTD12L
1000	227-329	2900	6HFTD12L
1000	240-347	2975	6HFTD12L
1250	216-323	2900	6HFTD12L
1250	229-342	2975	6HFTD12L

PUMPSENSE UL Listed Centrifugal Fire Pumps (UL 448) UL-End Suction

Rated Capacity (usgpm)	Rated Net Pressure Range (psi)	Approx. Speed (rpm)	Model Designation
300	83-148	2950	EF 80-310
300	86-154	3000	EF 80-310
300	105-189	3300	EF 80-310
300	123-220	3550	EF 80-310
400	78-140	2950	EF 80-310
400	81-146	3000	EF 80-310
400	100-180	3300	EF 80-310
400	118-211	3550	EF 80-310
450	76-135	2950	EF 80-310
450	79-141	3000	EF 80-310
450	98-175	3300	EF 80-310
450	115-207	3550	EF 80-310
500	89-156	2950	EF100-310
500	93-161	3000	EF100-310
500	114-199	3300	EF100-310
500	134-233	3500	EF100-310
750	75-121	2600	EF 125-310
750	89-143	2800	EF 125-310
750	97-154	2900	EF 125-310
750	101-160	2950	EF 125-310
750	104-166	3000	EF 125-310

FM Approved Centrifugal Fire Pumps (FM 1311)

Horizontal Split-Case, Single stage

PUMPSENSE

Rated Capacity (gal/min)	Rated Net Head at Rated Capacity (psi)	Rated Speed (r/min)	Suction Inlet, dia. (in.)	Discharge Outlet, dia. (in.)	Product
300	52-93	2800	6	4	4HF10
	58-103	2950			
	60-107	3000			
	71-140	3300			
	82-162	3550			
	88-139	2600	6	4	4HF12L
	104-162	2800			
	116-180	2950			
	120-187	3000			
400	49-89	2800	6	4	4HF10
	55-100	2950			
	58-104	3000			
	70-137	3300			
	82-159	3550			
	85-135	2600	6	4	4HF12L
	99-158	2800			
	111-177	2950			
	115-183	3000			
450	47-87	2800	6	4	4HF10
	53-98	2950			
	56-102	3000			
	69-136	3300			
	80-158	3550			
	82-133	2600	6	4	4HF12L
	97-155	2800			
	109-174	2950			
	113-181	3000			
500	45-85	2800	6	4	4HF10
	51-96	2950			
	53-99	3000			
	67-133	3300			
	79-157	3550			
	78-129	2600	6	4	4HF12L
	94-152	2800			
	106-171	2950			
	110-177	3000			
750	79-122	2600	6	4	4HF12
	94-147	2800			
	107-166	2950			
	112-172	3000			
1000	80-126	2600	6	5	5HF11
	95-148	2800			
	107-167	2950			
	111-173	3000			
	78-106	2800	6	6	6HF10
	88-118	2950			
	91-123	3000			
	105-148	3300			
	123-173	3550			

FM Approved Centrifugal Fire Pumps (FM 1311)

