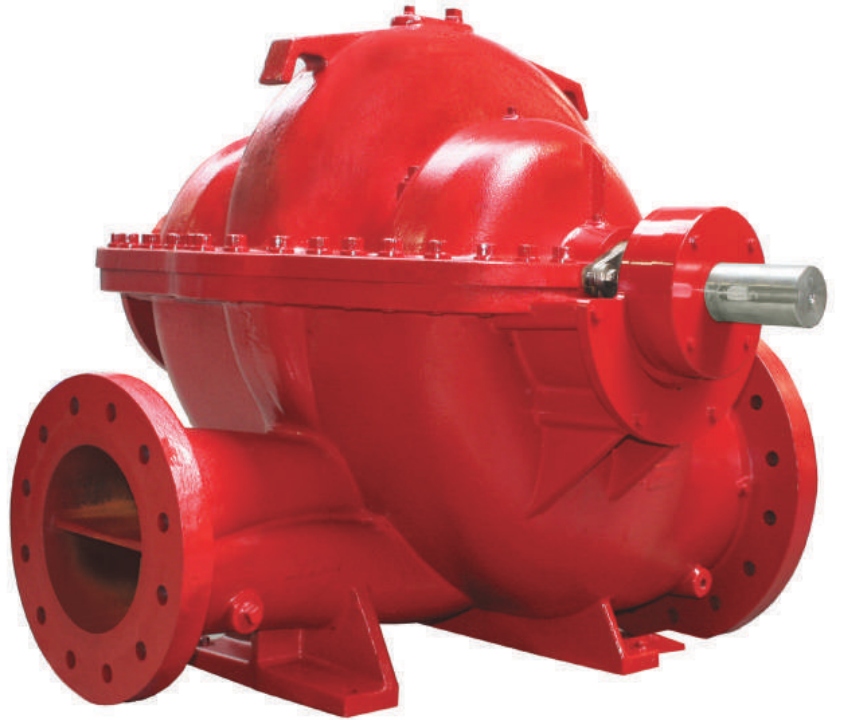
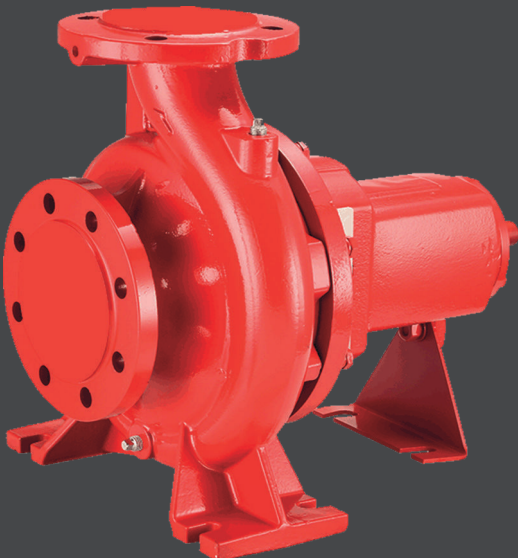



50HZ/60HZ



MENA
MECHANICAL INDUSTRIES CO.

FIRE PUMP




	
	Doc. Ref. TS-10007 -80
Customer Name WATERWAVE	
Project Name:	

Fire Pump Set
Technical Submittal

Capacity
1000 GPM @ 7 BAR

Project :
 Location :
 Client :
 Contractor :
 Consultant :


0	SUBMITTED FOR APPROVAL	KY	KY		30/08/2024
Rev	Description	Prepared	Checked	Approved	Date

DOCUMENT INDEX

Part	Seq. No.	Doc. Ref.	Description	Remarks
GENERAL DOCUMENTS	01	GD-SVL	Sub-Vendor List	
	02	GD-CE	UL/FM Certificates	
	03	GD-CP	Catalogue and Trade License	
	04	GD-ST5	System Technical Specifications	
DIESEL DRIVEN PUMP	05	DDP-PSC-750	Diesel Engine Driven Pump Specifications	
	06	DDP-DES	Diesel Engine Specifications	
	07	DDP-PCS-12V	Diesel Engine driven fire pump controller specifications	
ELECTRIC DRIVEN PUMP	08	EDP-PSC-750	Electric motor driven pump specifications	
	09	EDP-EMS-75/2	Electric motor specifications	
	10	EDP-PCS	Electric motor driven fire pump controller specifications	
JOCKEY PUMP	11	JP-RV	Jockey Pump Specifications	
	12	JP-PCS-JP3	Jockey Pump Controller	
ACCESSORIES	13	A-CRV-R	Casing Relief Valve	
		A-PG-W	Pressure Guages	
		A-FM-GRND	Flowmeter	
		A-CS-120	Diesel Fuel Tank Drawing	









0	SUBMITTED FOR APPROVAL				
Rev	Description	Prepared	Checked	Approved	Date

SUB VENDOR LIST

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date

SUB VENDOR LIST

EQUIPMENT	BRAND	MAKE	DESCRIPTION
END SUCTION FIRE PUMP		MENA MECHANICAL INDUSTRIES, UAE	RANGE: 50 - 1000 US GPM upto 230 PSI
DIESEL DRIVER	  <small>Enriching Lives</small>	BLACK STALION UL LISTED & FM APPROVED KIRLOSKAR UL LISTED & FM APPROVED	RANGE: 15 - 390 HP from 1400 - 3000 RPM RANGE: 62 - 330 HP from 1760 - 3000 RPM
FIRE PUMP MOTOR	  <small>A Regal Brand</small>  TECHTOP MOTOR	WEG UL LISTED MARATHON UL LISTED TECHTOP UL LISTED	RANGE: 11kW - 350kW Type: ODP & TEFC, NEMA2 RANGE: 15HP- 400HP Type: ODP & TEFC, NEMA2 RANGE: 15HP- 350HP Type: ODP & TEFC, NEMA2
FIRE PUMP CONTROLLERS	 <small>Fire Pump Controller</small>	TORNATECH, INC UL LISTED & FM APPROVED	RANGE: 11kW to 350KW Type: Diesel, Electric, Jockey
AIR RELIEF VALVE	<p style="text-align: center;">CAL-VAL</p> <p style="text-align: center;">OR FWIC Valves</p> <p style="text-align: center;"><small>*As Per Availability</small></p>	CAL-VAL, USA UL LISTED & FM APPROVED FWIC FM APPROVED	RANGE: 1/2 inch - 2 inch UP TO 300 PSI RANGE: 1/2 inch - 1 inch UP TO 300 PSI
FLOWMETER		GERAND, USA FM APPROVED	RANGE: 2-1/2 Inch to 8 Inch UP TO 300 PSI



Vendor Ref. No.

Contractor Ref. No.

Project Name:

Contractor Job No.

UL/FM CERTIFICATES

0	SUBMITTED FOR APPROVAL				
Rev	Description	Prepared	Checked	Approved	Date

CERTIFICATE OF COMPLIANCE

Certificate Number EX28929
Report Reference EX28929
Issue Date 2023-JANUARY-04

Issued to: **MENA MECH IND CO.**
Sharjah Al Sajaa Industrial Shed 6
Victory Warehouse, Sajja New Industrial Area
Sharjah, United Arab Emirates

This certificate confirms that representative samples of Centrifugal Fire Pumps, End Suction
See Addendum for Models

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

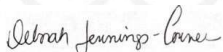
Standard(s) for Safety: ANSI/CAN/UL 448 – Centrifugal Stationary Pumps for Fire-Protection Service

Additional Information: See UL Product iQ® at <https://iq.ulprospector.com> for additional information.

This Certificate of Compliance indicates that representative samples of the product described in the certification report have met the requirements for UL certification. It does not provide authorization to apply the UL Mark. Only the Authorization Page that references the Follow-Up Services Procedure for ongoing surveillance 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.



Deborah Jennings-Conner, VP Regulatory Services
UL LLC

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CERTIFICATE OF COMPLIANCE

Certificate Number EX28929
Report Reference EX28929
Issue Date 2023-JANUARY-04

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

Document Name	Rated Capacity, GPM (L/Min)	Inlet Size, in.	Outlet Size, in.	Minimum Net Pressure Range, psig (kPa)	Maximum Net Pressure Range, psig (kPa)	Approx Speed, RPM	Max Working Pressure, psig (kPa)
VES 100-200	450 (1,703)	5	4	88 (606)	143 (985)	3500	225 (1,551)
	500 (1,892)	5	4	88 (606)	141 (972)	3500	225 (1,551)
	750 (2,839)	5	4	82 (565)	138 (951)	3500	225 (1,551)
VES 100-250	450 (1,703)	5	4	83 (572)	135 (930)	2900	290 (1,999)
	450 (1,703)	5	4	123 (848)	198 (1,365)	3500	290 (1,999)
	500 (1,892)	5	4	83 (572)	134 (923)	2900	290 (1,999)
	500 (1,892)	5	4	122 (841)	198 (1,365)	3500	290 (1,999)
	750 (2,839)	5	4	74 (510)	128 (882)	2900	290 (1,999)
	750 (2,839)	5	4	115 (792)	191 (1,316)	3500	290 (1,999)
VES 100-315	450 (1,703)	5	4	133 (917)	210 (1,447)	2900	290 (1,999)
	450 (1,703)	5	4	140 (965)	222 (1,530)	2980	290 (1,999)
	500 (1,892)	5	4	132 (910)	209 (1,441)	2900	290 (1,999)
	500 (1,892)	5	4	139 (958)	221 (1,523)	2980	290 (1,999)
	750 (2,839)	5	4	125 (861)	202 (1,392)	2900	290 (1,999)
	750 (2,839)	5	4	133 (917)	214 (1,475)	2980	290 (1,999)
VES 40-250	50 (189)	2-1/2	1-1/2	101 (696)	142 (979)	2900	200 (1,378)
	50 (189)	2-1/2	1-1/2	144 (992)	207 (1,427)	3500	290 (1,999)
	100 (379)	2-1/2	1-1/2	97 (668)	140 (965)	2900	200 (1,378)
	100 (379)	2-1/2	1-1/2	140 (965)	203 (1,399)	3500	290 (1,999)
	150 (568)	2-1/2	1-1/2	87 (599)	131 (903)	2900	200 (1,378)
	150 (568)	2-1/2	1-1/2	133 (917)	196 (1,351)	3500	290 (1,999)
VES 50-250	150 (568)	3	2	104 (717)	147 (1,013)	2980	225 (1,551)
	150 (568)	3	2	144 (992)	202 (1,392)	3500	290 (1,999)
	200 (757)	3	2	101 (696)	145 (999)	2980	225 (1,551)
	200 (757)	3	2	140 (965)	200 (1,378)	3500	290 (1,999)
	250 (946)	3	2	97 (668)	140 (965)	2980	225 (1,551)
	250 (946)	3	2	136 (937)	196 (1,351)	3500	290 (1,999)
VES 65-250	250 (946)	4	2-1/2	91 (627)	143 (985)	2900	225 (1,551)
	250 (946)	4	2-1/2	131 (903)	207 (1,427)	3500	290 (1,999)
	300 (1,136)	4	2-1/2	89 (613)	142 (979)	2900	225 (1,551)
	300 (1,136)	4	2-1/2	130 (896)	206 (1,420)	3500	290 (1,999)
	400 (1,514)	4	2-1/2	82 (565)	137 (944)	2900	225 (1,551)
	400 (1,514)	4	2-1/2	125 (861)	203 (1,399)	3500	290 (1,999)
VES 80-200	400 (1,514)	5	3	89 (613)	141 (972)	3500	225 (1,551)
	450 (1,703)	5	3	86 (592)	139 (958)	3500	225 (1,551)
	500 (1,892)	5	3	83 (572)	136 (937)	3500	225 (1,551)


 Deborah Jennings-Conner, VP Regulatory Services
 UL LLC

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CERTIFICATE OF COMPLIANCE

Certificate Number EX28929
 Report Reference EX28929
 Issue Date 2023-JANUARY-04

Document Name	Rated Capacity, GPM (L/Min)	Inlet Size, in.	Outlet Size, in.	Minimum Net Pressure Range, psig (kPa)	Maximum Net Pressure Range, psig (kPa)	Approx Speed, RPM	Max Working Pressure, psig (kPa)
VES 80-250	400 (1,514)	5	3	88 (606)	140 (965)	2900	225 (1,551)
	400 (1,514)	5	3	128 (882)	207 (1,427)	3500	290 (1,999)
	450 (1,703)	5	3	86 (592)	140 (965)	2900	225 (1,551)
	450 (1,703)	5	3	127 (875)	206 (1,420)	3500	290 (1,999)
	500 (1,892)	5	3	84 (579)	139 (958)	2900	225 (1,551)
	500 (1,892)	5	3	125 (861)	205 (1,413)	3500	290 (1,999)
VES 80-315	450 (1,703)	5	3	131 (903)	207 (1,427)	2900	290 (1,999)
	500 (1,892)	5	3	127 (875)	204 (1,406)	2900	290 (1,999)
VESD 150-100-200	500 (1,892)	6	4	116 (799)	142 (979)	3500	225 (1,551)
	750 (2,839)	6	4	112 (772)	137 (944)	3500	225 (1,551)
	1,000 (3,785)	6	4	99 (682)	128 (882)	3500	225 (1,551)
VESD 150-100-315	500 (1,892)	6	4	119 (820)	192 (1,323)	2900	250 (1,723)
	750 (2,839)	6	4	113 (779)	186 (1,282)	2900	250 (1,723)
	1,000 (3,785)	6	4	101 (696)	173 (1,192)	2900	250 (1,723)

Deborah Jennings-Conner

Deborah Jennings-Conner, VP Regulatory Services
 UL LLC



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QYLU.EX16109 - Internal-combustion Engines for Driving Stationary Fire Pumps

HISTORICAL

Internal-combustion Engines for Driving Stationary Fire Pumps

SFFECO GLOBAL FZE (Formerly Saudi Factory For Fire Equipment FZCO)

EX16109

S-10833
 JEBEL ALI FREE ZONE
 AUTHORITY SOUTH 1
 DUBAI, 261318 United Arab Emirates

DIESEL ENGINES RATED FOR USE WITHIN SPEED RANGES

Model	No. of Cylinders	Minimum		Maximum	
		Rated Speed (rpm)	Rated HP	Rated Speed (rpm)	Rated HP
BS0440MSR	4	2800	57	3000	56
BS04100MSR	4	2800	111	3000	110
BS06400LSR	6	1400	329	1800	343
BS06450LSR	6	1400	400	1800	410
BS12550LSR	12	1400	455	1800	550
BS12650LSR	12	1400	518	1800	588

DIESEL ENGINES RATED AT SPECIFIC SPEEDS

Model	No. of Cylinders	Rated Power, HP	Speed (RPM)
BS03015MSF	3	15	2900
FC3015-UL	3	15	2900
FC3015	3	15	2900
BS03020MSF	3	20	2900
FC3020-UL	3	20	2900
FC3020	3	20	2900
BS04030MSF	4	30	2900
FC4040-UL	3	30	2900
FC4040	3	30	2900

BS04036MSF	4	36	2900
BS04040TMSF	4	40	3000
BS04050TMSF	4	50	3000
BS04056TMSF	4	56	3000
BS04040TMSF	4	40	2900
BS04050TMSF	4	50	2900
BS04056TMSF	4	56	2900
BS04040TMSF	4	40	2800
BS04050TMSF	4	50	2800
BS04057TMSF	4	57	2800
BS04040MSF	4	40	2900
BS04050MSF	4	50	2900
BS04057MSF	4	57	2900
FC4060-UL	4	57	2900
FC4060	4	57	2900
BS04070MSF	4	70	2900
BS04075MSF	4	75	2900
BS04079MSF	4	79	2900
FC4085-UL	4	71	2900
FC4085	4	71	2900
BS04080MSF	4	80	3000
BS04090MSF	4	90	3000
BS04100MSF	4	100	3000
BS04110MSF	4	110	3000
BS04080MSF	4	80	2900
BS04090MSF	4	90	2900
BS04100MSF	4	100	2900
BS04110MSF	4	110	2900
BS04080MSF	4	80	2800
BS04090MSF	4	90	2800
BS04100MSF	4	100	2800
BS04111MSF	4	111	2800

BS06100MSF	6	100	2900
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BS06110MSF	6	110	2900
BS06118MSF	6	118	2900
FC6130-UL	6	118	2900
FC6130	6	118	2900
BS06120MSF	6	120	2900
BS06128MSF	6	128	2900
FC6150-UL	6	128	2900
FC6150	6	128	2900
BS06150MSF	6	150	2900
BS06160MSF	6	160	2900
BS06175MSF	6	175	2900
BS06186MSF	6	186	2900
FC6195-UL	6	186	2900
FC6195	6	186	2900
BS06200MSF	6	200	2900
BS06210MSF	6	210	2900
BS06212MSF	6	212	2900
BS06215MSF	6	215	2900
BS06218MSF	6	218	2900
FC6250-UL	6	209	2900
FC6250	6	209	2900
BS06220MSF	6	220	2900
BS06240MSF	6	240	2900
BS06250MSF	6	250	2900
BS06259MSF	6	259	2900
BS06265MSF	6	265	2900
BS06272MSF	6	272	2900
BS06275MSF	6	275	2900
FC6300-UL	6	259	2900
FC6300	6	259	2900
BS06300LSF	6	300	1800
BS06320LSF	6	320	1800

BS06343LSF	6	343	1800
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BS06300LSF	6	300	1600
BS06320LSF	6	320	1600
BS06336LSF	6	336	1600
BS06300LSF	6	300	1400
BS06310LSF	6	310	1400
BS06329LSF	6	329	1400
BS06370LSF	6	370	1800
BS06400LSF	6	400	1800
BS06407LSF	6	407	1800
BS06410LSF	6	410	1800
BS06370LSF	6	370	1600
BS06372LSF	6	372	1600
BS06390LSF	6	390	1600
BS06405LSF	6	405	1600
BS06350LSF	6	350	1400
BS06375LSF	6	375	1400
BS06400LSF	6	400	1400
BS012450LSF	12	450	1800
BS012500LSF	12	500	1800
BS012548LSF	12	548	1800
BS012550LSF	12	550	1800
BS012450LSF	12	450	1600
BS012475LSF	12	475	1600
BS012502LSF	12	502	1600
BS012430LSF	12	430	1400
BS012455LSF	12	455	1400
BS012570LSF	12	570	1800
BS012585LSF	12	585	1800
BS012588LSF	12	588	1800
BS012530LSF	12	530	1600
BS012545LSF	12	545	1600
BS012552LSF	12	552	1600

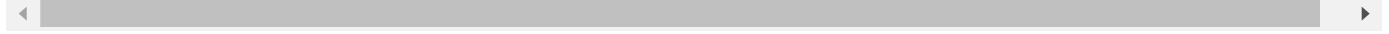
BS012480LSF	12	480	1400
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BS012510LSF	12	510	1400
BS012515LSF	12	515	1400
BS012518LSF	12	518	1400

Trademark and/or Tradename: "SFFECO",



Last Updated on 2021-04-27



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Certificate of Compliance

This certificate is issued for the following:

Diesel Engine Fire Pump Drivers

(see full listing attached)

Prepared for:

Saudi Factory for Fire Equipment FZCo

PO Box 261281

JAFZA South, Dubai S-10833

United Arab Emirates

Manufactured at:

Saudi Factory for Fire Equipment FZCo

PO Box 261281

JAFZA South, Dubai S-10833

United Arab Emirates

FM Approvals Class: 1333 (January 2018)

Approval Identification: 0003063444

Approval Granted: October 29, 2020

To verify the availability of the Approved product, 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.

A handwritten signature in dark ink, appearing to read 'D. B. Fuller', is written over a horizontal line.