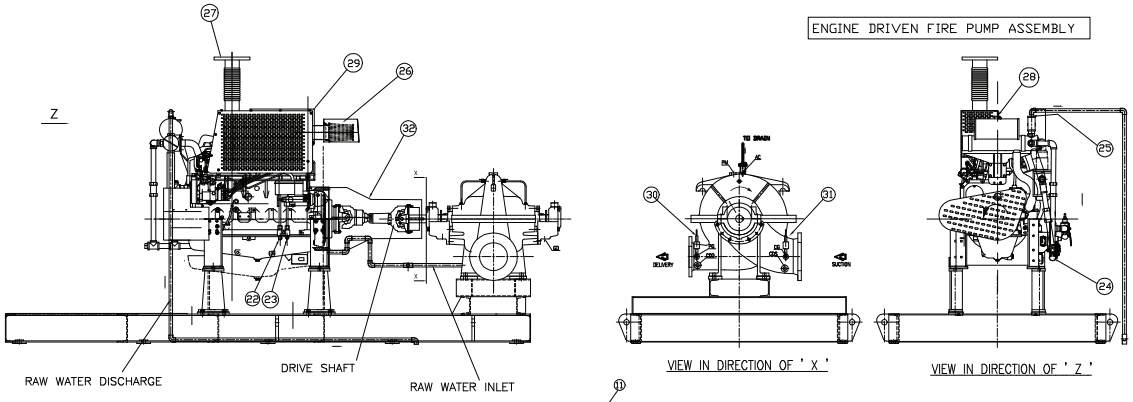
Horizontal Split-Case, Single stage

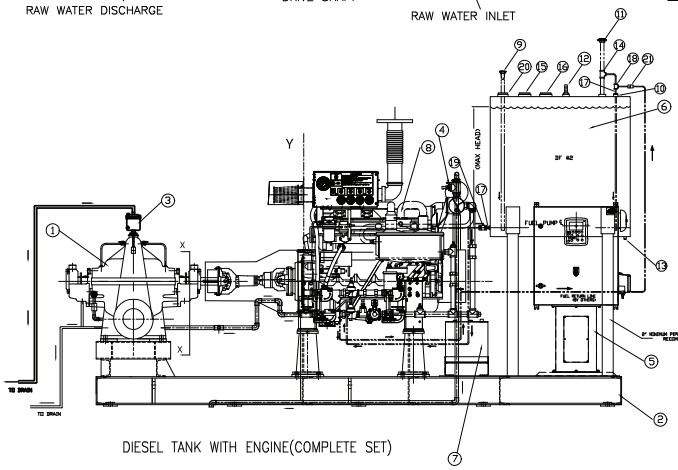
PUMPSENSE

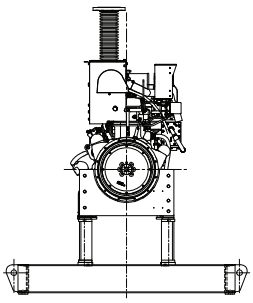
Rated Capacity (gal/min)	Rated Net Head at Rated Capacity (psi)	Rated Speed (r/min)	Suction Inlet, dia. (in.)	Discharge Outlet, dia. (in.)	Product
1000	135-173	2600	8	6	6HF14K
	159-204	2800			
	178-229	2950			
	185-237	3000			
1250	74-102	2800	6	6	6HF10
	83-115	2950			
	87-119	3000			
	101-145	3300			
	119-169	3550			
1250	83-132	2600	8	6	6HF12
	134-154	2800			
	115-170	2950			
	121-179	3000			
1500	108-165	2950	8	6	6HF12
	114-174	3000			
	101-124	1800	8	6	6HF18
	100-140	1480	8	6	6HF21
2000	120-146	2800	10	8	8HF13
	135-166	2950			
	138-173	3000			
	83-120	2100	12	8	8HF15
	106-153	2350			
	110-140	1770	10	8	8HF17
	80-116	1470	10	8	8HF20
	118-170	1760			
	123-178	1800			
	98-126	1480	10	8	8HF21
2500	100-146	2350	12	8	8HF15
	144-167	2800			
	162-187	2950			
2500	106-136	1770	10	8	8HF17
2500	73-110	1470	10	8	8HF20
	112-165	1760			
	118-173	1800			
3000	137-160	2800	12	8	8HF15
	154-179	2950			

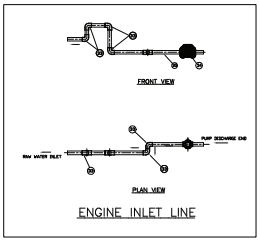
Engine Driven Fire Pump Assembly

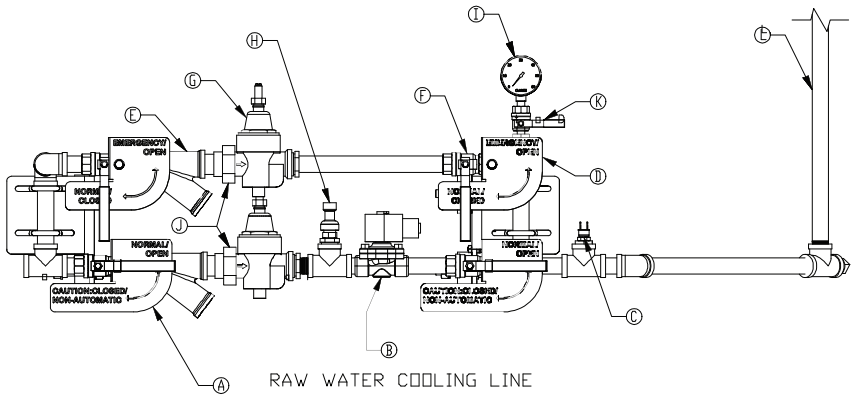
PUMPSENSE

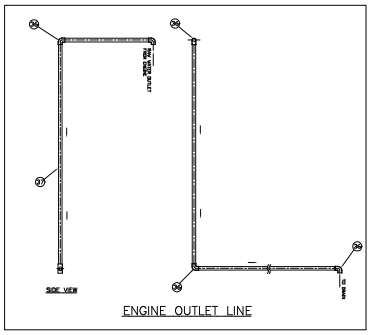












DIESEL TANK WITH ENGINE		
1	1	2" FILL CAP- WITH PROVISION FOR PADLOCK, COMBINED WITH REMOVABLE STRAINER (MAX. .06 MESH)
2	1	DOUBLE TAP BUSHING, 1" X .50"
3	1	VENT CAP, 1.25" NPT
4	1	DIRECT READING TANK GAUGE,2" NPT
5	1	PIPE PLUG FOR DRAIN, 1" NPT
6	1	PIPE TEE, 1.25" x 1.25" x TABLE 2 (MIN. FUEL RETURN S
7	1	PIPE PLUG, 4" NPT (PROVISION FOR EMERGENCY RELEIF VEN
8	1	PIPE PLUG, 2" NPT (PROVISION FOR LOW FUEL ALARM ACCES
9	1	PIPE NIPPLE, TABLE 2 (MIN. FUEL SUPPLY SIZE) x CLOSE
10	1	PIPE TEE, .50" x .50" x TABLE 2 (MIN. FUEL RETURN SIZ
11	1	STOP COCK, TABLE 2 (MIN. FUEL SUPPLY SIZE) (WITH PROVISION FOR PADLOCK)
12	1	DOUBLE TAP BUSHING, 3" x 2"
13	1	CHECK VALVE, TABLE 2 (MIN. FUEL RETURN SIZE) (PREVENTS SIPHONING)
ITEM	QTY.	DESCRIPTION (ALL FITTINGS BY OTHERS)

COMPLETE SYSTEM		
ITEM	QTY	
1	1	FIRE PUMP
2	1	BASE PLATE
3	1	AUTOMATIC AIR RELEASE VALVE
4	1	PRESSURE SENSOR/HEAT EXCHANGER OUTLET)
5	1	CONTROL PANEL (FLOOR MOUNTED)
6	1	DIESEL TANK
7	2	BATTERY
8	1	DIESEL ENGINE

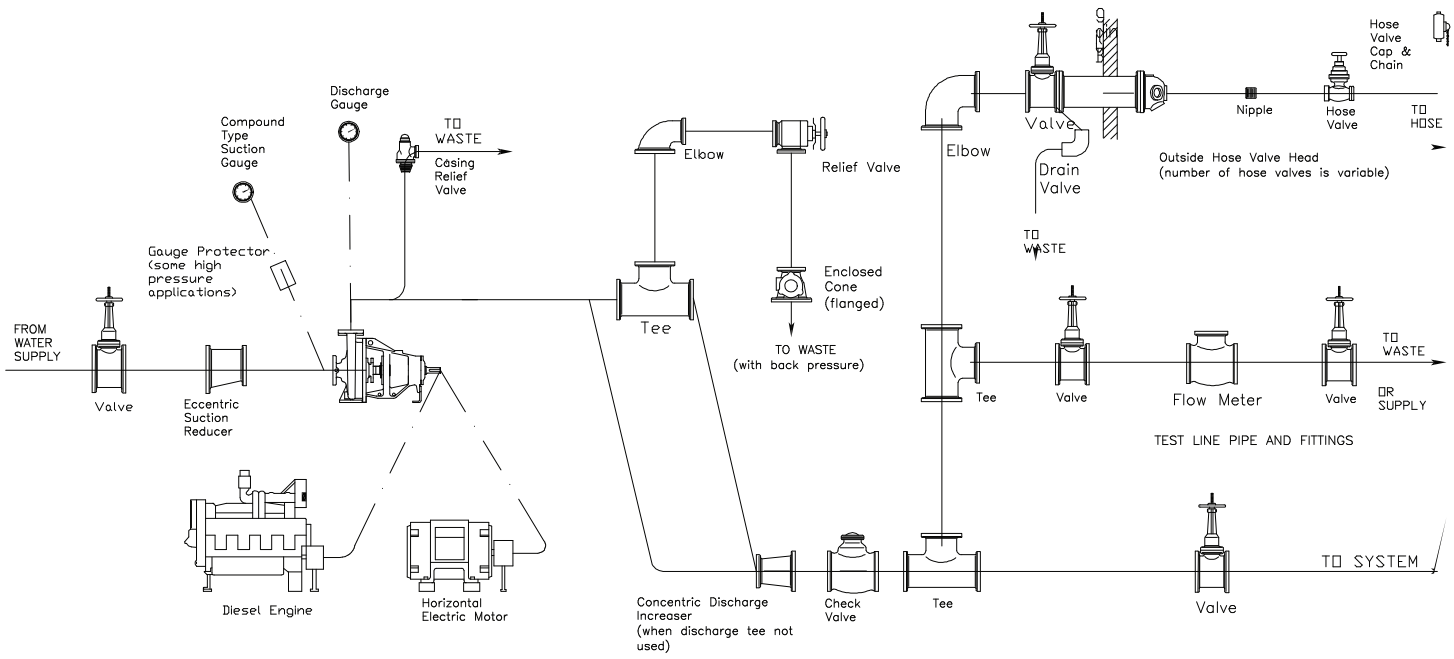
PUMP WITH DIESEL ENGINE		
1	TELESCOPING SHAFT GUARD	32
1	COMPOUND PRESSURE GAUGE (NOTE-4)	31
1	DELIVERY PRESSURE GAUGE (NOTE-4)	30
1	JUNCTION BOX	29
1	COOLANT FILL	28
1	FLEXIBLE EXHAUST OUTLET (NOTE-3)	27
1	AIR FILTER	26
1	1"NPT RAW WATER DISCHARGE	25
1	3/4"NPT RAW WATER INLET	24
1	3/8"NPT FUEL RETURN LINE	23
1	1/2"NPT FUEL SUPPLY LINE	22
NO. OFF	DESCRIPTION	REF.

RAW WATER COOLING LINE		
	PIPING KIT TO CHARGE AIR COOLER OR HEAT EXCHANGER	L
1	PRESSURE GAUGE SHUT-OFF VALVE	K
2	UNION	J
1	0-60 PSI PRESSURE GAUGE	I
1	PRESSURE SENSOR (COOLING LOOP)	H
2	PRESSURE REGULATOR	G
4	SHUT-OFF VALVE	F
2	WYE STRAINER	E
2	BYPASS LINE INDICATING PLATE	D
1	105° F TEMPERATURE SWITCH	C
1	SOLENOID VALVE	B
2	AUTOMATIC LINE INDICATING PLATE	A
NO. OFF	DESCRIPTION	REF.