David Fuller

VP - Manager of Fire Protection

FM Approvals

1151 Boston-Providence Turnpike

Norwood, MA 02062



Member of the FM Global Group



Certificate of Compliance

☒ Fire Pump Installation Systems ☒ Diesel Engines for Fire Pump Drivers ☒ Diesel Engines for Fire Pump Drivers, Liquid Cooled

Product	Rated Power, hp	Rated Power, kW	Rated Speed, r/min
BS03020MSF	20	15	2900
BS0320MSR	21	16	3000
BS0320MSR	21	16	2900
BS0320MSR	21	16	2800
BS03021MSF	21	16	3000
BS03021MSF	21	16	2900
BS03021MSF	21	16	2800
BS04030MSF	30	22	3000
BS04030MSF	30	22	2900
BS04030MSF	30	22	2800
BS04036MSF	35.5	26.5	3000
BS04036MSF	35.5	26.5	2900
BS04036MSF	35.5	26.5	2800
BS0440MSR	35.5	26.5	3000
BS0440MSR	35.5	26.5	2800
BS04040TMSF	40	30	3000
BS04040TMSF	40	30	2900
BS04040TMSF	40	30	2800
BS0440MSR	56	42	3000
BS0440MSR	60	45	2900
BS0440MSR	57	42.5	2800
BS04040MSF	40	30	3000
BS04040MSF	40	30	2900
BS04040MSF	40	30	2800
BS04050MSF	50	37	3000
BS04050MSF	50	37	2900
BS04050MSF	50	37	2800
BS04050TMSF	50	37	3000
BS04050TMSF	50	37	2900
BS04050TMSF	50	37	2800
BS04056TMSF	56	42	3000
BS04056TMSF	56	42	2900
BS04057MSF	57	42.5	2900
BS04057TMSF	57	42.5	2800
BS04059MSF	58.5	44	3000
BS04059MSF	58.5	44	2900
BS04059MSF	58.5	44	2800



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Certificate of Compliance

Product	Rated Power, hp	Rated Power, kW	Rated Speed, r/min
BS0460MSR	58.5	44	3000
BS0460MSR	58.5	44	2900
BS0460MSR	58.5	44	2800
BS04060TMSF	60	45	2900
BS04065MSF	65	48.5	3000
BS04065MSF	65	48.5	2800
BS04070MSF	70	52	3000
BS04070MSF	70	52	2900
BS04070MSF	70	52	2800
BS04075MSF	75	56	3000
BS04075MSF	75	56	2900
BS04075MSF	75	56	2800
BS04080MSF	80	60	3000
BS04080MSF	80	60	2900
BS04080MSF	80	60	2800
BS0485MSR	75	56	3000
BS0485MSR	75	56	2900
BS0485MSR	75	56	2800
BS04090MSF	90	67	3000
BS04090MSF	90	67	2900
BS04090MSF	90	67	2800
BS04100MSF	100	75	3000
BS04100MSF	100	75	2900
BS04100MSF	100	75	2800
BS04100MSR	111	83	3000
BS04100MSR	111	83	2900
BS04100MSR	111	83	2800
BS04110MSF	110	82	3000
BS04110MSF	110	82	2900
BS04111MSF	111	83	3000
BS04111MSF	111	83	2800
BS04114MSF	114	85	2900
BS06100MSF	100	75	3000
BS06100MSF	100	75	2900
BS06100MSF	100	75	2800
BS06110MSF	110	82	3000
BS06110MSF	110	82	2900
BS06110MSF	110	82	2800
BS06118MSF	118	88	2900
BS06120MSF	120	90	2900



Member of the FM Global Group



Certificate of Compliance

Product	Rated Power, hp	Rated Power, kW	Rated Speed, r/min
BS06127MSF	127	95	3000
BS06127MSF	127	95	2900
BS06127MSF	127	95	2800
BS06128MSF	128	95	2900
BS06130MSR	127	95	3000
BS06130MSR	127	95	2900
BS06130MSR	127	95	2800
BS06134MSF	133.5	100	2800
BS06147MSF	146.5	109	3000
BS06147MSF	146.5	109	2900
BS06147MSF	146.5	109	2800
BS06150MSF	150	112	2900
BS06150MSR	146.5	109	3000
BS06150MSR	146.5	109	2900
BS06150MSR	146.5	109	2800
BS06155MSF	154.5	115	2800
BS06160MSF	160	119	3000
BS06160MSF	160	119	2900
BS06175MSF	175	130	3000
BS06175MSF	175	130	2900
BS06186MSF	186	139	2900
BS06188MSF	187.5	140	2900
BS06191MSF	190.5	142	3000
BS06195MSR	190.5	142	3000
BS06195MSR	187.5	140	2900
BS06195MSR	133.5	100	2800
BS06200MSF	200	149	3000
BS06200MSF	200	149	2900
BS06210MSF	210	157	3000
BS06210MSF	210	157	2900
BS06212MSF	212	158	2900
BS06216MSF	216	161	3000
BS06220MSF	220	164	2900
BS06230MSF	230	172	3000
BS06240MSF	240	179	2900
BS06240MSF	240	179	2800
BS06250MSF	250	186	3000
BS06250MSF	250	186	2900
BS06250MSR	216	161	3000
BS06250MSR	212	158	2900



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Product	Rated Power, hp	Rated Power, kW	Rated Speed, r/min
BS06250MSR	154.5	115	2800
BS06259MSF	259	193	2900
BS06265MSF	265	198	2900
BS06272MSF	271.5	203	3000
BS06272MSF	271.5	203	2900
BS06300LSF	300	224	1800
BS06300LSF	300	224	1600
BS06300LSF	300	224	1400
BS06300MSR	271.5	203	3000
BS06300MSR	271.5	203	2900
BS06300MSR	240	179	2800
BS06310LSF	310	231	1400
BS06320LSF	320	239	1800
BS06320LSF	320	239	1600
BS06329LSF	329	245	1400
BS06330LSF	330	246	1400
BS06336LSF	336	251	1600
BS06343LSF	343	256	1800
BS06350LSF	350	261	1600
BS06350LSF	350	261	1400
BS06365LSF	365	272	1600
BS06370LSF	370	276	1800
BS06370LSF	370	276	1600
BS06372LSF	372	277	1600
BS06375LSF	375	280	1400
BS06390LSF	390	291	1600
BS06400LSF	400	298	1800
BS06400LSF	400	298	1400
BS06400LSR	343	256	1800
BS06400LSR	365	272	1600
BS06400LSR	330	246	1400
BS06405LSF	405	302	1600
BS06406LSF	406	303	1600
BS06407LSF	407	304	1800
BS06410LSF	410	306	1400
BS06450LSR	407	304	1800
BS06450LSR	406	303	1600
BS06450LSR	410	306	1400
BS012430LSF	430	321	1400
BS012450LSF	450	336	1800



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Product	Rated Power, hp	Rated Power, kW	Rated Speed, r/min
BS012450LSF	450	336	1600
BS012455LSF	455	339	1400
BS012475LSF	475	354	1600
BS012480LSF	480	358	1400
BS012500LSF	500	373	1800
BS012502LSF	502	374	1600
BS012508LSF	508	379	1600
BS012510LSF	510	380	1400
BS012515LSF	515	384	1400
BS012530LSF	530	395	1600
BS012545LSF	545	406	1600
BS012548LSF	548	409	1800
BS012550LSR	548	409	1800
BS012550LSR	508	379	1600
BS012550LSR	455	339	1400
BS012552LSF	552	412	1600
BS012562LSF	562	419	1600
BS012570LSF	570	425	1800
BS012585LSF	585	436	1800
BS012650LSR	585	436	1800
BS012650LSR	562	419	1600
BS012650LSR	515	384	1400



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CERTIFICATE OF COMPLIANCE

Certificate Number EX26635
Report Reference EX26635-20200127
Issue Date 2020-FEBRUARY-14

Issued to: SHANGHAI TOP MOTOR CO LTD
303 KANGLIU RD
KANGQIAO TOWN
NANHUI
SHANGHAI
201315 CHINA

**This certificate confirms that
representative samples of**

FIRE PUMP MOTORS
See Addendum page

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

Standard(s) for Safety:

UL 1004-1, Rotating Electrical Machines – General
Requirements
UL 1004-5, Fire Pump Motors
CSA C22.2 No. 100-14, Motors and Generators

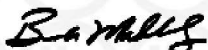
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See the UL Online Certifications Directory at
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This *Certificate of Compliance* does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization 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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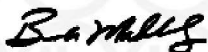
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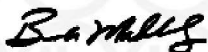
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TDC449T350U4B,F-TDC449T350U4B,F-TDC449T400U4B,F-TDC449T400U4B,F-
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QYZS.EX3971 Pump Controllers, Fire

[Page Bottom](#)

Pump Controllers, Fire

[See General Information for Pump Controllers, Fire](#)

TORNATECH INC

EX3971

#132
7075 PLACE ROBERT-JONCAS
ST LAURENT, QC H4M 2Z2 CANADA

Fire Pump Controllers: Models AF, AFP, AFR, AFY, ATF, ATR, ATP or ATY followed by C or N, followed by additional suffixes. All of the above controllers are suitable for use on circuits capable of delivering high fault currents. The withstand ratings are as follows:

Circuit Breaker	Max V AC	Max Short Circuit Current RMS Symmetrical Amps
MZMH6-63, MZMH6-100,	208; 240	25000; 42,000
MZMH6-160, MZMH6-250		
MZMH6-63, MZMH6-100,	480	65,000
MZMH6-160, MZMH6-250		

The controllers provided with Automatic Transfer Switches are suitable for use on circuits capable of delivering high fault currents. The withstand rating of the normal power source side is determined by the transfer switch as indicated below:

ASCO Transfer Switch	Max Controller Short Circuit Withstand Rating
9403704	22KA, 480 VAC Max
94031004	22KA, 480 VAC Max
94032604	35KA, 480 VAC Max

The withstand ratings for the alternate power source side will be dependent upon the ratings of the external circuit breaker provided. But in no case will they exceed those of the normal power source side.

Models AL or AL1 followed by additional suffixes.

All of the above controllers are suitable for use on circuits capable of delivering high fault currents. The withstand ratings are as follows:

Circuit Breaker	Max V AC	Max Short Circuit Current RMS Symmetrical Amps
NZM6B-63,	480	25,000
NZM6B-100, NZM6B-160		

The controllers provided with automatic Transfer Switches are suitable for use on circuits capable of delivering high fault currents. The withstand rating of the entire controller is determined by the transfer switch as indicated below:

ASCO Transfer Switch	Max Controller S. C. Withstand Rating
9403704	22KA, 480 VAC Max
94031004	22KA, 480 VAC Max
94032604	25KA, 480 VAC Max

The withstand ratings for the alternate power source side will be dependent upon the ratings of the external circuit breaker provided. But in no case will they exceed those of the normal power source side.

Authorities having jurisdiction should be consulted in all cases.

Model FPD Series controller for engine-driven centrifugal fire pumps.

Models FPA, FPP, FPR, FPS, FPV, FPW, FPY, VPA, VPR, and VPS may be followed by additional suffixes. The withstand ratings are as follows:

Withstand Ratings of Controllers Without Transfer Switch:

Short Circuit Withstand Ratings (Ampere Symmetrical)		
VOLTAGE	STANDARD	OPTIONAL HIGH
200 to 480 V	100,000A RMS	150,000A RMS
575 to 600 V	50,000A RMS	100,000A RMS

Models ATG , ATU, VPG or VPU. The controllers provided with Automatic Transfer Switches are suitable for use on circuits capable of delivering high fault currents. The withstand rating of the normal power side is the same as the withstand ratings of controllers without transfer switches. The withstand rating of the alternate power side is determined by the transfer switch as indicated by the following tables:

Withstand ratings of controllers with 120 A Tornatech Inc. Transfer Switch

200-208V 50/60 Hz MAX HP	230-240V 50/60 Hz MAX HP	380-416V 50/60 Hz MAX HP	440-480V 50/60 Hz MAX HP	600V 60Hz MAX HP	Withstand Rating (A)
40	40	—	—	—	65,000
—	—	60	75	—	25,000
—	—	—	—	100	18,000

Withstand Ratings For Controllers with Ascoelectric Transfer Switches

Transfer Switch (A)	200-208V 50/60 Hz Max HP	230-240V 50/60 Hz Max HP	Withstand Rating		Specific** Withstand Rating (A)
			(A)	Time (Cycles)	
100	30	30	10000	1.5	22000
150	50	50	1000	1.5	22000
400	150	150	35000	3	42000
600	N/A	N/A	50000	3	65000

** Tested and found suitable for 100kA

Withstand Ratings for Controllers with Ascoelectric Transfer Switches, Continued

Transfer Switch (A)	600V 60 Hz Max HP	Withstand Rating		Specific Withstand Rating (A)
		(A)	Time (Cycles)	
100	75	10000	1.5	N/A
150	150	1000	1.5	N/A
400	400	22000	3	N/A
600	N/A	N/A	N/A	N/A

Model ATU or VPU:	Normal Power Side:	Same as withstand rating of controller without transfer switch.
	Alternate Power Side:	Same as withstand rating of controller without transfer switch.

Model FPL:	Limited Service controllers with withstand ratings as follows:
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Short Circuit Withstand Ratings of Limited Service Controllers Without Transfer Switches		
VOLTAGE	STANDARD	OPTIONAL HIGH
200 to 480 V	25,000 A RMS	65,000 A RMS
575 to 600 V	18,000 A RMS	25,000 A RMS

Model LTG, GLG:	Automatic transfer switch for connection to a generator set.
Model LTU:	Automatic transfer switch for connection to a 2 nd utility.

Withstand ratings of Controller with transfer switch Model FPAT (Tornatech):

Model LTG:	Normal Power Side:	Same as withstand rating of controller without transfer switch.
	Alternate Power Side:	Withstand rating only applies when the generator set is protected by a molded case circuit breaker

TRANSFER SWITCH AMPERES	200-480 V H.P.	WITHSTAND RATING AMPERES
120	30	25,000

TRANSFER SWITCH AMPERES	600 V H.P.	WITHSTAND RATING AMPERES
120	30	18,000

Model LTU:	Normal Power Side:	Same as withstand rating of controller without transfer switch.
	Alternate Power Side:	Same as withstand rating of controller without transfer switch.

Withstand ratings of controller with transfer switch Model 940 (Ascoelectric):

Model LTG:	Normal Power Side:	Same as withstand rating of controller without transfer switch.
	Alternate Power Side:	Withstand rating only applies when the generator set is protected by a molded case circuit breaker not exceeding the ampere rating of the transfer switch.

Transfer Switch A	200-480 V Max HP	Withstand Rating		Specific Withstand Rating A
		A	Time	
120	30	10,000	1.5	22,000

Transfer Switch A	600 V Max HP	Withstand Rating		Specific Withstand Rating A
		A	Time	
120	30	10,000	1.5	N/A

Model LTU:	Normal Power Side:	Same as withstand rating of controller without transfer switch.
	Alternate Power Side:	Same as withstand rating of controller without transfer switch.

Models CPA, CPP, CPR, CPS, CPV, CPW, CPY, may be followed by additional suffixes. The withstand ratings are as follows:

Withstand ratings of controllers without transfer switch:

Short circuit withstand ratings (ampere symmetrical)		
voltage	standard	optional
200 to 480 V	100 kA	150 kA
575 to 600 V	50 kA	100 kA

Model CPU - The controllers provided with automatic transfer switches are suitable for use on circuits capable of delivering high fault currents. The withstand rating of the normal power side and the alternate power side is the same as the withstand ratings of controllers without transfer switches.

Model CPU

Short circuit withstand rating for alternate power circuit with transfer switch (RMS Symmetrical)		
V	Standard	High (optional)
200 to 480 V	100 kA	150 kA
575 to 600 V	50 kA	100 kA

Model GPD Series controller for engine-driven centrifugal fire pumps.

Overcurrent Protection Panels, Model OPD; may be followed by a number 200 through 575 with - or /; followed by a number 200 through 600 with /; followed by a number 10 through 500 with /; followed by 1 or 3 with /; followed by 50 or 60 or 50/60. - These panels provide separate overcurrent protection and disconnect to comply with NFPA 70 Article 695.4(B)(2)(a) and 695.4(B)(3) and NFPA 20 Article 9.2.3.1, 9.2.3.4, and 9.2.3.4.1.

Short Circuit Withstand Ratings, A Symmetrical			
V	Standard	High (Optional)	High Capacity
200-480	25,000	35,000 to 65,000	150,000

575-600	18,000	20,000 to 25,000	50,000 to 100,00
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Battery chargers, BCE10, followed by 12 or 24, followed by 120 or 220.

Fire pump controllers, horsepower rated, Models GPA, GPAe, GPP, GPR, GPS, GPV, GPY, GPYe or GPW; may be followed by a number 110 through 575 with - or /; followed by a number 200 through 600 with /; followed by a number 1 through 500 with /; followed by 1 or 3 with /; followed by 50 or 60 or 50/60.

Fire pump controllers, kilowatt rated, Models GPA, GPAe, GPP, GPR, GPS, GPV, GPY, GPYe or GPW; followed by -400/; followed by a number 0.75 through 315 with kW/; followed by 3 with /; followed by 50 or 60 or 50/60.

Transfer switch, horsepower rated, Model GPU; may be followed by a number 110 through 575 with - or /; followed by a number 200 through 600 with /; followed by a number 1 through 500 with /; followed by 1 or 3 with /; followed by 50 or 60 or 50/60.

Transfer switch, kilowatt rated, Model GPU; followed by -400/; followed by a number 0.75 through 315 with kW/; followed by 3 with /; followed by 50 or 60 or 50/60.

Withstand ratings of normal power circuit for GPA, GPAe, GPP, GPR, GPS, GPV, GPY, GPYe and GPW controllers with or without gpu transfer switch.

Short Circuit Withstand Ratings for normal power circuit with or without transfer switch, A Symmetrical		
V	Standard	High (Optional) +
200-480	100,000	150,000
575-600 +	50,000	100,000
+ - Not applicable to controllers that use NOARK Power Components.		

Limited service fire pump controllers, kilowatt rated, Models GPL; followed by -400/; followed by a number 0.75 through 315 with kW/; followed by 3 with /; followed by 50 or 60 or 50/60.

Limited service fire pump controllers, , kilowatt rated, Models GPL; followed by -400/; followed by a number 0.75 through 315 with kW/; followed by 3 with /; followed by 50 or 60 or 50/60.

Limited service transfer switch, for connection to a second utility, horsepower rated, Model GLU; may be followed by a number 110 through 575 with - or /; followed by a number 200 through 600 with /; followed by a number 1 through 500 with /; followed by 1 or 3 with /; followed by 50 or 60 or 50/60.

Limited service transfer switch, for connection to a second utility, kilowatt rated, Model GLU; followed by -400/; followed by a number 0.75 through 315 with kW/; followed by 3 with /; followed by 50 or 60 or 50/60.

Withstand ratings of normal power circuit for GPL controller with or without GLU transfer switch.

Short Circuit Withstand Ratings for normal power circuit with or without transfer switch, A Symmetrical		
V	Standard	High (Optional)
200-240	65,000	-
380-480	25,000	65,000
575-600	18,000	25,000

[Click here to view the Colombia Market Access Certification](#)

[Last Updated](#) on 2017-02-09

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Certificate of Compliance

This certificate is issued for the following:

**Controllers for Electric Motor Driven and
Diesel Engine Driven Fire Pumps**

**Model GPx Series electric motor driven and
Model GPD diesel engine driven fire pump controllers
manufactured at Tornatech FZE in Dubai, UAE**

Prepared for:

TornaTech Inc.
7075 Pl Robert-Joncas, #132
St Laurent, QC H4M 2Z2
Canada

Manufactured at:

TornaTech FZE
Warehouse CC-4 near R/A 08
P.O. Box 18435, Jebel Ali
Dubai, United Arab Emirates

FM Approvals Class: 1321/1323

Approval Identification: 0003052698

Approval Granted: June 24, 2014

To verify the availability of the Approved product, 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.