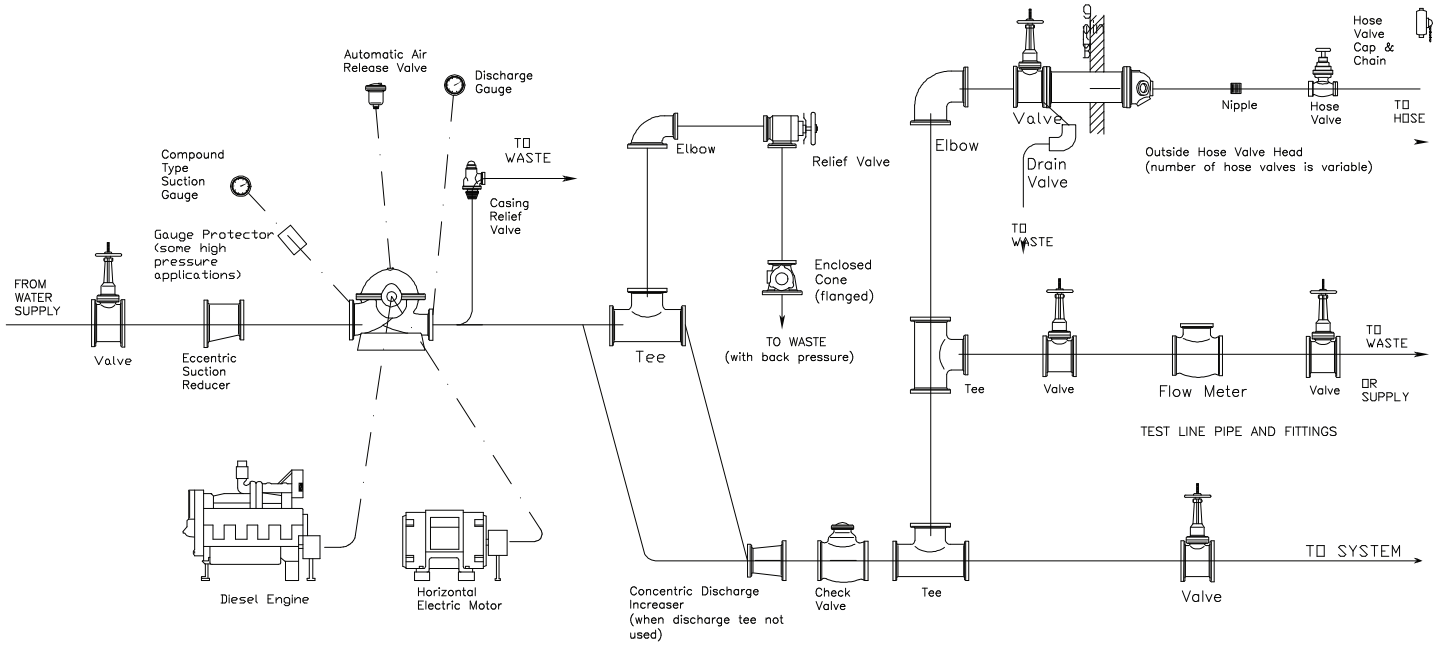
ENGINE OUTLET LINE				
	3/4"NB PIPE	37	SS	-
4	3/4" NB 90° THREADED ELBOW	36	SS	-
NO. OFF	DESCRIPTION	REF.	MATL.	WT. KG EACH

ENGINE INLET LINE				
	3/4"NB PIPE	35	SS	-
1	3/4"NPT THREADED EQUAL TEE	34	SS	-
6	3/4" NB 90° THREADED ELBOW	33	SS	-
NO. OFF	DESCRIPTION	REF.	MATL.	WT. KG EACH

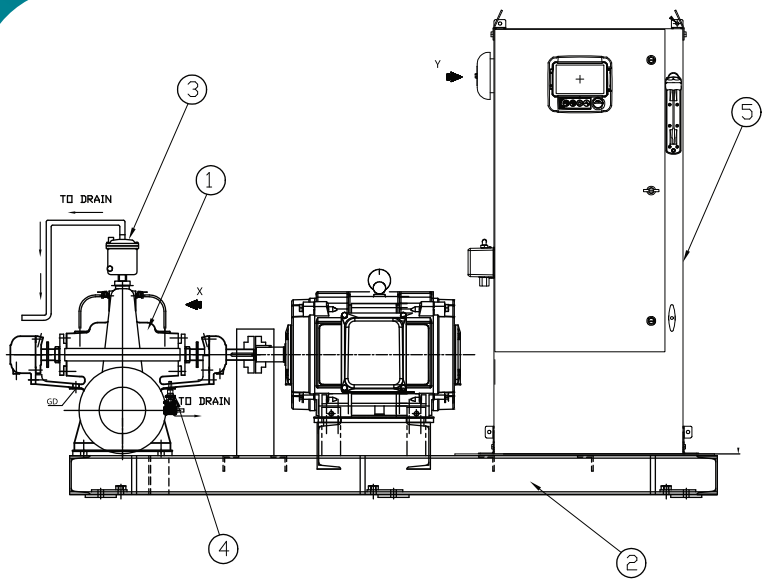
Motor/Engine Driven Fire Protection System with End Suction Pump

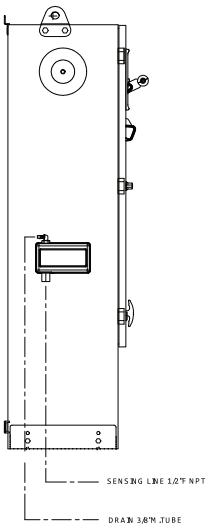


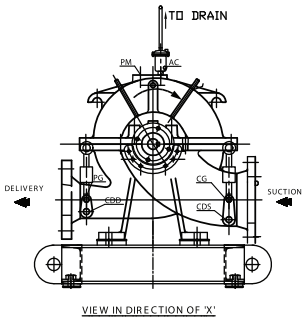
Motor/Engine Driven Fire Protection System with Split-Case Pump



Motor Driven Fire Pump Assembly

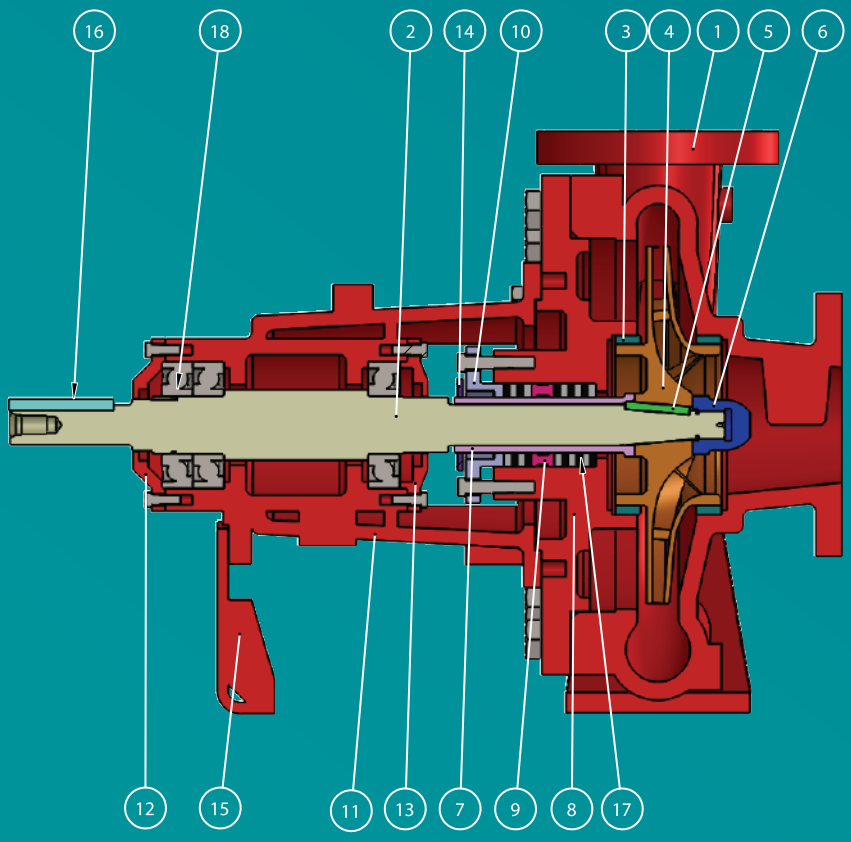






COMPLETE SYSTEM		
ITEM	QTY	DESCRIPTION
1	1	FIRE PUMP
2	1	BASE PLATE
3	1	AUTOMATIC AIR RELEASE VALVE
4	1	CASING RELIEF VALVE
5	1	CONTROL PANEL (FLOOR MOUNTED)

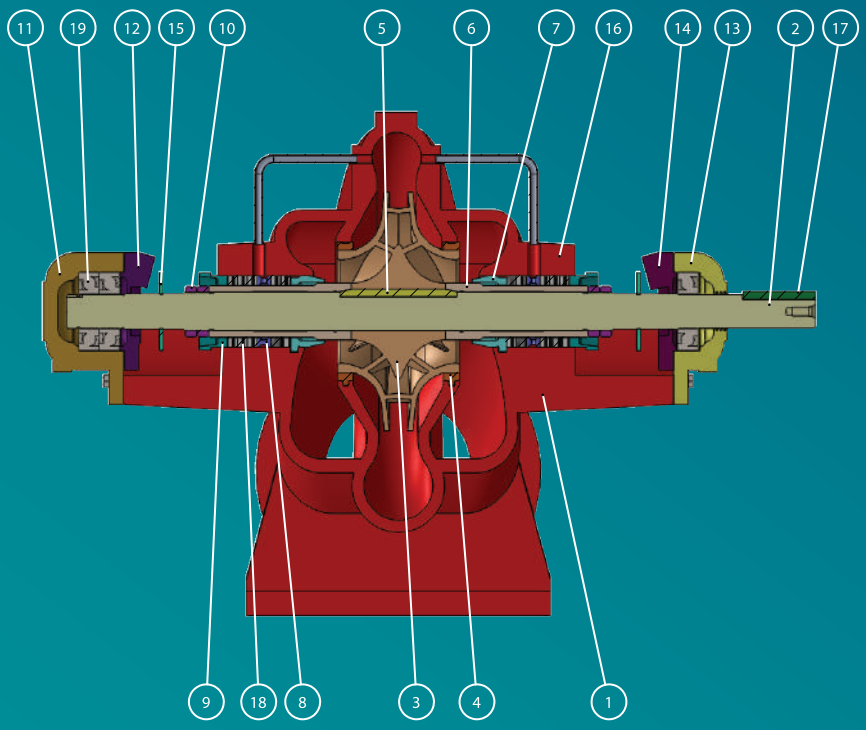
Cross Sectional Drawing For End Suction Fire Pump



ITEM NO.	DESCRIPTION	QTY.
1	CASING	1
2	SHAFT	1
3	WEAR RING	2
4	IMPELLER	1
5	IMPELLER KEY	1
6	IMPELLER NOSE CAP	1
7	SHAFT SLEEVE	1
8	BACK COVER	1
9	LANTERN RING	1
10	SPLIT GLAND	1
11	BEARING BRACKET	1
12	BEARING END COVER PE	1
13	BEARING END COVER FE	1
14	WATER THROWER	1
15	SUPPORT FOOT	1
16	COUPLING KEY	1
17	GLAND PACKING	5
18	BEARINGS (DE + NDE)	3