A handwritten signature in dark ink, appearing to read 'Richard B. Dunne', is written over a horizontal line.

Richard B. Dunne
Manager, Fire Protection
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062



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Member of the FM Global Group

FM Approvals
1151 Boston-Providence Turnpike, PO Box 9102
Norwood, MA 02062 USA
Tel: +1 (781) 255-4000
Fax: +1 (781) 762-9375
Email: certificates@fmaprovals.com
Website: www.fmaprovals.com

CERTIFICATE OF COMPLIANCE

This certificate of compliance validates the following

TEST REPORT NUMBER: 3052698 TEST CERTIFICATE NUMBER: 3052698
DATE OF ISSUE: 24 June, 2014 DATE OF ISSUE: 24 June, 2014
DATE OF EXPIRY: NONE DATE OF EXPIRY: NONE

NAME OF FACTORY/ MANUFACTURER: TORNATECH INC. NAME OF THE BRAND(S): TORNATECH FZE Warehouse CC-4 near R/A 08
ADDRESS/REGION: 7075 PLACE ROBERT-JONCAS, #132 SAINT LAURENT, QUEBEC H4M 2Z2 CANADA P.O. Box 18435, Jebel Ali Dubai, United Arab Emirates
MODEL/NO: GPx series GPD series



LOGO ON THE PRODUCT:



DESCRIPTION OF THE PRODUCT: Samples of the GPx series and GPD series were submitted for examination and testing. All testing and analysis was conducted and verified to be in compliance with the Standards listed in the Test Standards section below

TEST STANDARD: FM Approvals, Approval Standard for Controllers for Electric Motor and Diesel Engine Driven Fire Pumps, Class 1321/1323, dated November 2007

TEST DESCRIPTION: All testing and analysis considered appropriate was conducted and verified to be in compliance with the Standards listed in the Test Standards section. All data is on file at FM Approvals along with other documentation and correspondence applicable to this program.

SPECIFICATION OF TEST SPECIMEN: The samples were considered to be representative of the product line and were examined, tested, and compared to the manufacturer's drawings.

TEST RESULTS: Pass

NAME OF TEST FACILITY: FM Approvals
TEST FACILITY ADDRESS/REGION:
LABORATORY CONTACT: Mr. Richard Dunne
CONTACT PHONE: 1-401-567-5701
CONTACT EMAIL: Richard.Dunne@fmaprovals.com
PRODUCT APPLICATION GUIDELINE (END USE): Installations shall comply with the manufacturer's instructions.

SIGNED BY: [Signature]

The above certificate is valid only when installed in accordance with the "Product Application Guideline (End Use)" as stated above. To verify the validity of the product please log into our website, www.approvalguide.com.



Certificate of Compliance

This certificate is issued for the following:

Fire Pump Flowmeter Systems
(See complete listing details below)

Prepared for:

Quest Engineering dba Gerand Engineering
2300 Edgewood Avenue South
St. Louis Park, MN 55426

FM Approvals Class: 1046

Approval Identification: 3058542

Approval Granted: April 26, 2016

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.

A handwritten signature in black ink that reads 'David B. Fuller'.

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



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Certificate of Compliance

Pump Rating, gal/min (dm ³ /min)	Nominal Meter Line Size in.	Model Designation	
		Venturi (1)	Orifice (2)
25 (95)	1 1/4	GV-25-1 1/4	-
50 (190)	2	GV-50-2	-
100 (380)	2 1/2	GV-100-2 1/2	GO-100-2 1/2
150 (570)	3	GV-150-3	GO-150-3
200 (755)	3, 4	GV-200-3, 4	GO-200-3, 4
250 (945)	4, 5	GV-250-4, 5	GO-250-4, 5
300 (1135)	4	GV-300-4	GO-300-4
400 (1515)	4, 5	GV-400-4, 5	GO-400-4, 5
450 (1705)	4, 5	GV-450-4, 5	GO-450-4, 5
500 (1895)	5, 6	GV-500-5, 6	GO-500-5, 6
750 (2840)	5, 6	GV-750-5, 6	GO-750-5, 6
1000 (3785)	6, 8	GV-1000-6, 8	GO-1000-6, 8
1250 (4730)	6, 8	GV-1250-6, 8	GO-1250-6, 8
1500 (5680)	8, 10	GV-1500-8, 10	GO-1500-8, 10
2000 (7570)	8, 10	GV-2000-8, 10	GO-2000-8, 10
2500 (9465)	8, 10	GV-2500-8, 10	GO-2500-8, 10
3000 (11 355)	8, 10	GV-3000-8, 10	GO-3000-8, 10



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Certificate of Compliance

Pump Rating, gal/min (dm ³ /min)	Nominal Meter Line Size in.	Model Designation	
		Venturi (1)	Orifice (2)
3500 (13 245)	10, 12	GV-3500-10, 12	GO-3500-10, 12
4000 (15 140)	10, 12	GV-4000-10, 12	GO-4000-10, 12
4500 (17 035)	10, 12	GV-4500-10, 12	GO-4500-10, 12
5000 (18 925)	10, 12	GV-5000-10, 12	GO-5000-10, 12

Each system consists of a Gerand Venturi (GV) or a Gerand Orifice (GO), a differential meter reading in gpm or dm³/min and associated fittings.

GV systems can be equipped with either a 4 1/2 in. dial meter (Gerand Model K) or a 6 in. dial meter (Gerand Model M). GO systems are only available with a 4 1/2 in. dial meter (Gerand Model I). Permanent installations (wall or panel mount) or portable installations are available on all systems. Rated working pressure is 500 psi (3445 kPa) except that:

GV systems with Model M dial meter have a rated working pressure of 175 psi (1205 kPa).

GV systems with Model K dial meter and Class 150 flanges have a rated working pressure of 275 psi (1905 kPa).

The following end-connection styles are available:

Venturi (1)VS. Brass screw ends, 1 1/4 through 2 1/2 in.

Venturi (1)VW-B. Steel butt-welded ends, 2 1/2 through 12 in.


Venturi (1)V-GE. Steel grooved ends, 2 1/2 through 12 in.

Venturi (1)VW-F. Steel flanged ends, 2 1/2 through 12 in. Class 150 flanges rated at 275 psi (1905 kPa). Class 300 flanges rated at 500 psi (3445 kPa).

Orifice (2). Steel socket-welded ends with adaptability for flanging, 2 1/2 through 12 in.

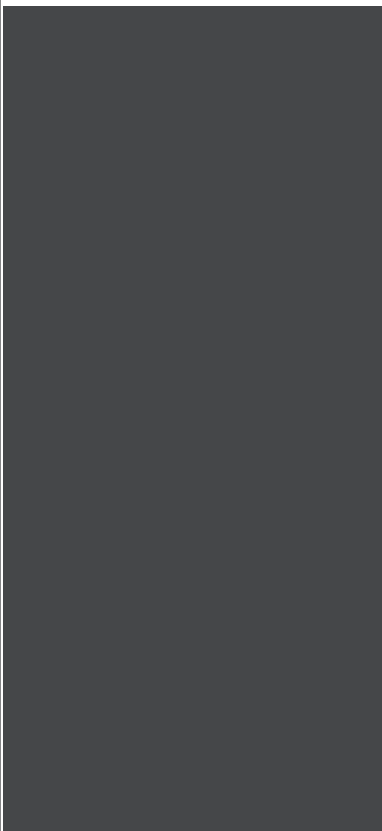
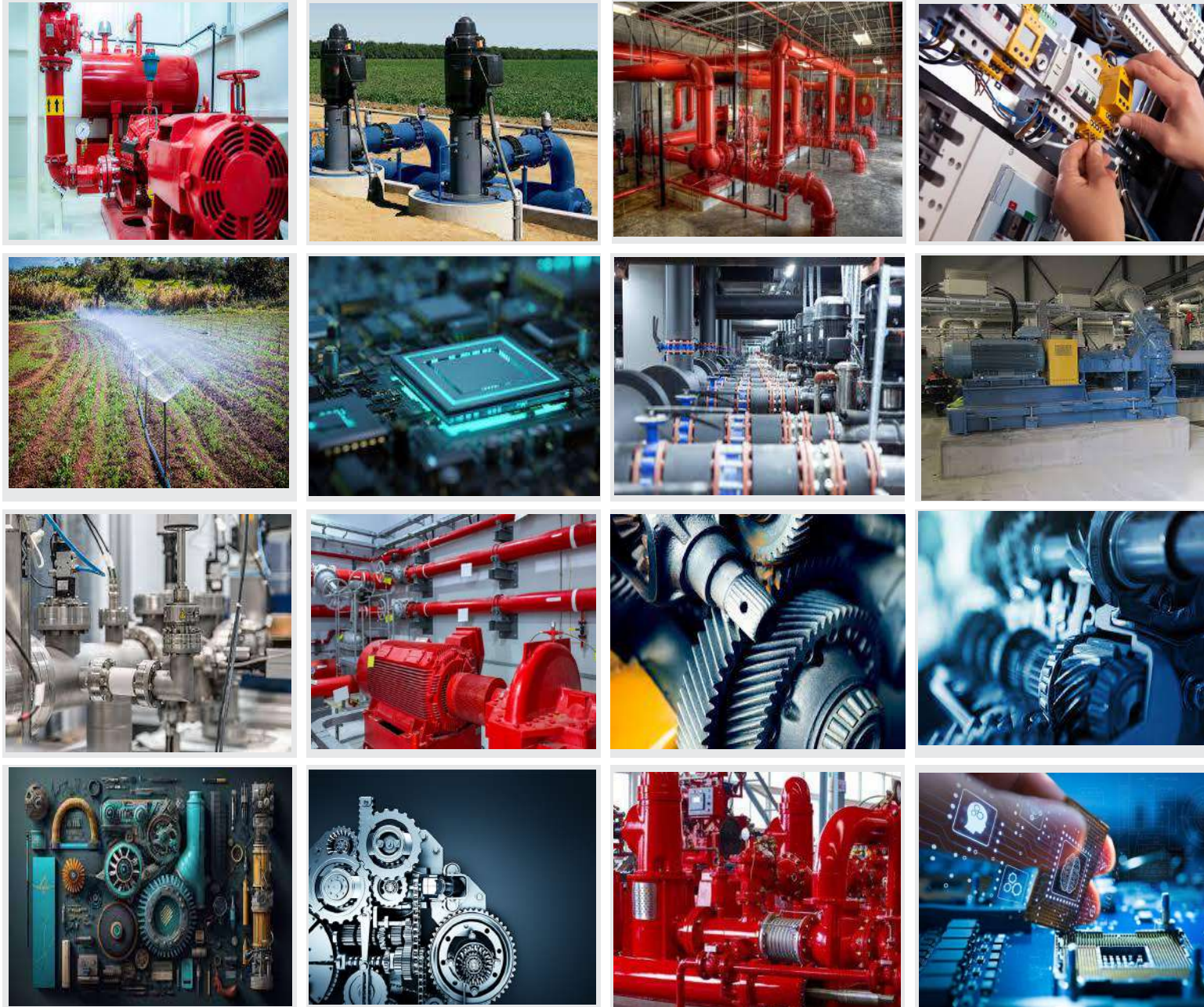


Member of the FM Global Group

	Vendor Ref. No.	
	Contractor Ref. No.	
Project Name:	Contractor Job No.	

**COMPANY PROFILE
&
TRADE LICENSE**

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date



COMPANY PROFILE



CEO MESSAGE

Mena Mech Ind co has undergone a remarkable evolution in the past six years in the UAE. In the last 37 years in the Middle East, we've pursued our vision to become the leading fire pump systems provider in the Middle East and north Africa. But one of the most profound changes that have taken place over time is that we have a deeper and richer understanding, commitment and sustainability that has come into focus as we have refined our views of what it means to be a leader.

Today, as a result, we are increasingly adapting Mena strategies, operations and culture to drive positive results across our experience and provide a superior quality product to serve the commitments.

Our commitment in MENA is much stronger than ever. Indeed, one of the most important aspects of growth, opportunities for our company depends on solving engineering challenges a reality that is making sustainability a competitive imperative in the industry.

We also know our Customer's expectations from a leading company like Mena.

Our Company Profile will provide multiple examples of our commitment for supply, operation and after sales service, across wide range of products, from Fire Pump Solutions to pumps of the water sector, along with engineering Solutions etc.

MENA branches expands in all UAE emirates, Egypt, Palestine, Sudan, GCC Countries, and North Africa to serve our client.

With your continuous support and trust, Mena now poised to further grow its Middle east and north Africa network. In the end, I appreciate your business commitment.

Eng. Mamoun A. Al-Burieni
Chief Executive Officer



VISION

MENA MECH aspires to be among the leading companies of the field in the MENA region, renowned and recognized around the globe for offering comprehensive, professional services & products of the highest quality for its distinctive clients.

MISSION

MENA is committed to providing its clients with service and products of the highest quality; offering a comprehensive platform of services and products. Promoting the personal, and social career growth of all employees, adding to the human knowledge of contributing to culture, social and economic progress of society preserving and promoting the Arab, Islamic culture, heritage and history; and contributing to the advancement of firefighting and security of lives of people living in the middle east and north Africa.

VALUES

- Commitment to our clients.
- Be reliable and add value to our customers.
- Empowerment, Intergrity, Excellence and Collaboration.
- Trust our employees to make the right decisions.
- Show transparency in everything we do.
- Operate professionally, safely & effectively.
- Cooperation; work as one team to deliver value.

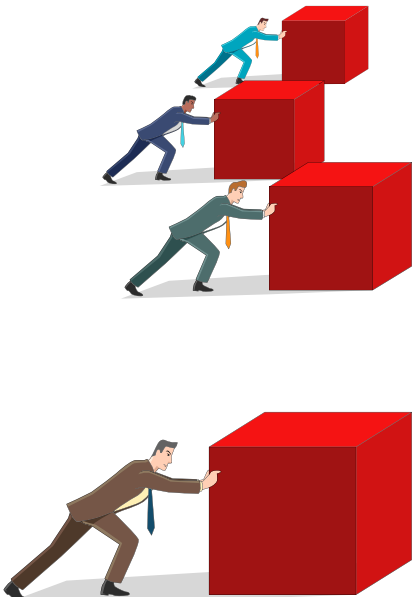


OUR STRATEGY

GUIDING PRIORITIES

A major and comprehensive company: Mena Fire Fighting offers varieties of Pumping Solutions, in the field of firefighting and Water Applications.

- **Client Success:**
The company is committed to enriching its client's success within an economy rich environment.
- **Emphasis on Quality:**
The standard of our company enhances us to practice a diversity of designs that allow and evaluates the client's request. Our effectiveness and practicality of all the services and products offered by the company are to provide the best result for our clients.



- **Supportive:**
Our company emphasizes the importance of our services and products by providing the required training to operate the product and maintenance period to ensure that the client receives the maximum benefit of our services and products supplied.

- **Global Vision:**
Our Company takes pride in being a part of an international Supply chain with partner companies around the globe.

- **Research Intensive:**
Our company is continuously making strident moves to establish itself nationally and internationally through extensively researching the latest technologies in the field.



- **Engagement With The Community:**
Our company plays a vital role in the social and economic development and safety of UAE and middle east by introducing the most advanced technologies with affordable and competitive prices.

GUIDING PRIORITIES

A major and comprehensive company: MENA MECH IND CO offers varieties of Pumping Solutions, in the field of firefighting and Water Applications.

- **Client Success:**

The company is committed to enriching its client's success within an economy rich environment.

- **Emphasis on Quality:**

The standard of our company enhances us to practice a diversity of designs that allow and evaluates the client's request. Our effectiveness and practicality of all the services and products offered by the company are to provide the best result for our clients.



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Our company plays a vital role in the social and economic development and safety of UAE and middle east by introducing the most advanced technologies with affordable and competitive prices.



SAFETY POLICY

MENA MECH IND CO is committed to emphasize on the education, interest and awareness of new employees in safety concepts in a safe environment before the assumption of duty.

Ensure that the organization's environment, facilities, equipment and substances are subject to safe systems of work to prevent risks to health or safety.

Just as we are keen for our client's safety, our employees have to be provided by the safest working environment including a spacious atmosphere, excellent ventilation, pest control, etc.

 <p>END SUCTION & SPLIT CASE PUMPS VERTICAL TURBINE FIRE PUMP MENA MECHANICAL INDUSTRIES- UAE</p>	 <p>DIESEL DRIVER KIRLOSKAR, INDIA UL LISTED & FM APPROVED</p>	 <p>DIESEL DRIVER NM FIRE, CHINA UL LISTED & FM APPROVED</p>	 <p>DIESEL DRIVER GREAVES COTTON UL LISTED & FM APPROVED</p>
 <p>DIESEL DRIVER TAIDONG, CHINA UL LISTED LISTED</p>	 <p>DIESEL DRIVER CLARKE, UK /USA UL LISTED & FM APPROVED</p>	 <p>FIRE PUMP MOTOR WEG, BRAZIL UL LISTED APPROVED</p>	 <p>FIRE PUMP MOTOR MARATHON, USA UL LISTED</p>
 <p>FIRE PUMP CONTROLLERS TORNATECH, CANADA UL LISTED & FM APPROVED</p>	 <p>PRESSURE RELIEF VALVE SINGER VALVE, CANADA UL LISTED & FM APPROVED</p>	 <p>FIRE PUMP MOTOR TECHTOP, INC UL LISTED APPROVED</p>	 <p>FLOWMETER GERAND, USA FM APPROVED</p>
<p>VENDORS</p>		   	 <p>AMERILLO GEARS - USA</p>

THE COMPANY

Since 2017, our Headquarters has been located in the Emirate of Dubai. MENA MECH IND CO is charged with an ambitious growth with the mission to protect people of the United Arab Emirates, and middle east Countries by providing world-class fire pump solutions manufacture by MENA MECH IND CO.

Mena is efficiently covering its Services by having a regional office in Egypt, Sudan and various other locations in the Middle East.

Mena Mech IND CO is the sole distributor throughout the Gulf Countries for its products, which are approved from Civil defense in many countries including UAE.