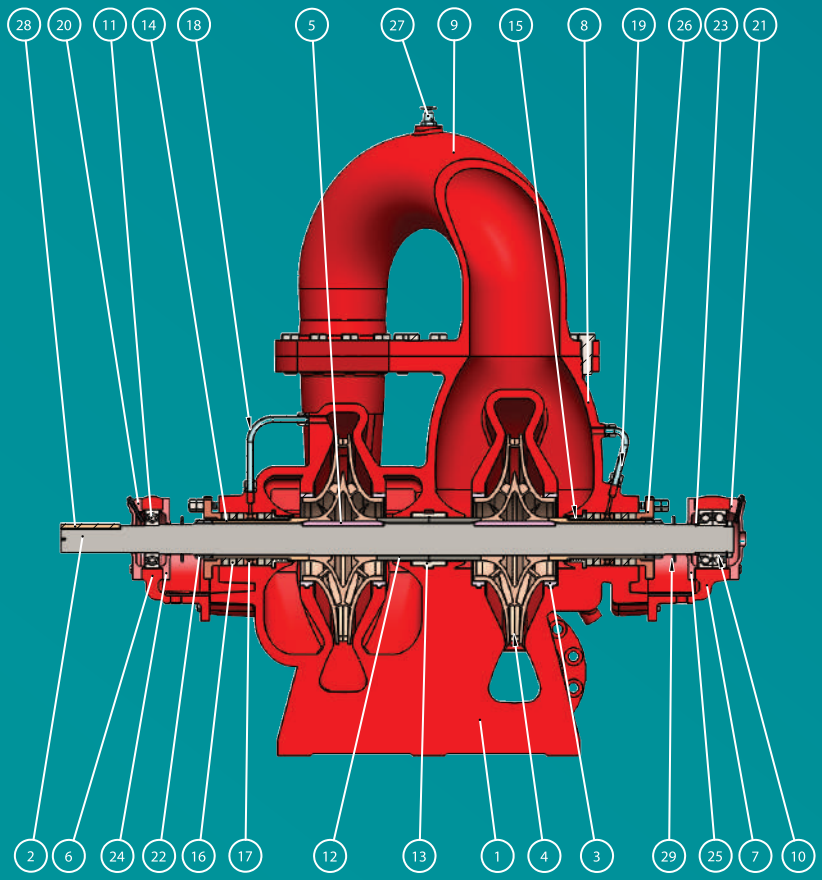
PUMPSENSE

Cross Sectional Drawing For Single Stage Split-Case Pump



ITEM NO.	DESCRIPTION	QTY.
1	CASING BOTTOM HALF	1
2	SHAFT	1
3	IMPELLER	1
4	WEAR RING	2
5	IMPELLER KEY	1
6	SHAFT SLEEVE	2
7	STUFFING BOX BUSH	2
8	LANTERN RING	2
9	SPLIT GLAND	2
10	SLEEVE NUT	4
11	BEARING HOUSING (NDE)	1
12	BEARING END COVER (NDE)	1
13	BEARING HOUSING (DE)	1
14	BEARING END COVER (DE)	1
15	WATER THROWER	2
16	CASING TOP HALF	1
17	COUPLING KEY	1
18	GLAND PACKING	10
19	BEARINGS (DE + NDE)	3

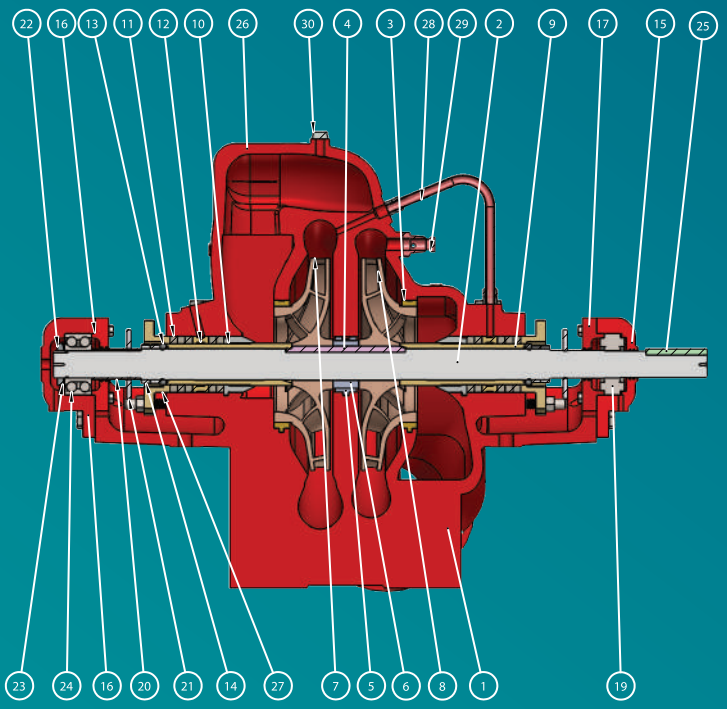
Cross Sectional Drawing For Two Stage Fire Pump With External Crossover



ITEM NO.	DESCRIPTION	QTY.
1	LOWER CASING	1
2	SHAFT	1
3	WEAR RING	4
4	IMPELLER	2
5	IMPELLER KEY	2
6	BEARING BRACKET DE	1
7	BEARING BRACKET FE	1
8	UPPER CASING	1
9	CROSS OVER BEND	1
10	BEARING NDE	2
11	BEARING DE	1
12	INTERSTAGE COLLAR	2
13	INTERSTAGE BUSH	1
14	SHAFT SLEEVE	2
15	THRUST BUSH	2
16	GLAND PACK	10
17	LANTERN RING	2
18	SEAL FLUSHING LINE DE	1
19	SEAL FLUSHING LINE NDE	1
20	BEARING END COVER OUTER DE	1
21	BEARING END COVER OUTER NDE	1
22	SLEEVE NUTS	4
23	THRUST COLLAR	1
24	BEARING END COVER INNER DE	1
25	BEARING END COVER INNER NDE	1
26	SPLIT GLAND	2
27	AIR COCK	1
28	COUPLING KEY	1
29	WATER THROWER	2

Cross Sectional Drawing For Two Stage Fire Pump With Internal Crossover

PUMPSENSE



ITEM NO.	DESCRIPTION	QTY.
1	LOWER CASING	1
2	SHAFT	1
3	WEAR RING	2
4	IMPELLER KEY	1
5	INTER STAGE BUSH	1
6	INTER STAGE COLLAR	1
7	IMPELLER 2ND STAGE	1
8	IMPELLER FIRST STAGE	1
9	SHAFT SLEEVES	2
10	STUFING BOX BUSH	2
11	GLAND PACK	10
12	LANTERN RING	2
13	SLEEVE WASHER	2
14	SLEEVE NUTS	4
15	BEARING BRACKET DE	1
16	BEARING BRACKET NDE	1
17	BEARING ENDCOVER DE	1
18	BEARING ENDCOVER NDE	1
19	BEARING DE	1
20	THRUST SLEEVE	1
21	WATER THROWER	2
22	LOCK NUT	1
23	LOCK WASHER	1
24	BEARING NDE	1
25	COUPLING KEY	1
26	UPPER CASING	1
27	SPLIT GLAND	2
28	WATER SEALING PIPE	1
29	AIR COCK	1
30	PRIMING NUT	1

Standard QA Documents:

1. Material Test certificates of all major items as per UL and FM surveillance audit requirement.
2. Pump hydrostatic pressure test report.
3. Pump impeller balancing report as per ISO 21940 Gr. 6.3.
4. Pump performance test report and IOM.
5. Panel shop test certificates, panel diagrams and panel IOM.
6. Diesel Engine datasheets, drawings, test certificate and engine IOM.
7. ARV datasheet and ARV IOM.
8. MRV datasheet and MRV IOM.
9. Pressure gauges datasheets.
10. Complete diesel engine driven pump set drawing.
11. Complete electric motor driven pump set drawing.
12. Motor datasheet, curves, certificate of compliance and motor IOM

PUMPSENSE

Specifications Sheet

The fire pumpset supplied by Pumpsense shall include the pump, driver, controller and fittings as detailed in the following technical specifications. All the materials supplied shall be installed as recommended in NFPA 20.

- **Pump Technical Details:**

The UL/FM certified fire pumps will be horizontal, centrifugal single/multi stage axially split case type or centrifugal single stage end suction type constructed specifically for fire pump services by Pumpsense. The pump must be selected for the certified duty ..... USGPM and the differential head ..... PSIG within the listed range for the specific duty and speed. The pump must deliver 150% of the rated flow and the head ratio with the rated heat should not be less than the 65% whereas the rated head should not be more than 140% of the pump shut-off head for the specified impeller. The pump should draw water from an above ground tank (or any other source with positive pressure) with a maximum pressure ..... PSIG or from underground tank with a minimum pressure .... PSIG. For clear water usage, Pump casings are in cast iron FG260, impeller in bronze LG2, shaft AISI 410 and all other rotating elements in standard bronze construction. Bearings are mainly grease lubricated. Special materials can be provided on request for sour fluid handling firefighting application.

- **Electric Motor:**

For UL or UL and FM certified pump sets, the electric pump should be coupled by a flexible pin and bush type coupling with UL listed rating .... HP,ODP/TEFC, maximum ambient temperature ..... deg.C, supply frequency ..... Hz, supply voltage ..... V, ... phase, ... efficiency class horizontal foot mounted motor.

- **Electric Fire Pump Controller:**

The fire pump controller shall be factory assembled, wired and tested as a unit prior to shipment. The controller shall be available for 380-415 Volt, 50 Hz or 440-460V three phase power. The controller shall include the following standard features:

- NEMA type 2 drip proof metal freestanding enclosure. Optional enclosure types are available on request.
- The controller shall be of combined manual and automatic type designed for one of the following starting methods :
  DOL (b) Star/Delta (c) Auto transformer (d) Soft starter
- The controller shall include Isolating Disconnect Switch/Circuit Breaker of adequate rating suitable for the motor kW.
- The controller shall be supplied with a solid state pressure transducer with a range of _____ PSI for monitoring system pressure and providing the feedback to the controller.
- Touch screen color Human Interface Device (HMI) display shall be provided of minimum 5 inch size capable of being read in both direct sunlight and dark lighting conditions.

- Touch screen pushbuttons shall be provided on HMI for easy screen navigation, alarm reset, and alarm silencing.
- All features shall be enabled or disabled through the HMI, no jumpers or external wires shall be needed or allowed to activate or deactivate a feature.
- The system status data shall be displayed on the HMI.
- Data logging shall be possible with real time/date clock to store the continuous pressure log, event log, alarm log and all user changeable set points and system data. Battery backup of any kind shall not be allowed.
- The controller shall be provided with a USB port capable of accepting USB flash memory disk to download historical data of events, alarms and pressure logs
- When emergency standby generator is to be used an automatic power transfer switch can be provided to route source of power (utility and standby generator) to the fire pump motor (optional).
- Anti-condensation space heaters and other options can be offered on request.

• Diesel Engine:

For UL/FM certified diesel pump set, the engine should be UL and FM certified horizontal 4 stroke internal combustion engine, have FM 1311 approved heat exchanger cooling loop, UL listed driveshaft (only for UL listed set; for only FM approved set non-UL driveshaft is acceptable). The location of the engine installation is at .....mm from sea level with an ambient temperature ..... deg.C. stator voltage ..... (12/24) V DC, Jacket Water Heater Voltage ..... (120/240) V AC and type of silencer ..... (Industrial/Residential). Engine rating will be ..... HP with a derating factor suitable for the temperature and altitude.

• Diesel Fire Pump Controller:

The fire pump controller shall be factory assembled, wired and tested as a unit prior to shipment. The controller shall be available for either 12VDC or 24VDC systems. The controller shall include the following standard features:

- NEMA type 2 drip proof metal wall mount or freestanding enclosure. Optional enclosure types are available on request.
- Dual solid state battery chargers.
- Two outer door mounted crank push buttons and two inner panel mounted battery on/off switches.
- Outer door mounted key operated AUTO, OFF, MANUAL, mode and selector switch.
- The controller shall be supplied with a solid state pressure transducer with a range of _____ PSI for monitoring system pressure and providing the feedback to the controller.
- Touch screen pushbuttons shall be provided on HMI for easy screen navigation, alarm reset, and alarm silencing.