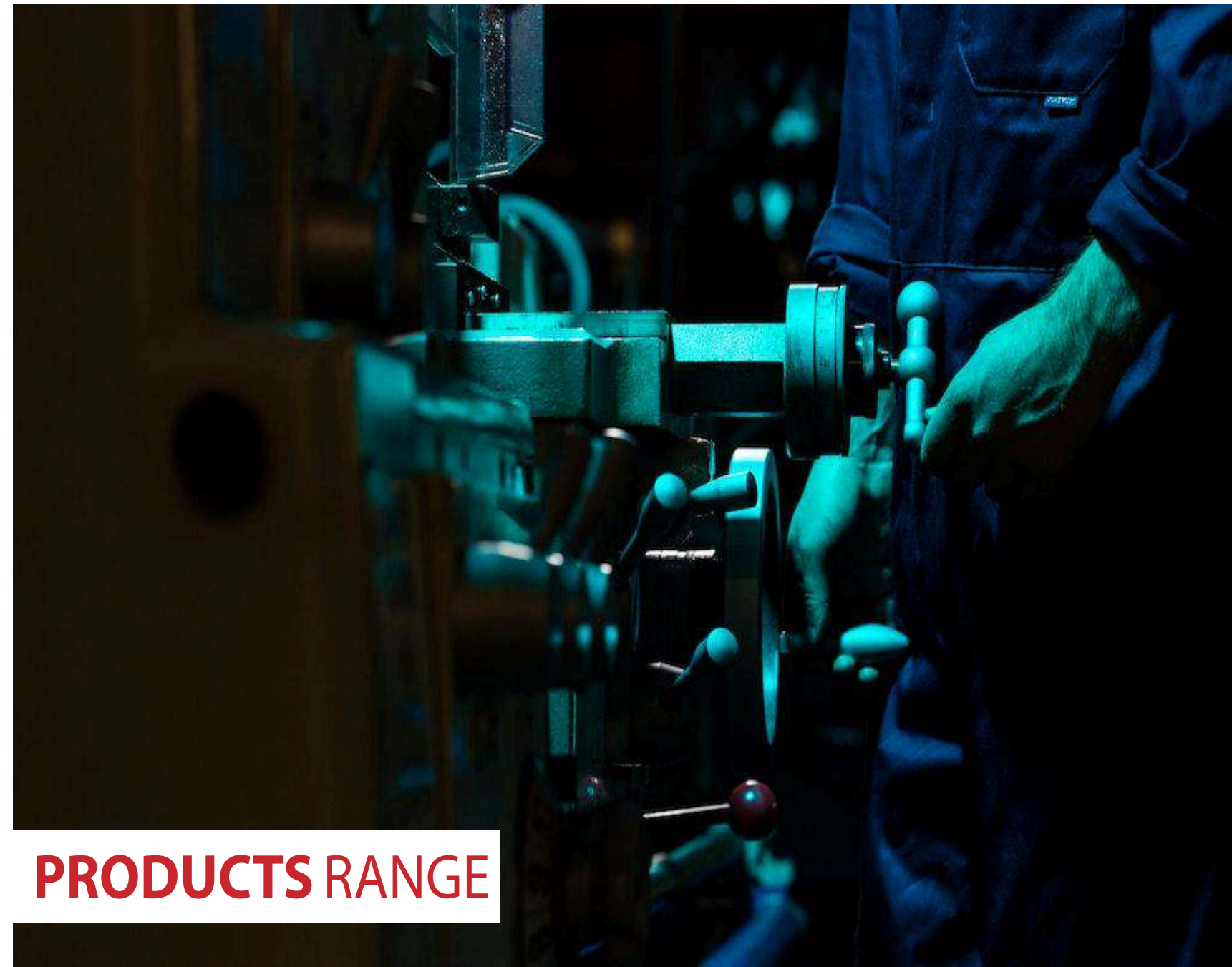
This company profile includes a complete illustration and real pictures of production process, starting from engineering, casting, machining, manufacturing, and ending with assembly.

The experts of MENA MECH IND CO are well managed, dedicated and well-versed with knowledge research and development in all aspects of Pumping Solutions. They are also supported with a qualified team of engineers and technicians with years of experiences to provide the best quality service to clients. and has an outstanding track record of delivering products on time and are punctual in providing services at regular intervals; this has been the bases of establishing a strong relationship with the clients.

MENA MECH IND CO has a well-equipped workshop for maintenance service as per International standards.

MENA MECH IND CO commits to consistently demonstrate the highest ethical standards in our actions through innovative solutions, honoring our agreements and being transparent in our communications.

Our value and service meets our customer expectations because we build and maintain a good relationship with them to ensure long-term satisfaction.

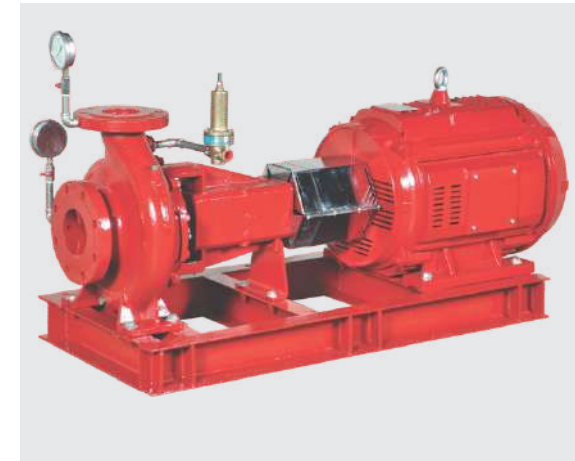


PRODUCTS RANGE

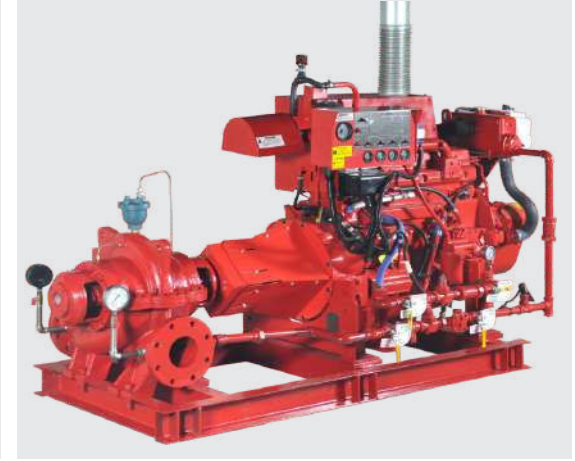
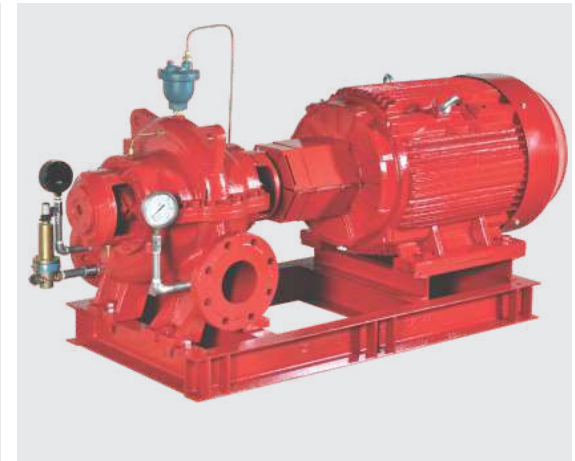
Vertical Turbine Fire Pumps



Horizontal End Suction



Horizontal Split Case



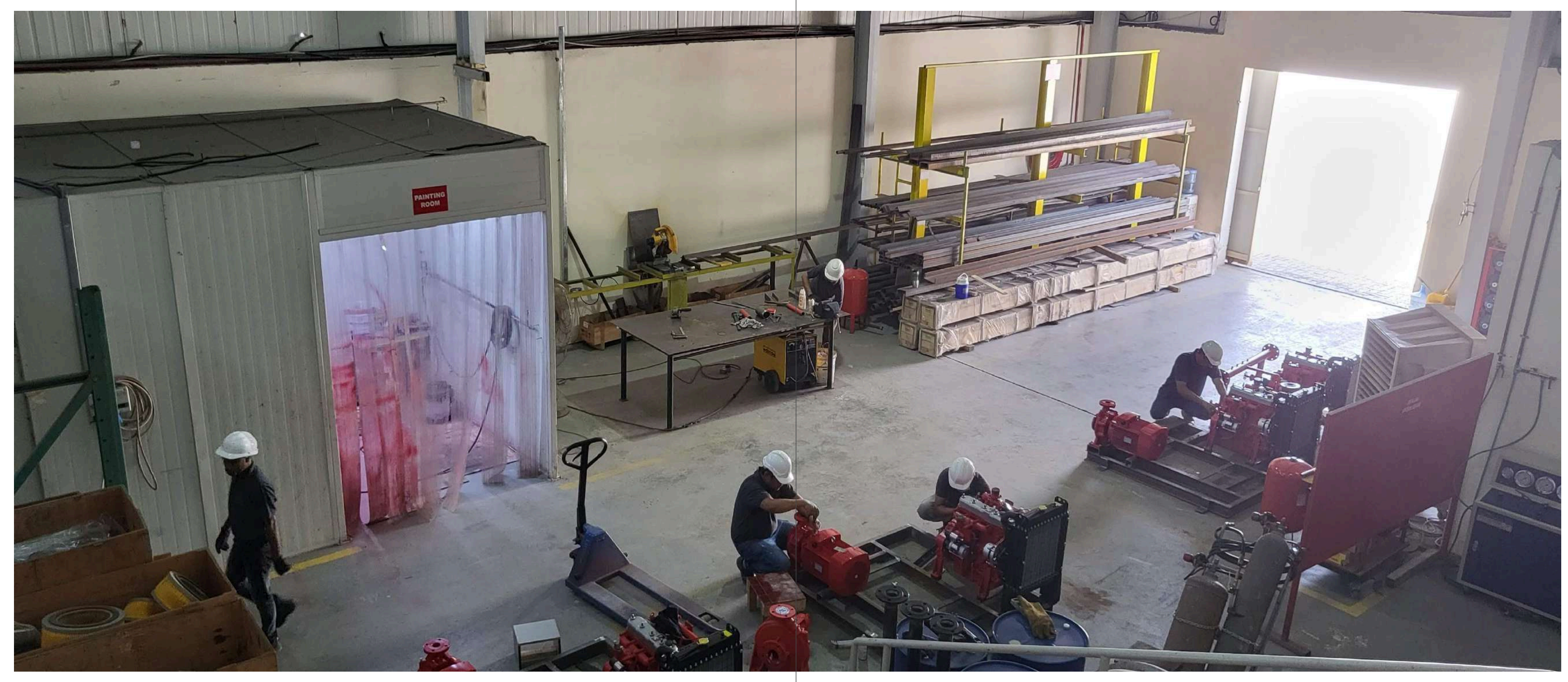
Product Range Overview

- UL Listed Horizontal End Suction Fire Pumps
- UL Listed Horizontal Split Case Fire Pumps
- UL Listed Vertical Turbine Fire Pumps
- UL/FM Industrial Packaged Fire Pump Set
- Diesel Engine Driven Pump Set
- Electric Motor Driven Pump Set
- Jockey Pump
- Fire Pump Packaged as per NFPA



PRODUCTION CAPABILITIES





CERTIFICATE OF COMPLIANCE

Certificate Number EX28977
Report Reference EX28977-2023-04-05
Issue Date 2023-APRIL-18

Issued to: MENA MECH IND CO.
Sharjah Al Sajaa Industrial Shed 6
Victory Warehouse, Sajja New Industrial Area
Sharjah, United Arab Emirates

This certificate confirms that representative samples of Centrifugal Fire Pumps, Split Case
See Addendum for Models

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

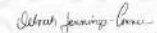
Standard(s) for Safety: ANSI/CAN/UL 448 – Centrifugal Stationary Pumps for Fire-Protection Service

Additional Information: See UL Product iQ® at <https://iq.ulprospector.com> for additional information.

This Certificate of Compliance indicates that representative samples of the product described in the certification report have met the requirements for UL certification. It does not provide authorization to apply the UL Mark. Only the Authorization Page that references the Follow-Up Services Procedure for ongoing surveillance 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.


Deborah Jennings, Conner, VP Regulatory Services
UL LLC

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Page 1 of 8



UL Product iQ®



Centrifugal Fire Pumps, Vertical Turbine

COMPANY

Volute Engineering Pvt Ltd

No. 37, Muthiya Mudali Second Street
Royapettah
Chennai, Tamil Nadu 600014 India

EX28924

Trademark and/or Tradename: "VOLUTE",



Note: For additional marking information, refer to the [Guide Information Page](#).

View model for additional information

Centrifugal Fire Pumps, Vertical Turbine, Model(s): [VT100-155](#), [VT125-180](#), [VT145-270](#), [VT150-265](#), [VT170-304](#), [VT185-335](#), [VT200-350](#), [VT225-400](#), [VT250-400](#), [VT275-430](#), [VT80-145](#)

Last Updated on 2023-01-03

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PROJECTS REFERENCE

Sr No.	Project Details (2022)					Capacity	
	Client	Main Contractor	Consultant	Project Name	Location	Flow (US GPM)	Head (Bar)
1	Sheikh Mohamed Zayed Al Nehyan	Miami Contracting Company	Development Engineering Consultant	G+M+4 Commercial Office Building	Dubai	500	10
2	Ismail Abdullah Al - Gergawi	Talai Contracting	Fourth Dimension Engineering Consultant	Commercial Building	Dubai	500	9
3	Al Bahidh General Trading LLC	Quick Steel Building Contracting LLC	Capital Engineering Consultant	G+M Cold Storage Building	Dubai	750	7
4	Mrs. Hawa Abdullah	Abdullah Bin Dasmal Contracting	Circle Engineering Consultant	G+3+R Residential Building, Muhaisnah	Dubai	750	8
5	Mr. Hassan Arab Darwish	Remal Al Sahara Building Contracting Company LLC	Sharjah Engineering Consultant	G+1 Commercial Building	Sharjah	300	9
6	Mr. Hassan Arab Darwish	Remal Al Sahara Building Contracting Company LLC	Sharjah Engineering Consultant	G+3 Commercial Building	Sharjah	300	9
7	Mr. Essa Abdulla Buhumaid	Solid Building Contracting LLC	Retaj Engineering Consultancy	G+M Warehouse & G+M Office	Dubai	500	9
8	Mr. Younis Abdelaziz Al Nimr	Ideal Building Contracting	Emirates Engineer Consultant	G+5 Residential Building	Sharjah	500	10
9	H.H Saud bin Rashid Al Mualla	Zamalek Contracting	ATI Engineer Consultant	Commercial Building / School	Umm Al Quain	1500	9
10	Mr. Mohammed Abdulazez Ahmad	Hilal Al Emarate Contracting	High Arc Engineering Consultants	G+5 Residential Building	Sharjah	500	10
11	Shaikha Moudi Hamad Al Shami	Remal Al Sahara Contracting	Al Bait Engineering Consultants	G+2 building	Sharjah	500	9
12	Al Fahim Group	Hamed El Sayah Contracting	MAZ Engineering Consultant	Industrial Garage	Dubai	300	9
13	Ms. Metha Ahmed Ali Al Weis	Al Muntaser Building Contracting	Arabic Architecture Engineering Consultant	Commercial Building G+4 TYP	Dubai	750	10





مكتب الشارقة الرقمية
Sharjah Digital Office

رخصة صناعية Industrial License



763789

License Details

تفاصيل الرخصة

Issue Date	26-09-2018	تاريخ الإصدار	License No.	763789	رقم الرخصة
Expiry Date	26-09-2024	تاريخ الإنتهاء	Registration No.	183382	رقم السجل
Trade Name	MENA MECH IND CO L L C SOLE PROPRIETORSHIP				الاسم التجاري
Legal status	Individual Company L.L.C	شركة ذات مسؤولية محدودة - الشخص الواحد (ذ م م)			الشكل القانوني

License Members

أطراف الرخصة

الحصص	الصفة	رقم الهوية / الجواز	الجنسية	اسم المستثمر	رقم المستثمر
Shares	Type	ID \ Passport No	Nationality	Investor Name	Investor No
100.0 %	المالك Owner	784198950286397	الأردن Jordan	وليد مامون على عفانه WALEED MAMOUN ALI AFANEH	4863779

المدير وليد مامون على عفانه

أنشطة الرخصة تعبئة مواد أطفاء الحريق, تجميع المضخات

العنوان الشارقة-الصجعة صناعية/الشارقة-شارع الإمارات شبرة رقم 6 ملك احمد محمد حسين المرزوقي

الهاتف المتحرك: 0507690431

صندوق البريد: 430541 الشارقة

البريد الإلكتروني: a@gmail.com

Notes

الملاحظات

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User Name 49972 رقم المستخدم Printing Date 23-10-2023 تاريخ الطباعة

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شهادة سجل صناعية Industrial Register Certificate



763789

License Details

تفاصيل الرخصة

Issue Date	26-09-2018	تاريخ الإصدار	License No.	763789	رقم الرخصة
Expiry Date	26-09-2024	تاريخ الإنتهاء	Registration No.	183382	رقم السجل
			Capital	300000	رأس المال
			شركة ميناء للصناعات الميكانيكية ذ م م شركة الشخص الواحد		الاسم التجاري
Trade Name	MENA MECH IND CO L L C SOLE PROPRIETORSHIP				
Legal status	Individual Company L.L.C	شركة ذات مسؤولية محدودة - الشخص الواحد (ذ م م)		الشكل القانوني	
		وليد مامون على عفانه		المدير	
		تعبئة مواد أطفاء الحريق, تجميع المضخات		أنشطة الرخصة	
		الشارقة-الصحة الصناعية/الشارقة-شارع الإمارات شجرة رقم 6 ملك احمد محمد حسين المرزوقي		العنوان	



User Name 49972

رقم المستخدم

Printing Date 23-10-2023


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	Vendor Ref. No.	
	Contractor Ref. No.	
Project Name	Contractor Job No.	








SYSTEM TECHNICAL SUBMITTAL

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date

Diesel Fire Pump

Item Description

Proposed

<u>Diesel Pump:</u>	
Make	: MENA (MENA Mechanical Industries) UL Listed
Model	: VESD150-100-315
Type	: End Suction Fire Pump
Rated Flow	: 1000 USGPM
Rated Head	: 7 BAR
Rated Speed	: 2900 RPM
Casing	: Ductile Iron
Impeller	: Bronze
Material Shaft	: ASTM 420
Brand	: 
Pump Approval	: UL Listed 
<u>Diesel Engine:</u>	
Make	: Black Stallion
Model / Hp	: BS04100MSF 100 HP
Cooling Method	: Heat Exchanger
Speed	: 2900 RPM
Engine Approval	: UL Listed & FM Approved  
<u>Diesel Pump Controller</u>	
Make	: "Tornatech" 
Model	: GPD-24-220
Operation	: Combined Automatic , Manual Start
Enclosure	: NEMA 2
Mounting	: FLOOR / WALL
Method of Start	: Standard
Operation Interface	: Standard
Power Supply	: 220V AC, 24V DC
Controller Approval	: UL Listed & FM Approved, Built to NFPA 20 Standards  



Electric Fire Pump

Item Description

Proposed



<u>Electric Pump:</u>	
Make	: MENA (MENA Mechanical Industries) UL Listed
Model	: VESD150-100-200
Type	: End Suction Fire Pump
Rated Flow	: 1000 USGPM
Rated Head	: 7 BAR
Rated Speed	: 3500 RPM
Casing	: Ductile Iron
Impeller Material	: Bronze
Shaft	: ASTM 420
Brand	:
Pump Approval	: UL Listed
<u>Electric Motor:</u>	
Make	: TECHTOP
Protection	: Class F
Type	: ODP
Performance Rating	: 75 HP, 3Ph, 60Hz , 380V, 2 POLES
Speed	: 3500 RPM
Motor Approval	: UL Listed
<u>Electric Pump Controller</u>	
Make	: "Tornatech"
Model	: GPY-380\75\3\60
Operation	: Combined Automatic , Manual Start & Remote Start
Enclosure	: NEMA 2
Mounting	: FLOOR / WALL
Method of Start	: STAR DELTA
Operation Interface	: Standard
Power Supply	: 3Ph, 380V, 60Hz
Controller Approval	: UL Listed & FM Approved, Built to NFPA 20 Standards




Jokey Fire Pump

Item Description

Proposed

<u>Electric Pump:</u>	
Make	: PACIFIC OR MENA Pumps AS PER AVAILABILITY
Model	: RV OR MNT
Type	: Vertical Multistage
Rated Flow	: 50 USGPM
Rated Head	: 8 BAR
Rated Speed	: 3500 RPM, 60 Hz
<u>Motor:</u>	
Type	: TEFC Motor
Power Supply	: 3 Ph, 380V, 60 hz
Rated power	: 7.5 Hp
Speed	: 3500RPM
<u>Jockey Pump Controller</u>	
Make	: "Tornatech" 
Model	: JP3-380\7.5\3\60
Operation	: Combined Automatic , Manual Start
Enclosure	: NEMA 2
Mounting	: WALL
Method of Start	: DOL
Operation Interface	: Touch Screen
Power Supply	: 3 Phase, 380 V, 60 Hz
Controller Approval	: UL Listed / Built to NFPA 20 Standards 

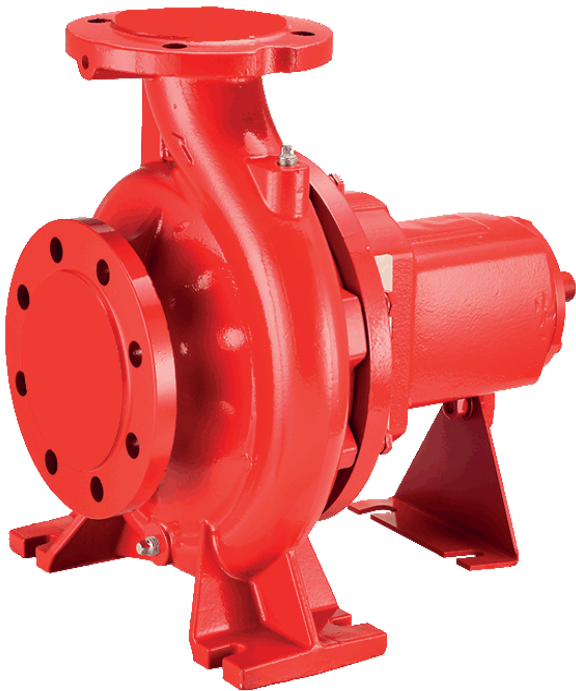
	Vendor Ref. No.	
	Contractor Ref. No.	
Project Name:	Contractor Job No.	