- Controller settings shall be programmable through the HMI and shall be protected by passwords.
- The system status data shall be displayed on the HMI.
- Audible alarm shall be provided with alarm silence feature for silenceable alarms.
- Data logging shall be possible with real time/date clock to store the continuous pressure log, event log, alarm log and all user changeable set points and system data. Battery backup of any kind shall not be allowed.
- The controller shall be provided with a USB port capable of accepting USB flash memory disk to download historical data of events, alarms and pressure logs
- Anti-condensation space heaters and other options can be offered on request.

- **Standard Accessories for Pump Set**

I. The horizontal axially split case pump should be equipped with an automatic air release valve with ..... mm inlet size either UL listed or UL and FM certified. For end suction pump an automatic air release valve is not required.

II. The horizontal axial split case pump and end suction pump driven by an electric motor should have a casing relief valve with .... mm inlet size and with ..... (angle/globe) configuration with a pressure range rating ..... PSIG. The valve should be set at a pressure slightly below that of the pump shut-off pressure to protect the pump from the overheating.

III. Compound Suction Gauge, 3-1/2" dial with ¼" BSP port and isolation valve.

IV. Discharge Gauge, 3-1/2" dial with ¼" BSP port and isolation valve. Discharge gauge is either UL listed or UL and FM certified.

V. The pump/motor set or pump/engine set will be mounted on a base frame. Base frame should be machined properly having the lifting points for the loading and unloading purpose. The base frame should have provision of the heavy duty anchor bolts to fit on the foundation.

VI. Diesel engine set pump will be supplied with UL FM or UL certified main relief valve as per the minimum size mentioned in the NFPA20 for the specific pump duty. Main relief valve will be ..... (flanged/grooved) type, pressure rating ..... PSI, ... (angle/globe) orientation.

VII. FM approved orifice type flow meter of minimum size ..... inch as per NFPA20, ... (flanged/grooved) type.

VIII. Each diesel engine should have an independent fuel tank. Fuel tank size will be 1 gallon for 1HP with 5% volume for expansion and 5% for residual volume. Fuel tank will be supplied with minimum accessories as per NFPA20, 2inch lockable fuel fill cap, 1 inch drain port, mechanical direct fuel gauge, emergency vent port, port for low level fuel level switch. Diesel Tank can be single wall or double wall. Double wall diesel tank should have a 2" port at the outer containment to detect the leakage in the inner containment. There should be fuel inlet line port and return line port in the fuel tank to be connected with the diesel engine.

- **Jockey Pump**

The jockey pump shall be a vertical multistage inline pump with a capacity ..... USGPM, ...PSI differential head. The jockey pump will be driven by a TEFC motor of .... HP rating, voltage ..... V, frequency .... Hz, phase ....., speed ... rpm.

- **Jockey Pump Controller:**

The jockey pump controller shall be factory assembled, wired and tested as a unit prior to shipment. The controller shall include the following standard features:

o NEMA type 2 drip proof metal wall mount enclosure. Optional enclosure types are available on request.

o The controller shall have a fused horse power rated door interlocked rotary switch.

o The controller shall be of combined manual and automatic type designed for one of the following starting methods :
(a) DOL (b) Star/Delta

o The controller shall provide protection against overload and single phasing.

o The controller shall be supplied with a solid state pressure transducer with a range of _____ PSI for monitoring system pressure and providing the feedback to the controller.

o Touch screen color Human Interface Device (HMI) display shall be provided of minimum 3 inch size capable of being read in both direct sunlight and dark lighting conditions.

o Touch screen pushbuttons shall be provided on HMI for easy screen navigation, alarm reset, and alarm silencing.

o Controller settings shall be programmable through the HMI and shall be protected by passwords.

o All features shall be enabled or disabled through the HMI, no jumpers or external wires shall be needed or allowed to activate or deactivate a feature.

o The system status data shall be displayed on the HMI.

o The controller shall be provided with a USB port capable of accepting USB flash memory disk to download historical data of events, alarms and pressure logs.

PUMPSENSE

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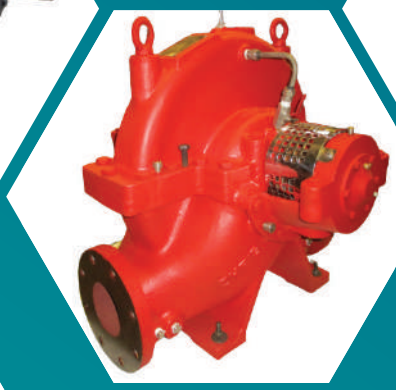
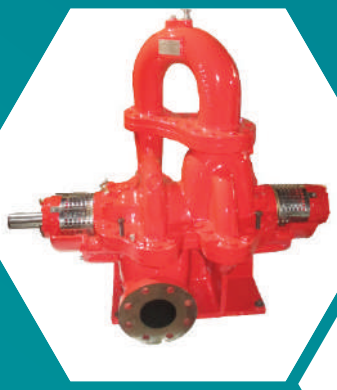
Standard Products

Split-case Fire Pump (HS Range)



Split-case Fire Pump (HF Range)

Mixed Flow Pump (EMF Range)



Two-stage Split-case Pump (HST Range)

Large End Suction Pump (ESL Range)

End Suction Marie Fire Pump (ESF Range)

Vertical Sewage Pump (SW Range)

Vertical Compact Split-case Pump(CSC Range)

PUMPSENSE

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