**DIESEL ENGINE DRIVEN PUMP
SPECIFICATIONS**

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date

END SUCTION FIRE PUMP

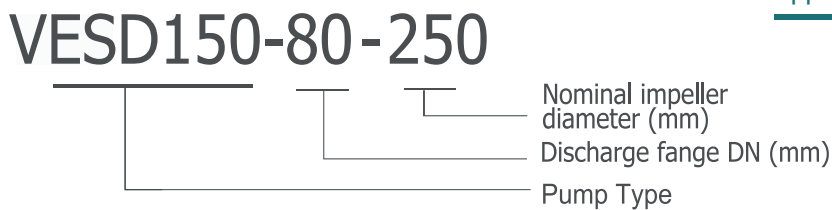
END SUCTION FIRE PUMP



Technical Specifications	
Suction fange	1.5-6 Inch
Discharge fange	2.5-4 inch
Flow	50-1000 GPM
Discharge pressure	84-230PSI

Material Specifications	
Casing	Ductile Iron
Impeller	Bronze or stainless steel
Shaft	ATSM420
Sealing	Gland packing
Bearing Housing	Rolling bearing
Suction/discharge fanges	ANSI

Pump Naming



Product Standard

UL 448, NFPA

Product Approvals



Flange Standards

Pump Installing Dimensions are confirming to ISO2858 Standard, and Tested according to with UL 448 -2013

Driver Options



Electrical



Diesel

Application Areas



Hydrant



Sprinkler



Overflow



Foam

Risk Class



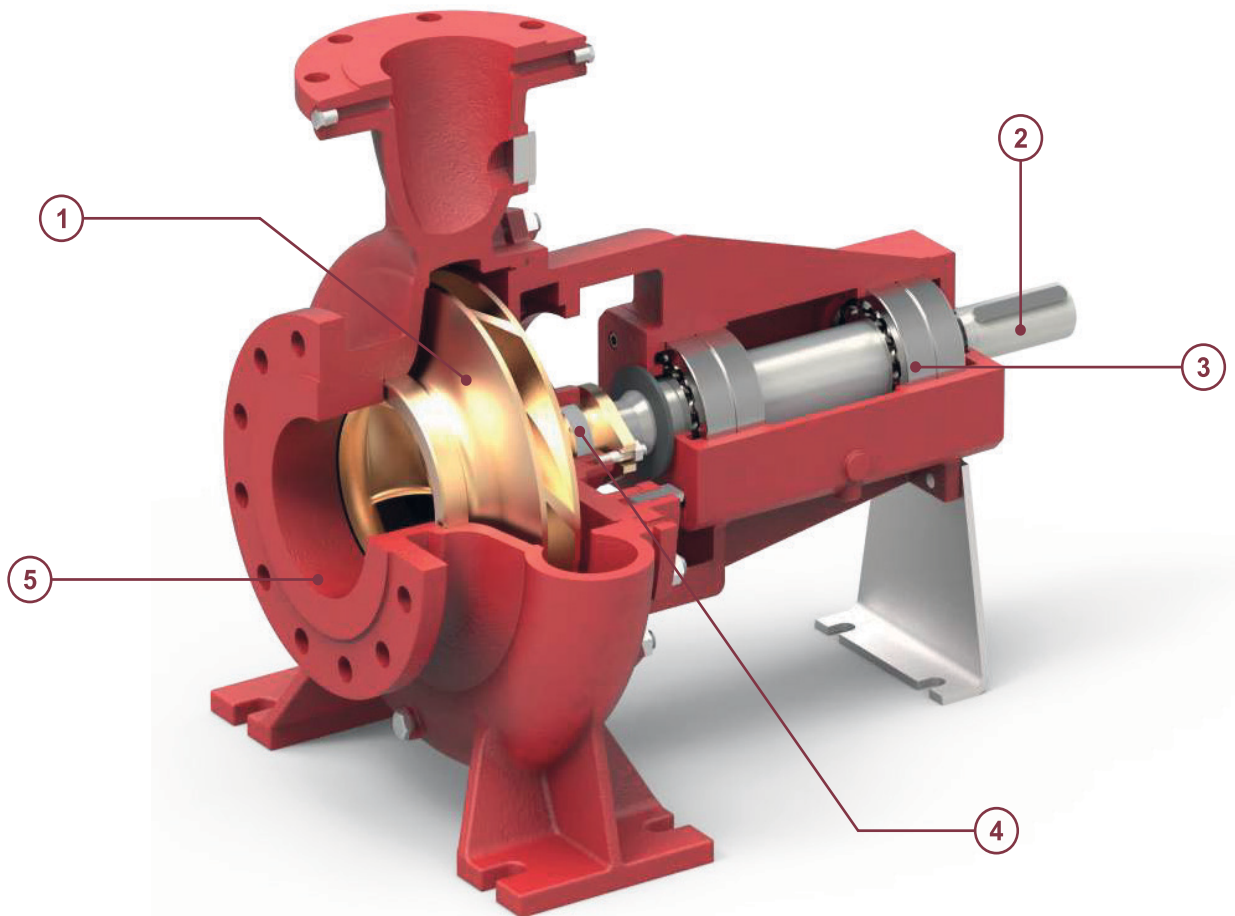
Ordinary



High

END SUCTION FIRE PUMP

General Pump Features



END SUCTION FIRE PUMP

1 - Impeller & Casing

- Impeller is dynamically balanced to grade G6.3 balance quality in accordance to ISO 1940-1.
- Impeller & Casing are designed using state of art CFD tools to ensure optimal performance.

2 - Shaft

- Heavy duty stainless steel shaft completely sealed and dry for zero corrosion available upon request.
- Short and rigid with negligible vibrations.
- Replaceable shaft protecting sleeves.
- No threads exposed to pump medium, long operating life and no corrosion.
- Adjustment-free assembly.

3 - Bearing

- Heavy duty and permanently grease lubricated antifriction bearings for long service life.
- Open gland, enough space for service activities.

4 - Seal

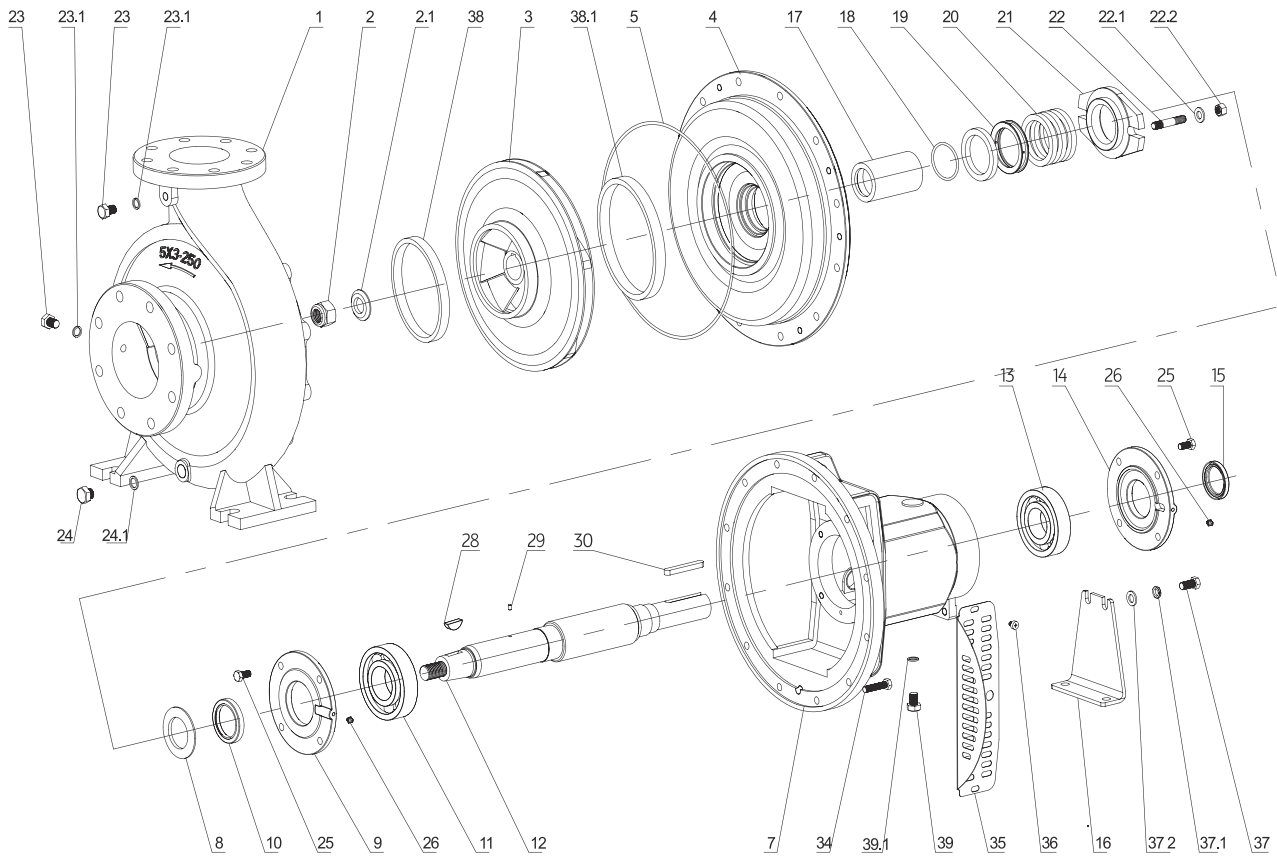
- Asbestos - free, soft packed stuffing boxes.

5 - Casing

- End Suction backpullout design permits maintenance of the pump without removing the pipes.
- Rugged Ball Bearings on Drive as well as Non Drive end.
- Flange drilled as per ANSI B16.1 class 250.
- Smooth surface inside & CED coated for superior corrosion protection.
- Replaceable wear ring protect the casing and the impeller running clearances.
- Heavy duty casing design for high working pressure.

END SUCTION FIRE PUMP

VES Series - Exploded View & Part list

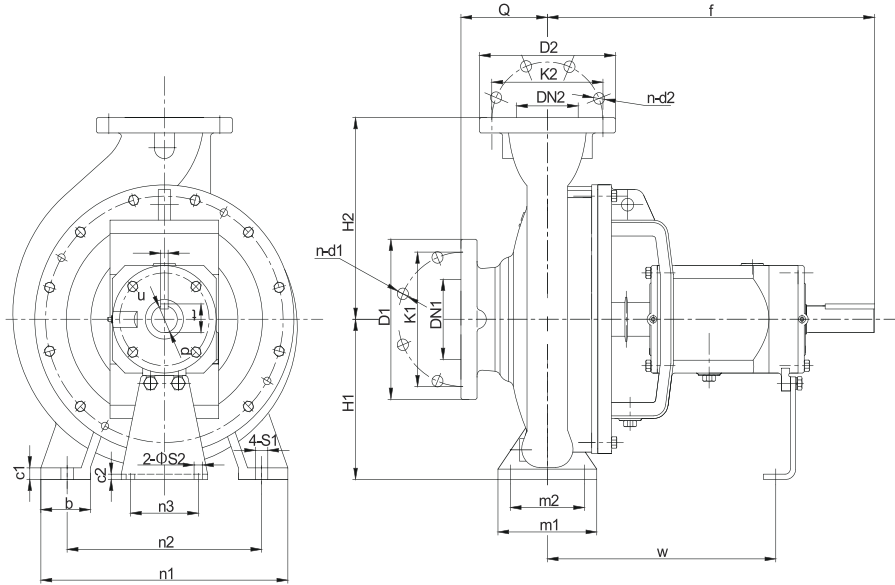


END SUCTION FIRE PUMP

Code	Part Name	Code	Part Name	Code	Part Name
1	Casing	16	Support Foot	26	Oil Cup M6
2	Impeller Nut	17	Packing Sleeve	28	key
2.1	Lock washer for impeller	18	O-ring	29	pin
3	Impeller	19	Gland Packing	30	key
4	Gland Cover	20	Packing Seal Cage	34	Screw Bolt
5	O-ring	21	Gland Cover	35	Protective cover
7	Bearing Housing	22	Stud Bolt	36	Bolt
8	Rubber Slinger	22.1	Flat Washer	37	Screw Bolt
9	NDE Bearing Cover	22.2	Screw Nut	37.1	Elastic Washer
10	NDE Oil Seal	23	Plug	37.2	Flat Washer
11	NDE Bearing	23.1	Plug Spacer	38	Front-Wearing
12	Shaft	24	Plug	38.1	Back-Wearing
13	DE Bearing	24.1	Plug Spacer	39	Plug
14	DE Bearing Cover	25	Screw Bolt	39.1	Plug Spacer
15	DE Oil Seal				

END SUCTION FIRE PUMP

VES SERIES INSTALLATION DIMENSION



END SUCTION FIRE PUMP

Model	DN1		DN2		Impeller Dia.	Shaft No.	a	f	h1	h2	b	m1	m2	n1	n2	n3	c1	c2	w	S1	S2	d	t	u	l	Weight (kg)
	inch	mm	inch	mm																						
40-250	2.5"	65	1.5"	40	250	2	100	500	180	225	65	125	95	320	250	110	14	6	370	M12	M12	32	35	10	80	71
50-250	3"	80	2"	50	250	2	125	500	180	225	65	125	95	320	250	110	15	6	370	M12	M12	32	35	10	80	76
65-250	4"	100	2.5"	65	250	2	125	500	200	250	80	160	120	360	280	110	16	6	370	M16	M12	32	35	10	80	84
80-250	5"	125	3"	80	250	2	125	500	225	280	80	160	120	400	315	110	18	6	370	M16	M12	32	35	10	80	88
80-315	5"	125	3"	80	315	3	125	530	250	315	80	160	120	400	315	110	20	8	370	M16	M12	42	45	12	110	130
100-315	5"	125	4"	100	315	3	140	530	250	315	80	160	120	400	315	110	19	8	370	M16	M12	42	45	12	110	138
100-250	5"	125	4"	100	315	3	140	530	250	315	80	160	120	400	315	110	19	8	370	M16	M12	42	45	12	110	138
100-200	5"	125	4"	100	315	3	140	530	250	315	80	160	120	400	315	110	19	8	370	M16	M12	42	45	12	110	138
80-200	5"	125	3"	80	315	3	125	530	250	315	80	160	120	400	315	110	20	8	370	M16	M12	42	45	12	110	130
150-100-200	6"	150	4"	100	200	3	125	530	250	315	80	160	120	400	315	110	20	8	370	M16	M12	42	45	12	110	130
150-100-315	6"	150	4"	100	315	3	125	530	250	315	80	160	120	400	315	110	20	8	370	M16	M12	42	45	12	110	130

	Flange standard : ASTM B16.42-1998 Class150					Flange standard : ASTM B16.42-1998 Class300				
DN1/DN2	1.5"	2"	2.5"	3"	4"	5"	3"	4"	5"	
D1/D2	127	152.4	177.8	190.5	228.6	254	209.6	254	279.4	
K1/K2	98.6	120.7	139.7	152.4	190.5	215.9	168.1	200.2	234.9	
n-d1/ n-d2	4-φ15.7	4-φ19.1	4-φ19.1	4-φ19.1	8-φ19.1	8-φ22.4	8-φ22.4	8-φ22.4	8-φ22.4	

FIRE PUMP SKIDS

MENA MECH IND CO is an established well reputed manufacturer of Premium Custom Engine Driven Centrifugal Fire Pump Skids. We specialized in designing and developing packages in compliance to NFPA 20 requirements with Listed & Approved Drivers.

MENA offers listed Centrifugal Fire Pump Skids that meet every fire protection need.

- Driven by Listed & Approved Diesel Engines or Electric Motors.
- Well aligned and Coupled for Direct Operation.
- Skid Packages are Pre-Tested and Inspected thoroughly before release to customers.
- One piece base plate with Anchor Bolt holes.
- Engineered, coated, hot rolled mild steel to resist corrosion and abrasion.
- Heavy Fabricated C-Channel Structure constructed to provide proper alignment of Pump with Diesel Engine or Pump with Motor.
- Compact skid Design with Small Foot-Print for Retrofit.
- High standard of Quality in material Construction finish and Workmanship.

DIESEL DRIVEN SKIDS

MENA maintains its standard with using it's proudly own listed & approved Black Stallion Diesel Engines and Centrifugal Fire Pumps to package Heavy Duty and High Quality Compact Skids.

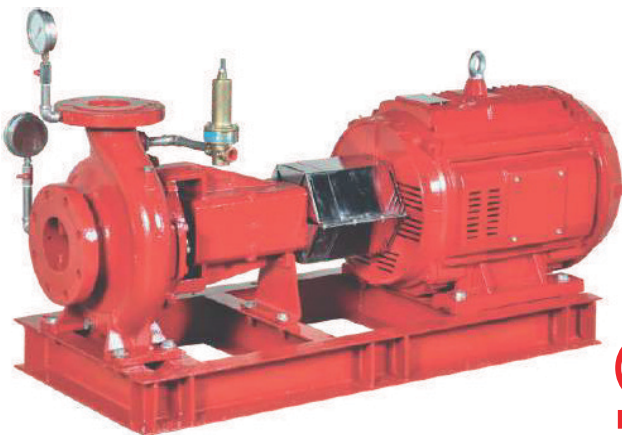
Our Listed and Approved Fire Pumps can also be coupled with any other Listed Diesel Engine of any specific brand as per customers requirement.



MOTOR DRIVEN SKIDS

MENA maintains its standard with using WEG which is High Efficiency Fire Pump Motors with our own Listed and Approved Centrifugal Fire Pumps to package Heavy Duty and High Quality Compact Skids.

Our Listed and Approved Fire Pumps can also be coupled with any other Listed Fire Pump Motors of any specific brand as per client requirement.




END SUCTION -RANGE

APPROVED UL LISTING RANGE

LISTING RANGE

Rated Capacity, US GPM	Size, In.	Model	Pressure Rating, psi	Approx Speed RPM	Maximum Working Pressure Psi
50	2.5x1.5	VES 40-250	101 - 142	2900	200
50	2.5x1.5	VES 40-250	144 - 207	3500	290
100	2.5x1.5	VES 40-250	97 - 140	2900	200
100	2.5x1.5	VES 40-250	140 - 203	3500	290
150	2.5x1.5	VES 40-250	87 - 131	2900	200
150	2.5x1.5	VES 40-250	133 - 196	3500	290
150	3x2	VES 50-250	104 - 147	2980	225
150	3x2	VES 50-250	144 - 202	3500	290
200	3x2	VES 50-250	101 - 145	2980	225
200	3x2	VES 50-250	140 - 200	3500	290
250	3x2	VES 50-250	97 - 140	2980	225
250	3x2	VES 50-250	136 - 196	3500	290
250	4x2.5	VES 65-250	91 - 143	2900	225
250	4x2.5	VES 65-250	131 - 207	3500	290
300	4x2.5	VES 65-250	89 - 142	2900	225
300	4x2.5	VES 65-250	130 - 206	3500	290
400	4x2.5	VES 65-250	82 - 137	2900	225
400	4x2.5	VES 65-250	125 - 203	3500	290
400	5x3	VES 80-200	89 - 141	3500	225
400	5x3	VES 80-250	88 - 140	2900	225
400	5x3	VES 80-250	128 - 207	3500	290
450	5x3	VES 80-200	86 - 139	3500	225
450	5x3	VES 80-250	86 - 140	2900	225
450	5x3	VES 80-250	127 - 206	3500	290
450	5x3	VES 80-315	131 - 207	2900	290
450	5x4	VES 100-200	88 - 143	3500	225
450	5x4	VES 100-250	83 - 135	2900	290
450	5x4	VES 100-250	123 - 198	3500	290
450	5x4	VES 100-315	133 - 210	2900	290
450	5x4	VES 100-315	140 - 222	2980	290
500	5x3	VES 80-200	83 - 136	3500	225
500	5x3	VES 80-250	84 - 139	2900	225
500	5x3	VES 80-250	125 - 205	3500	290
500	5x3	VES 80-315	127 - 204	2900	290
500	5x4	VES 100-200	88 - 141	3500	225
500	5x4	VES 100-250	83 - 134	2900	290
500	5x4	VES 100-250	122 - 198	3500	290
500	5x4	VES 100-315	132 - 209	2900	290
500	5x4	VES 100-315	139 - 221	2980	290
500	6x4	VESD 150-100-200	116 - 142	3500	225
500	6x4	VESD 150-100-315	119 - 192	2900	250
750	5x4	VES 100-200	82 - 138	3500	225
750	5x4	VES 100-250	74 - 128	2900	290
750	5x4	VES 100-250	115 - 191	3500	290
750	5x4	VES 100-315	125 - 202	2900	290
750	5x4	VES 100-315	133 - 214	2980	290
750	6x4	VESD 150-100-200	112 - 137	3500	225
750	6x4	VESD 150-100-315	113 - 186	2900	250
1000	6x4	VESD 150-100-200	99 - 128	3500	225
1000	6x4	VESD 150-100-315	101 - 173	2900	250



	Vendor Ref. No.	
	Contractor Ref. No.	
Project Name:	Contractor Job No.	

DIESEL ENGINE SPECIFICATIONS

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date

BLACK STATION

PRODUCING TRUST IN FIRE AND SAFETY



Product of



CERTIFIED DIESEL DRIVEN ENGINES

www.sffecoglobal.com



SFFECO GLOBAL with its more than 30 years of experience has always been a progressive organization that has remained in the forefront of the fire fighting industry with innovative, re-engineered and unique products.

SFFECO GLOBAL in its state-of-the-art manufacturing plants in RIYADH & DUBAI works in close connections with renowned governmental and certification bodies to provide key answer to the challenges faced by the society.

SFFECO GLOBAL brings together over 3-Decades of expertise and experience in form of Design, Consultancy, Testing, Commissioning, Maintenance and Refurbishment of fire protection and fire fighting system.

SFFECO GLOBAL works with many Global and International certification bodies. The logos shown on the catalog are to display our association with the respective certification bodies. For Product certifications, please visit the respective product page or contact our sales team.





BLACK STALLION today is a symbol for producing efficient, reliable, high performance, cost effective and premium quality internal combustion engines with a wide range of power. Our wide range enables you to find the best engine to fit your needs to deliver effectively and efficiently. We produce engines that meet all the requirements of the NFPA 20 quality and compliance standards and has passed all the tests of the UL 1247 and FM class Number 1333 requirements. Our manufacturing and testing facilities are Witnessed by UL/FM and each product produced are tested to meet all the requirements before they are delivered.

BLACK STALLION is known for reengineering and developing internal combustion engines which is the crucial component for any fire pump.

*QUALITY
EFFICIENCY
PERFORMANCE
DELIVERY*





HIGH PERFORMANCE ► FEATURES

- Disposable dry type air filter
- Able to reach the power within 20sec of starting of the engine
- Flexible hose supply and return fuel connections
- Spin-on type fuel and oil filter
- Inline type, gear driven fuel injection system
- High capacity automatic engine water heater to keep engine warm in the cold conditions
- Water to water, shell and tube type heat exchanger
- Instrumentation panel evaluates as per UL50E and meeting NEMA TYP-2 Requirements.
- Electronic over speed control with reset and test functions
- Energized to stop type solenoid
- High torque starters
- Tamper proof Adjustable speed control
- Water cooling loop

DIESEL ENGINES

BLACK STALLION is an internal combustion diesel engine trademark by SFFECO Global. It is known for reengineering and developing internal combustion engines which is the crucial component for any fire pump.

BLACK STALLION today is a symbol for producing efficient, reliable, high performance, cost effective and premium quality internal combustion engines with a wide range of power. Our wide range enables you to find the best engine to fit your needs to deliver effectively and efficiently. We produce engines that meet all the requirements of the NFPA 20 quality and compliance standards and has passed all the tests of the UL 1247 and FM class Number 1333 requirements.

To provide this confidence, each diesel engine of ours, goes through multiple tests like Endurance Test, and governor test before dispatch from our factory.

Features:

- Engine Type: In line 4 Stroke cycle.
- Cooling System : Water Cool
- Rated Power : From 15 HP to 590 Hp
- 1400,1600,1800,2800,2900,3000
And 1400-1800, 2800-3000 (Refer individual ratings for RPM)
- Number Of Cylinders : 3 , 4, 6 and 12 Cylinders
- Aspiration: Naturally Aspirated and Turbo Charger
- Rotation: Counter Clock Wise (Fronting Fly Wheel)
- Innovative Design
- Latest Technology
- Performance Oriented
- Competitive Pricing
- Premium Quality
- Compact Arrangement
- Low Maintenance
- Easy to Operate
- Efficient Fuel Consumption
- Fast & Timely Delivery

Specification:

UL/FM ENGINE RATINGS AT SPECIFIC SPEEDS				
Model Numbers	Rated Power, HP	Number of cylinders	Speed (RPM)	Certification
BS04040TMSF	40	4	2800	UL/FM
BS04050TMSF	50	4	2800	UL/FM
BS04057TMSF	57	4	2800	UL/FM
BS04080MSF	80	4	2800	UL/FM
BS04090MSF	90	4	2800	UL/FM
BS04100MSF	100	4	2800	UL/FM
BS04111MSF	111	4	2800	UL/FM
BS03020MSF	20	3	2900	UL/FM
BS04030MSF	30	4	2900	UL/FM
BS04040TMSF	40	4	2900	UL/FM
BS04050TMSF	50	4	2900	UL/FM
BS04040MSF	40	4	2900	UL/FM
BS04050MSF	50	4	2900	UL/FM
BS04057MSF	57	4	2900	UL/FM
BS04070MSF	70	4	2900	UL/FM
BS04075MSF	75	4	2900	UL/FM
BS04080MSF	80	4	2900	UL/FM
BS04090MSF	90	4	2900	UL/FM
BS04100MSF	100	4	2900	UL/FM
BS06100MSF	100	6	2900	UL/FM
BS06110MSF	110	6	2900	UL/FM

UL/FM ENGINE RATINGS AT SPECIFIC SPEEDS

Model Numbers	Rated Power, HP	Number of cylinders	Speed (RPM)	Certification
BS06118MSF	118	6	2900	UL/FM
BS06120MSF	120	6	2900	UL/FM
BS06128MSF	128	6	2900	UL/FM
BS06150MSF	150	6	2900	UL/FM
BS06160MSF	160	6	2900	UL/FM
BS06175MSF	175	6	2900	UL/FM
BS06186MSF	186	6	2900	UL/FM
BS06200MSF	200	6	2900	UL/FM
BS06210MSF	210	6	2900	UL/FM
BS06212MSF	212	6	2900	UL/FM
BS06220MSF	220	6	2900	UL/FM
BS06240MSF	240	6	2900	UL/FM
BS06250MSF	250	6	2900	UL/FM
BS06265MSF	265	6	2900	UL/FM
BS04040TMSF	40	4	3000	UL/FM
BS04050TMSF	50	4	3000	UL/FM
BS04056TMSF	56	4	3000	UL/FM
BS04080MSF	80	4	3000	UL/FM
BS04090MSF	90	4	3000	UL/FM
BS04100MSF	100	4	3000	UL/FM
BS04110MSF	110	4	3000	UL/FM
BS06300LSF	300	6	1400	UL/FM
BS06310LSF	310	6	1400	UL/FM
BS06329LSF	329	6	1400	UL/FM
BS06350LSF	350	6	1400	UL/FM
BS06375LSF	375	6	1400	UL/FM
BS06400LSF	400	6	1400	UL/FM
BS012430LSF	430	12	1400	UL/FM
BS012455LSF	455	12	1400	UL/FM
BS012480LSF	480	12	1400	UL/FM
BS012510LSF	510	12	1400	UL/FM
BS06300LSF	300	6	1600	UL/FM
BS06320LSF	320	6	1600	UL/FM
BS06336LSF	336	6	1600	UL/FM
BS06370LSF	370	6	1600	UL/FM
BS06372LSF	372	6	1600	UL/FM
BS06390LSF	390	6	1600	UL/FM
BS06405LSF	405	6	1600	UL/FM
BS012450LSF	450	12	1600	UL/FM
BS012475LSF	475	12	1600	UL/FM
BS012530LSF	530	12	1600	UL/FM
BS012545LSF	545	12	1600	UL/FM
BS06300LSF	300	6	1800	UL/FM
BS06320LSF	320	6	1800	UL/FM
BS06343LSF	343	6	1800	UL/FM
BS06370LSF	370	6	1800	UL/FM
BS012450LSF	450	12	1800	UL/FM
BS012500LSF	500	12	1800	UL/FM
BS012570LSF	570	12	1800	UL/FM

DIESEL ENGINES

UL ENGINE RATINGS AT SPECIFIC SPEEDS				
Model Numbers	Rated Power, HP	Number of cylinders	Speed (RPM)	Certification
BS03015MSF	15	3	2900	UL
BS04036MSF	36	4	2900	UL
BS04057TMSF	56	4	2900	UL
BS04079MSF	79	4	2900	UL
BS04111MSF	110	4	2900	UL
BS06215MSF	215	6	2900	UL
BS06218MSF	218	6	2900	UL
BS06272MSF	272	6	2900	UL
BS06275MSF	275	6	2900	UL
BS012518LSF	518	12	1400	UL
BS012503LSF	502	12	1600	UL
BS012553LSF	552	12	1600	UL
BS06390LSF	400	6	1800	UL
BS06390LSF	410	6	1800	UL
BS012550LSF	550	12	1800	UL
BS012589LSF	590	12	1800	UL

FM ENGINE RATINGS AT SPECIFIC SPEEDS				
Model Numbers	Rated Power, HP	Number of cylinders	Speed (RPM)	Certification
BS03021MSF	21	3	2800	FM
BS04030MSF	30	4	2800	FM
BS04036MSF	35.5	4	2800	FM
BS04040MSF	40	4	2800	FM
BS04050MSF	50	4	2800	FM
BS04059MSF	58.5	4	2800	FM
BS04065MSF	65	4	2800	FM
BS04070MSF	70	4	2800	FM
BS04075MSF	75	4	2800	FM
BS06100MSF	100	6	2800	FM
BS06110MSF	110	6	2800	FM
BS06127MSF	127	6	2800	FM
BS06147MSF	146.5	6	2800	FM
BS06134MSF	133.5	6	2800	FM
BS06155MSF	154.5	6	2800	FM
BS06240MSF	240	6	2800	FM
BS03021MSF	21	3	2900	FM
BS04036MSF	35.5	4	2900	FM
BS04056TMSF	56	4	2900	FM
BS04060TMSF	60	4	2900	FM
BS04059MSF	58.5	4	2900	FM
BS04110MSF	110	4	2900	FM
BS04114MSF	114	4	2900	FM
BS06127MSF	127	6	2900	FM
BS06147MSF	146.5	6	2900	FM
BS06188MSF	187.5	6	2900	FM

FM ENGINE RATINGS AT SPECIFIC SPEEDS

Model Numbers	Rated Power, HP	Number of cylinders	Speed (RPM)	Certification
BS06272MSF	271.5	6	2900	FM
BS03021MSF	21	3	3000	FM
BS04030MSF	30	4	3000	FM
BS04036MSF	35.5	4	3000	FM
BS04040MSF	40	4	3000	FM
BS04050MSF	50	4	3000	FM
BS04059MSF	58.5	4	3000	FM
BS04065MSF	65	4	3000	FM
BS04070MSF	70	4	3000	FM
BS04075MSF	75	4	3000	FM
BS04111MSF	111	4	3000	FM
BS06100MSF	100	6	3000	FM
BS06110MSF	110	6	3000	FM
BS06127MSF	127	6	3000	FM
BS06147MSF	146.5	6	3000	FM
BS06160MSF	160	6	3000	FM
BS06175MSF	175	6	3000	FM
BS06191MSF	190.5	6	3000	FM
BS06200MSF	200	6	3000	FM
BS06210MSF	210	6	3000	FM
BS06216MSF	216	6	3000	FM
BS06230MSF	230	6	3000	FM
BS06250MSF	250	6	3000	FM
BS06272MSF	271.5	6	3000	FM
BS06330LSF	330	6	1400	FM
BS06410LSF	410	6	1400	FM
BS012515LSF	515	12	1400	FM
BS06350LSF	350	6	1600	FM
BS06365LSF	365	6	1600	FM
BS06406LSF	406	6	1600	FM
BS012502LSF	502	12	1600	FM
BS012508LSF	508	12	1600	FM
BS012552LSF	552	12	1600	FM
BS012562LSF	562	12	1600	FM
BS06400LSF	400	6	1800	FM
BS06407LSF	407	6	1800	FM
BS012548LSF	548	12	1800	FM
BS012585LSF	585	12	1800	FM

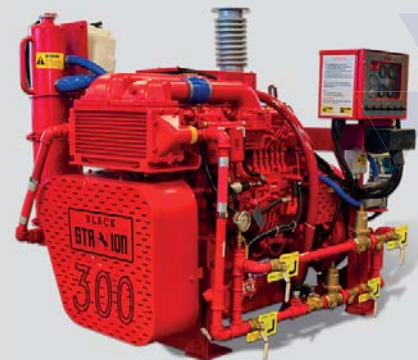
DIESEL ENGINES

DIESEL ENGINES RATED FOR USE WITHIN SPEED RANGES							
SNo.	Proposed Model Numbers	Minimum		Maximum		No. of Cylinders	Cerification
		Rated Speed(rpm)	Rated HP	Rated Speed (rpm)	Rated HP		
1	BS0320MSR	2800	20	3000	21	3	FM
2	BS0440AMSR	2800	35.5	3000	35.5	4	FM
3	BS0440MSR	2800	57	3000	56	4	UL/FM
4	BS0460MSR	2800	58.5	3000	58.5	4	FM
5	BS0485MSR	2800	75	3000	75	4	FM
6	BS04100MSR	2800	111	3000	110	4	UL
7	BS04100MSR	2800	111	3000	111	4	FM
8	BS06130MSR	2800	127	3000	127	6	FM
9	BS06150MSR	2800	146.5	3000	146.5	6	FM
10	BS06195MSR	2800	133.5	3000	190.5	6	FM
11	BS06250MSR	2800	154.5	3000	216	6	FM
12	BS06300MSR	2800	240	3000	271.5	6	FM
13	BS06400LSR	1400	329	1800	343	6	UL
14	BS06400LSR	1400	330	1800	343	6	FM
15	BS06450LSR	1400	400	1800	410	6	UL
16	BS06450LSR	1400	410	1800	407	6	FM
17	BS12550LSR	1400	455	1800	550	12	UL
18	BS12550LSR	1400	455	1800	548	12	FM
19	BS12650LSR	1400	518	1800	588	12	UL
20	BS12650LSR	1400	515	1800	585	12	FM

- **BLACK STALLION Engines are UL/FM Approved. Please contact our sales team for each individual engine certification.**
- **Standard diesel engines are also available and ranges from 25 HP to 536 HP.**
- **FM Engine model listings are awaited, Please contact our sales team for our existing FM Approved engine models**



2800, 2900, 3000 RPM
15 - 275 HP



1400, 1600, 1800 RPM
300 - 588 HP

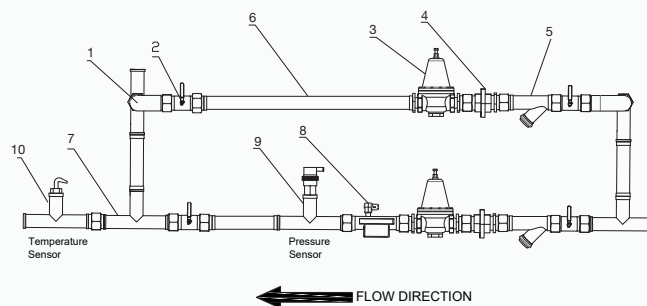
COOLING LOOP ▼

FEATURES & SPECIFICATIONS

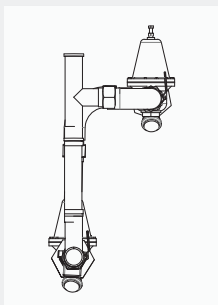
- Complying to UL /FM standards.
- Manufactured as per the guidelines of NFPA 20.
- Hydrostatically tested to assure optimum performance
- All components are checked for pipe strain and leakage prior to initial start-up.
- Black stallion cooling loop incorporates all components required by NFPA and is sized and selected to provide the required volume of water at the proper pressure for the heat exchanger of the engine models.
- Flushing type strainer is used to protect the regulator valve, solenoid valve and the tubes of the heat exchanger from foreign material.
- The regulator valves are used to control the volume and pressure of the cooling water.
- The pressure guages indicates the back pressure on the cooling water discharge. The recommended back pressure to assure adequate flow is less than 20psi and should not exceed the allowable pressure.
- Cooling Loop is available in sizes of 1/2", 3/4", 1", 1 1/4", 1 1/2" and 2" as shown in the table below, selected as per the Engine Size.
- SS and GI Cooling loops are available.
- Option of diaphragm is available instead of solenoid valve..
- Black stallion standard cooling loop is available in Red Epoxy Coated Finish. Other finishes are available upon request

PARTS LIST STANDARD COOLING LOOP

FRONT VIEW



SIDE VIEW



No.	Description
1	Elbow - 90
2	Ball Valve - UL Listed
3	Pressure Regulating Valve
4	Bush Reducer
5	Y-Strainer
6	G.I. Pipe
7	Tee
8	Solenoid Valve
9	Pressure Sensor
10	Temperature Sensor



Note: Pressure and Temperature sensors are FM cooling loop requirements
 Note: Components & Accessories of the Cooling Loop are Certified and Approved.

Product of



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BLACK STALLION

Model Nomenclature:

Fixed Speed Rated Engine

BS04110MSF

BS: Black Stallion

04: Number of Cylinders

110: Rated HP

MS: Medium Speed

F: Fixed (Specific) Speed Rated Engine

ENGINE POWER RATINGS (HP)

Engine Model Numbers	Rated Speed (RPM)			UL LISTED	FM APPROVED
	2800	2900	3000		
BS04080MSF	80	80	80	✓	✓
BS04090MSF	90	90	90	✓	✓
BS04100MSF	100	100	100	✓	✓
BS04110MSF	-	110	110	✓	✓
BS04111MSF	-	-	111		✓
BS04111MSF	111	-	-	✓	✓
BS04114MSF	-	114			✓

ENGINE GENERAL DETAILS

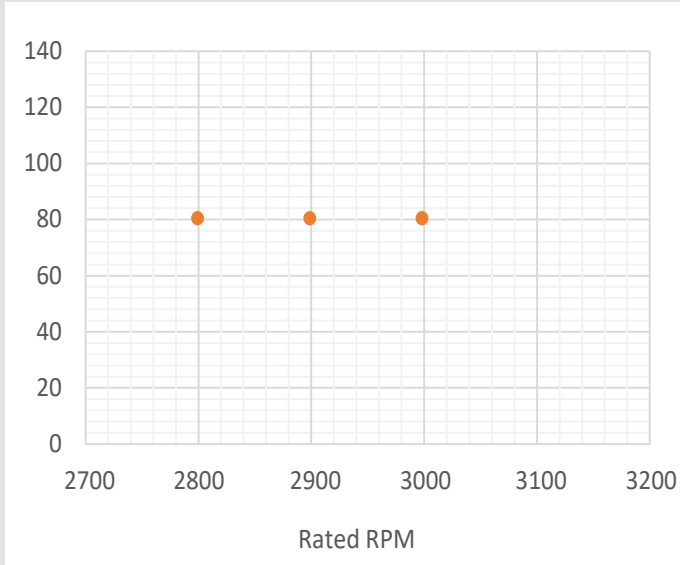
Engine Type	In - Line 4 Stroke Cycle, 4 Cylinder
Cooling System	Water Cooled
Aspiration	Turbo Charged
Combustion Type	Direct Injection
Bore X Stroke	102 mm x 118 mm
Compression Ratio	17.5:1
Displacement	3.8560 Ltrs
Cylinder Firing Order	1-3-4-2
Engine Flywheel Housing	SAE 3
Flywheel power take-off	Driveshaft system
Rotation	Counter Clock Wise (Fronting Fly Wheel)
Approx. Weight	520 KG
Coolant Capacity (Ltr)	16 Ltr
Dimension (L X W X H) Approx.	1160 mm X 910mm X 1070 mm
Engine Crankcase Vent System	Open
Mountings	Factory Standard
Governor speed	Mechanical Type
Throttle Control	Adjustable Speed

Fuel System

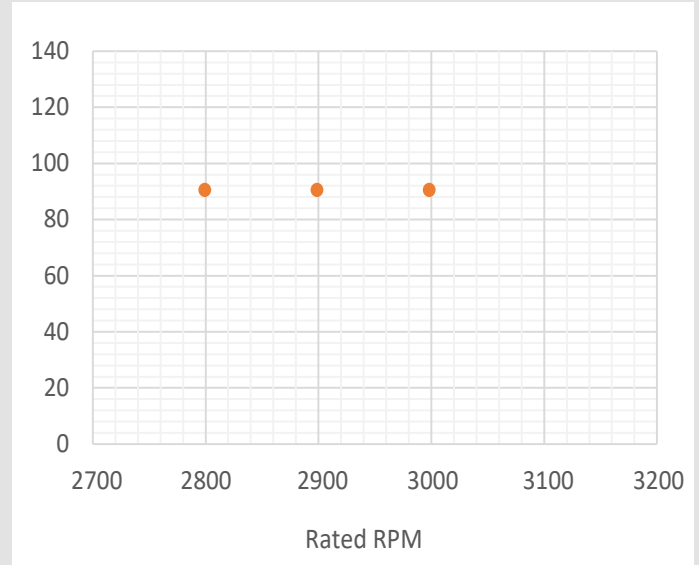
Injection Pump	In-Line Type
Feed Pump	Mechanical Type
Injection Nozzle	Multi Hole
Fuel Filter	Cartridge Type
Fuel used	ASTM D 975-96 Grade 2 or BS 2869 Class A2
Minimum Supply line Size	10mm
Minimum Return line Size	8mm
Fuel lines	High pressure pipe
Fuel Pump Solenoid	24V DC Energized to Stop

POWER CURVES FOR FIXED POINT RATED SPEED ENGINES

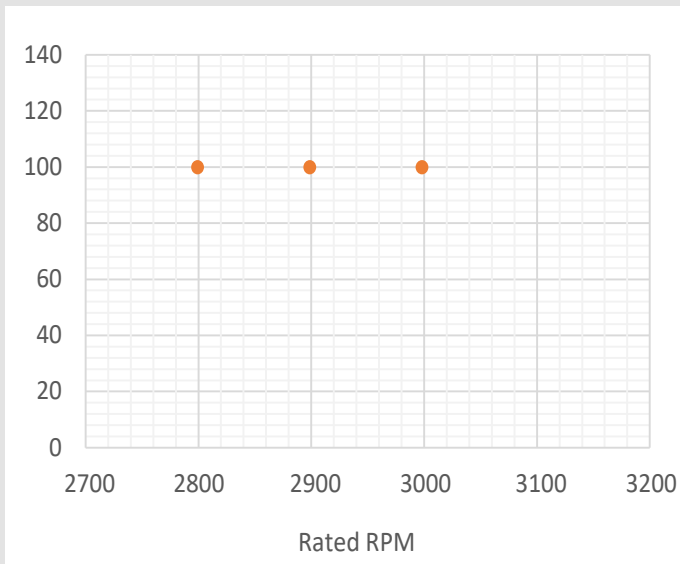
BS04080MSF



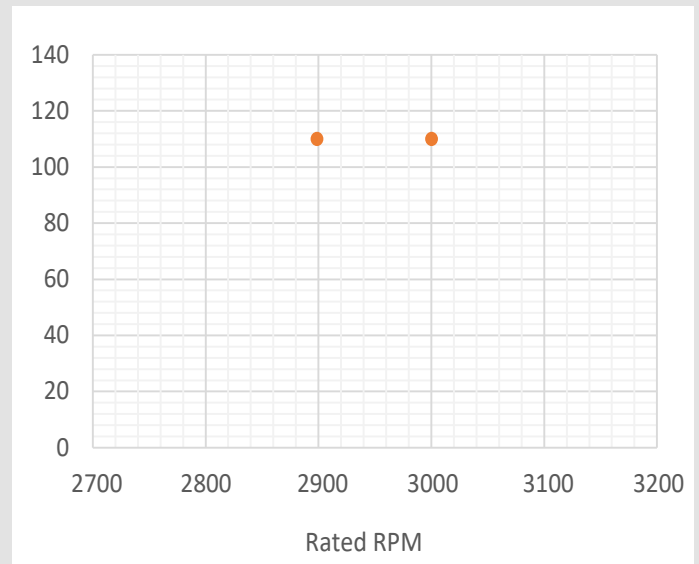
BS04090MSF



BS04100MSF

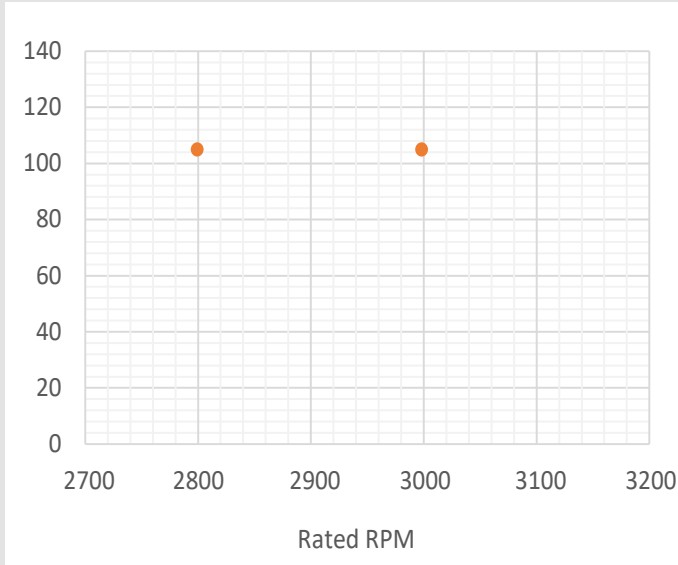


BS04110MSF

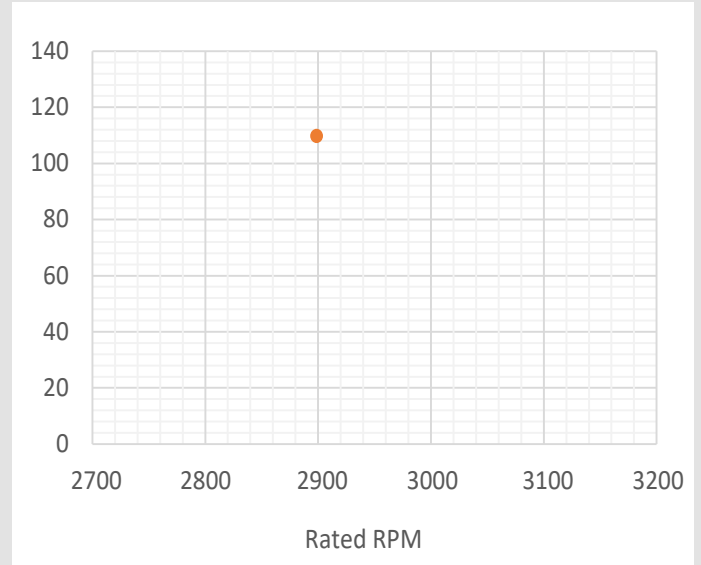


POWER CURVES FOR FIXED POINT RATED SPEED ENGINES

BS04111MSF



BS04114MSF



Cooling system

Heat exchanger	Shell and Tube
Heat Exchanger Minimum Raw Water Flow	18 GPM
Engine Water Pump	Centrifugal type driven by belt
Minimum Heat Exchanger Raw water Flow @ Inlet Temperature	Minimum 18 GPM upto water inlet Temp of 38 Deg.C
Heat Exchanger Max Water Pressure	60 Psi
Thermostat, Start to Open	76 Deg.C
Fully Opened	85 Deg.C
Heat Exchanger Inlet Port size	1"
Heat Exchanger outlet Port size	1 ½"
Cooling Loop Size Minimum	1"
Cooling Loop Maximum Working pressure	250 PSI

Electrical System

Starter motor	24V- 1 Number
Number of Batteries	4
Quantity per battery bank	2

Air Induction System

Air Filter	Drip Proof, Replaceable Type
Engine Intake Air Flow	572 CFM @ 2800 RPM 593 CFM @ 2900 RPM 613 CFM @ 3000 RPM
Air Inlet Restriction	0.67 Psi / 4.619 Kpa @ 2800 RPM 0.88 Psi / 6.067 Kpa @ 2900 RPM 0.89 Psi / 6.136 Kpa @ 3000 RPM

Lubrication System

Lubricating Method	Pressure feed Type
Oil Pump	Gear type driven by crank shaft
Oil Filter	Cartridge Type
Oil pressure Range, normal	3 to 6 bar
Oil Sump Capacity	At Low Level 5.5 Ltrs At High level 8 Ltrs
Total Engine Oil Capacity litre	8 Ltr

Exhaust System

Exhaust Gas Flow	1646 CFM @ 2800 RPM 1715 CFM @ 2900 RPM 1784 CFM @ 3000 RPM
Max. Allowable Back Pressure	0.61 Psi / 4.20 Kpa @ 2800 RPM 1.14 Psi / 7.86 Kpa @ 2900 RPM 1.02 Psi / 7.03 Kpa @ 3000 RPM
Minimum Exhaust Pipe Diameter	Kindly Visit SFFECO GLOBAL Website for Back pressure calculation page to find out the Minimum exhaust Pipe Diameter.

Heater System

Wattage (Nominal)	750 to 2000 W *
Number of heaters	1
Voltage – AC	130 to 240V *

* Factory choice


Instrumentation Panel

Control / Instrumentation panel	Mounted on the engine
Instrumentation panel	24V DC ,Tachourmeter,Oil pressure, water temperature & 2 Volt meter, Battery charger Indicator, over speed shutdown Indicator
Manual start and stop	Start : By means of toggle switch and Battery Contactor Stop: Toggle switch Provided
Overspeed control	Electronic setting on the Panel with over speed reset switch and over speed shutdown indicator indication on the panel
Cranking Switch	On instrumentation panel

Notes

- 1) Each engine is factory tested to verify power and performance.
- 2) All BLACK STALLION Certified Engines are tested in accordance with standard UL-1247 and FM-1333.
- 3) All cooling loops meets the requirement of NFPA20, UL-1247 and FM-1333.
- 4) Each cooling loops are hydro tested.
- 5) Engines are to be used for stationary emergency standby fire pump service only.
- 6) Engines are to be tested in accordance with NFPA 25
- 7) Engines are rated at standard SAE conditions of 29.61 inches Hg (752.1mm) barometer (approximately 300 feet (91.44 m) above sea level) and 25 Deg.C (77 Deg.F) . (see SAE Standard J 1349).
- 8) A deduction of 3 percent from engine horsepower rating at standard SAE Conditions shall be made for diesel engines for each 1000 ft. (305 m) altitude above 300 ft. (91.4m)
- 9) A deduction of 1 percent from engine horsepower rating as corrected to standard SAE conditions shall be made for diesel engines for every 5.6 Deg.C (10 Deg.F) above 25 Deg.C (77 Deg.F) ambient temperature.

"Specification in this datasheet subjected to change without any prior notice"

	Vendor Ref. No.	
	Contractor Ref. No.	
Project Name:	Contractor Job No.	

DIESEL DRIVEN PUMP CONTROLLER SPECS

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date

Shipping Weight & Dimensions

Starting Voltage	Wall Mount		Floor Mount	
	Approx. dimensions in inches (mm)	Approx. Weight in Lbs (kg)	Approx. dimensions in inches (mm)	Approx. Weight in Lbs (kg)
12V.DC	27 ⁵ / ₈ " h x 27 ¹ / ₈ " w x 9" d (700 x 600 x 228)	70 (32)	47 ¹ / ₈ " h x 27 ¹ / ₈ " w x 9" d (1208 x 600 x 228)	95 (43)
24V.DC				



Diesel Engine Fire Pump Controllers



Standard Features

- ViZiTouch operator interface
- NEMA 2 assembly
- Pressure and event recorder
- Battery voltage and amperage display
- Run Test push button
- HAND - OFF - AUTO selector switch
- Manual crank pushbuttons (2)
- Stop pushbutton
- Remote start / deluge valve start provision
- Pressure transducer and run test solenoid valve externally mounted
- Gland plate
- Audible alarm
- Alarm contacts for remote indication
- Weekly exercise programmable time clock
- Crank cycle
- Programmable automatic shutdown (minimum run timer)
- Programmable sequential start timer (delay start timer)



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TORNATECH

Project: _____

Customer: _____

Engineer: _____

Pump Manufacturer: _____

Technical Data Submittal Document

Model GPD

Diesel Engine Driven Fire Pump Controller



Contents:

- Data Sheets
- Dimensional Data
- Wiring Schematics
- Field Connections

Note: The drawings included in this package are for controllers covered under our standard offering. Actual AS BUILT drawings may differ from what is shown in this package.



March 2024



Standard, Listings, Approvals and Certifications	Built to NFPA 20 (latest edition)		
	Underwriters Laboratory (UL)	UL218 - Fire Pump Controllers	
	FM Global	Class 1321/1323	
	New York City	Accepted for use in the City of New York by the Department of Buildings	
	CE Mark	Various EN, IEC & CEE directives and standards	
	Built in Canada or U.A.E	Built in Europe	
	CE Mark Option	Supplied as Standard	
Enclosure	Protection Rating		
	Built in Canada or U.A.E	Built in Europe	
	Standard: NEMA 2	Standard: IP55	
	Optional		
	NEMA 12	NEMA 4X-304 sst painted	IP54
	NEMA 3	NEMA 4X-304 sst brushed finish	IP55
	NEMA 3R	NEMA 4X-316 sst painted	IP65
	NEMA 4	NEMA 4X-316 sst brushed finish	IP66
	Accessories • Bottom entry gland plate • Lifting Lugs • Keylock handle	Paint Specifications • Red RAL3002 • Powder coating • Glossy textured finish	
	Ambient Temperature Rating	Standard 4°C to 40°C / 39°F to 104°F	
Optional 4°C to 55°C / 39°F to 131°F Controllers built in Dubai, UAE (Tornatech FZE) are supplied standard with 55°C rating.			





General	AC	120V / 1ph / 60hz 208V to 240V / 1ph / 50-60hz
	DC	12VDC 24VDC
	Grounding system	• Negative
	Battery chargers	• Two independent fully automatic • 10A continuous charge • 500mA trickle charge
Electrical Reading	<ul style="list-style-type: none"> • Battery 1 & Battery 2 voltage • Battery 1 & Battery 2 charging amperage • Charging mode 	
Pressure Reading	<ul style="list-style-type: none"> • Continuous system pressure display • Cut-in and cut-out pressure setting 	
Pressure and Event Recorder	<ul style="list-style-type: none"> • Pressure readings with date stamp • Event recording with date stamp • Under regular maintained operation, events are stored in memory for the life of the controller. • Data viewable on operator interface display screen • Downloadable by USB port to external memory device 	



Pressure sensing	<ul style="list-style-type: none"> • Pressure transducer and run test solenoid valve assembly for fresh water application • Pressure sensing connection 1/2" Female NPT • Drain connection 3/8" • Rated and calibrated for 0-500psi working pressure • Externally mounted with protective cover
Audible Alarm	Alarm buzzer - 85dB at 3 meters
Visual Indications	<ul style="list-style-type: none"> • Engine run • Main switch AUTO • Main switch in OFF • Main switch in HAND • Periodic test • Cranking Cycle • AC Power available • Pump room temperature (°F or °C)
Visual & Audible Alarms	<p>Visual only</p> <ul style="list-style-type: none"> • Pump room trouble • Pump on demand • AC Failure • Charger 1 & 2 Failure • Weak battery 1 & 2 • Battery 1 & 2 overvoltage • Loss of continuity 1 & 2 • High fuel level • Fuel tank leak • PLD low suction pressure • High raw water temperature • Low pump room temperature • Service required • ECM warning • Weekly test cut-in not reached • Check weekly test solenoid • Pressure transducer fault • Invalid Cut-In <p>Visual and Audible</p> <ul style="list-style-type: none"> • Engine trouble • Controller trouble • Engine low oil pressure • Engine high temperature • Engine low temperature • Engine overspeed • DC Failure • Battery 1 & 2 Failure • Engine fail to start • Low fuel level • ECM fault • ECM SS in Alternate Position • Fuel injection malfunction
Remote Alarm Contacts	<p>DPDT-8A-250V.AC</p> <ul style="list-style-type: none"> • Engine run • Common controller trouble <ul style="list-style-type: none"> • Charger #1 & Charger #2 failure • Pressure transducer fault • Common engine trouble <ul style="list-style-type: none"> • High engine temperature • Fail to start • Fuel injection malfunction** • ECM selector switch in alternate position*** • Battery #1 & battery #2 failure • DC failure • Loss of continuity (starter) #1 and/or #2 • PLD low suction pressure • Overspeed • Fail when running • Low oil pressure • Common pump room trouble (field re-assignable)* <ul style="list-style-type: none"> • Low fuel level • High fuel level • Fuel tank leak • Low pump room temperature • High pump room temperature • AC Failure • H-O-A selector switch in OFF or HAND • Free (field programmable)*

*Except if option C13 is ordered. Tornatech reserves the right to use any of these four alarm points for special specific application requirements

**Applicable to electronic engines only.

*** Applicable to electronic engines only. Alarms when ECM selector switch on the engine is in alternate mode.



Terminals for Field Connections for External Devices	<ul style="list-style-type: none"> • Low fuel level • Remote AUTOMATIC start • Water reservoir low (re-assignable) • Fuel tank leak (re-assignable) • High fuel level (re-assignable) 		
ViZiTouch V2.1 Operator Interface	<ul style="list-style-type: none"> • Embedded microcomputer with software PLC logic • 7.0" color touch screen (HMI technology) • Upgradable software • Multi-language 		
Operation	Selector Switch	<ul style="list-style-type: none"> • Hand-Off-Auto • Behind lockable and breakable cover 	
	Automatic Start	<ul style="list-style-type: none"> • Start on pressure drop • Remote start signal from automatic device 	
	Manual Start	<ul style="list-style-type: none"> • Crank 1 and Crank 2 start pushbuttons • Run test pushbutton 	
	Crank Cycle	<ul style="list-style-type: none"> • 6 consecutive cycle attempts <ul style="list-style-type: none"> • 3 X 15s crank from battery 1 or 2 alternatively • 15s rest in between each crank attempt 	
	Stopping	<ul style="list-style-type: none"> • Manual with Stop pushbutton • Automatic after expiration of minimum run timer **** 	
	Timers	Field Adjustable & Visual Countdown	<ul style="list-style-type: none"> • Minimum run timer ****(off delay) • Sequential start timer (on delay) • Periodic test timer
	Actuation	Visual Indication	<ul style="list-style-type: none"> • Pressure • Non-pressure
	Mode		<ul style="list-style-type: none"> • Automatic • Non-automatic
Communication Protocol Capability	<ul style="list-style-type: none"> • Protocol: Modbus • Connection type: Shielded female connector RJ45 • Frame Format: TCP/IP • Addresses: See bulletin MOD-GPD 		

Alarm and shutdown schedule		Automatic Start	Manual or Remote Start	Run Test or Periodic Test
	High Coolant	Alarm only	Alarm only	Shutdown
	Low Oil Pressure	Alarm only	Alarm only	Shutdown
	Overspeed	Shutdown	Shutdown	Shutdown

	Wall Mount		Floor Mount	
Starting Voltage	Approx. shipping dimensions in inches (mm)	Approx. Shipping Weight in Lbs (kg)	Approx. shipping dimensions in inches (mm)	Approx. Shipping Weight in Lbs (kg)
12V.DC	32" l x 29" w x 16" h (813 x 737 x 407)	85 (39)	32" l x 29" w x 26" h (813 x 737 x 661)	115 (52)
24V.DC				

**** Automatic shutdown shall be approved by the AHJ.



A1	Periodic test alarm contact (DPDT)
A2	Overspeed alarm contact (DPDT)
A3	Low oil pressure alarm contact (DPDT)
A4	High coolant temperature alarm contact (DPDT)
A5	Failure to start alarm contacts alarm contact (DPDT)
A6	Battery 1 & 2 failure alarm contact (2 x DPDT)
A7	Charger 1 & 2 failure alarm contact (2 x DPDT)
A8	AC failure alarm contact (DPDT)
A9	System overpressure alarm contact (For engines with PLD) (DPDT)
A11	Extra controller trouble alarm contact (DPDT)
A12	Extra engine trouble alarm contact (DPDT)
Ax	Additional engine alarm contact (DPDT) (specify function)
B1	Low fuel level alarm contact (DPDT)
B2	Water reservoir level low alarm contact (DPDT)
B3	Water reservoir empty alarm contact (DPDT)
B4	Low pump room temperature alarm contact (DPDT)
B5	High fuel level alarm contact (DPDT)
B6	Low system (discharge) pressure alarm contact (DPDT)
B7	Low suction pressure alarm contact (DPDT)
B8	Pump on demand alarm contact (DPDT)
B9	Fuel tank leak alarm contact (DPDT)
B10	Main relief valve open alarm contact (DPDT)
B11	Flow meter loop valve open alarm contact (DPDT)
B12	Water reservoir level high alarm contact (DPDT)
B13	High pump room temperature alarm contact (DPDT)
Bx	Additional pump room alarm contact (DPDT) (specify function)
C5	CE Mark with factory certificate
C6	Nickel – cadmium battery chargers (Battery data sheet required)
C7	Engine block heater circuit - 3KW max (same voltage as battery charger primary)

C7A	Engine block heater circuit - 6KW max (same voltage as battery charger primary) Confirm power rating of block heater
C9	Non pressure actuated controller w/o pressure transducer and run test solenoid valve
C13	Louver activation circuit (battery power specific)
C14	Delayed automatic start on AC power failure (factory set at 15 minutes)
C15	Low zone pump control function
C16	Middle zone pump control function
C17	High zone pump control function
C19	Lockout/interlock circuit from equipment installed inside the pump room
D4	Pressure transducer and run test solenoid valve for fresh water rated for 0-500psi (for factory calibration purposes only)
D6	Pressure transducer and run test solenoid valve for sea water rated for 0-500PSI
D7A	Low fuel level float switch supplied as separate item (1-1/4")
D7B	Low fuel level float switch supplied as separate item (1-1/2")
D8A	High fuel level float switch supplied as separate item (1-1/4")
D8B	High fuel level float switch supplied as separate item (1-1/2")
D9A	Anti-condensation heater & thermostat
D9B	Anti-condensation heater & humidistat
D9C	Anti-condensation heater & thermostat & humidistat
D11	Low suction pressure transducer for fresh water rated at 0-300PSI with visual indication and alarm contact
D11A	Low suction pressure transducer for sea water rated at 0-300PSI with visual indication and alarm contact
D12	Tropicalization
D25	Mounting stand
D25A	Mounting stand SST- 304 painted
D25B	Mounting stand SST- 304 brushed finish
D25C	Mounting stand SST- 316 painted
D25D	Mounting stand SST- 316 brushed finish
D26	Combined low and high fuel level float switch (1-1/4")

Note: Options chosen from this page are not electrically represented on the wiring schematics in this submittal package.



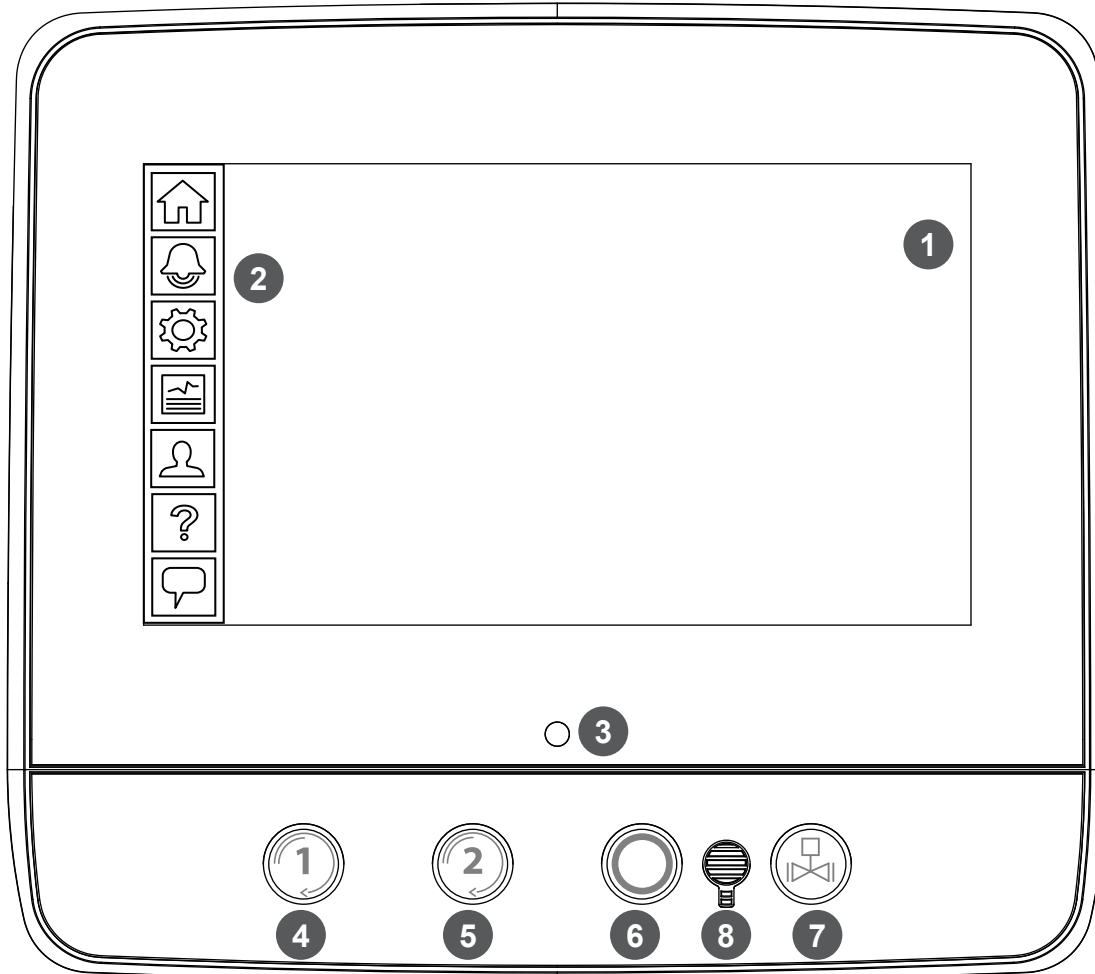
D26A	Combined low and high fuel level float switch (1-1/2")
D27	Fuel level probe (2") Level indication
D28A	Field programmable I/O board - 5 Input / 5 output
D30	Redundant pressure transducer for fresh water rated for 0-500PSI
D31	Redundant pressure transducer for sea water rated for 0-500PSI
D32	Modbus with RTU frame format and RS485 connection
D35	Seismic Certification compliant to CBC 2019, IBC 2018 rigid base/wall mounted only
D38	Special Seismic Certification compliant to OSHPD rigid base/wall mounted only

L01	Other language and English (bilingual)
L02	French
L03	Spanish
L04	German
L05	Italian
L06	Polish
L07	Romanian
L08	Hungarian
L09	Slovak
L10	Croatian
L11	Czech
L12	Portuguese
L13	Dutch
L14	Russian
L15	Turkish
L16	Swedish
L17	Bulgarian
L18	Thai
L19	Indonesian
L20	Slovenian
L21	Danish
L22	Greek
L23	Arabic
L24	Hebrew
L25	Chinese

Additional Options:

Note: Options chosen from this page are not electrically represented on the wiring schematics in this submittal package.

ViZiTouch V2.1 Operator Interface



- | | |
|------------------------|--------------------------|
| 1 - Color touch screen | 3 - Power LED (3 colors) |
| 2 - Onscreen menu | 4 - CRANK 1 button |
| • HOME page | 5 - CRANK 2 button |
| • ALARM page | 6 - STOP button |
| • CONFIGURATION page | 7 - RUN TEST button |
| • HISTORY page | 8 - Alarm buzzer |
| • SERVICE page | |
| • MANUAL page | |
| • LANGUAGES page | |



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	BY	DD/MM/YY
DRAWN BY	ACD	28/02/23
FINAL APPROVAL	FC	28/02/23

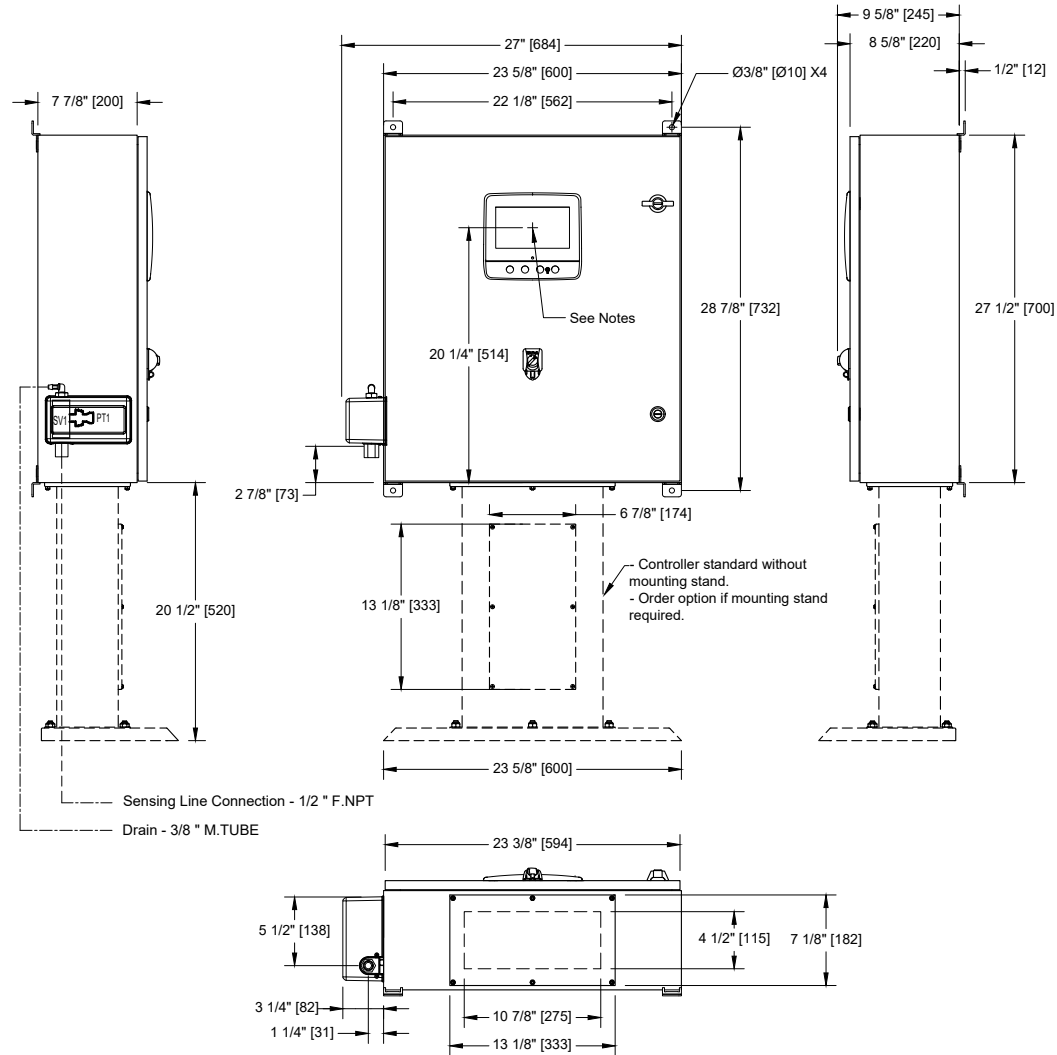
DIESEL ENGINE FIRE PUMP CONTROLLER 12VDC OR 24VDC NEGATIVE GROUND

MODEL: GPD

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70



DRAWING NUMBER	GPD-DI800/E
DWG REV. 0	
SHEET 1 OF 1	



- Notes:**
- Standard: NEMA 2
 - Standard paint : textured red RAL 3002.
 - All dimensions are in inches [millimeters].
 - Center of screen: 20-1/4" [514] from bottom (no feet).
 - Bottom conduit entrance through removable gland plate recommended.
 - Use watertight conduit and connector only.
 - Protect equipment against drilling chips.
 - Door swing equal to door width.



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DIESEL ENGINE FIRE PUMP CONTROLLER

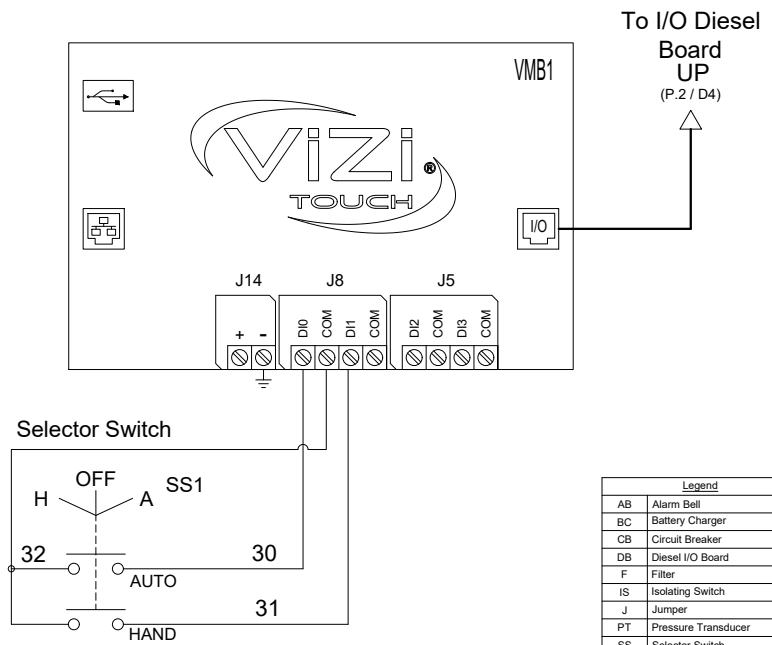
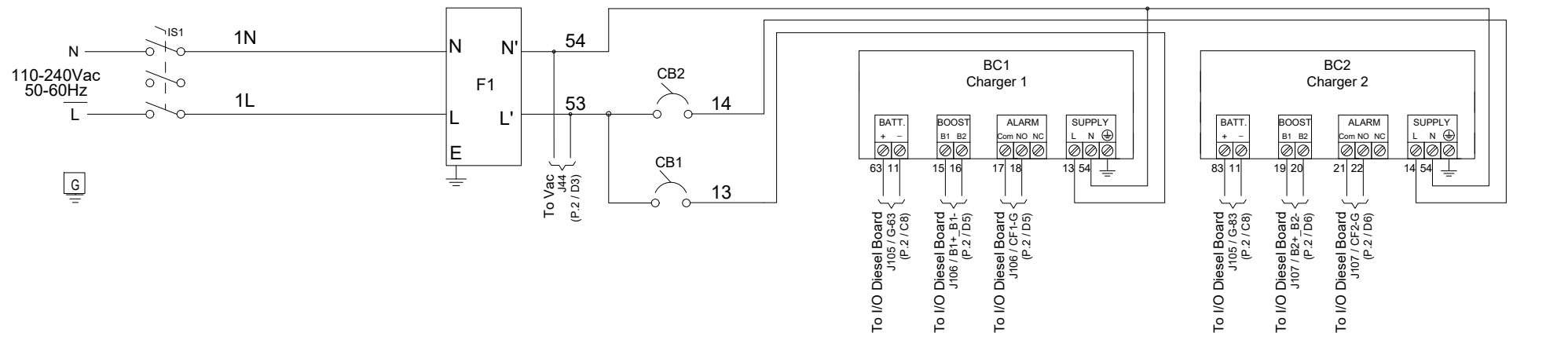
12VDC OR 24VDC NEGATIVE GROUND

MODEL: GPD

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70



DRAWING NUMBER	GPD-WS800/E
DWG REV. 0	
SHEET 1 OF 2	



Legend	
AB	Alarm Bell
BC	Battery Charger
CB	Circuit Breaker
DB	Diesel I/O Board
F	Filter
IS	Isolating Switch
J	Jumper
PT	Pressure Transducer
SS	Selector Switch
SV	Solenoid Valve
VMB	Main Board



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DIESEL ENGINE FIRE PUMP CONTROLLER 12VDC OR 24VDC NEGATIVE GROUND

MODEL: GPD

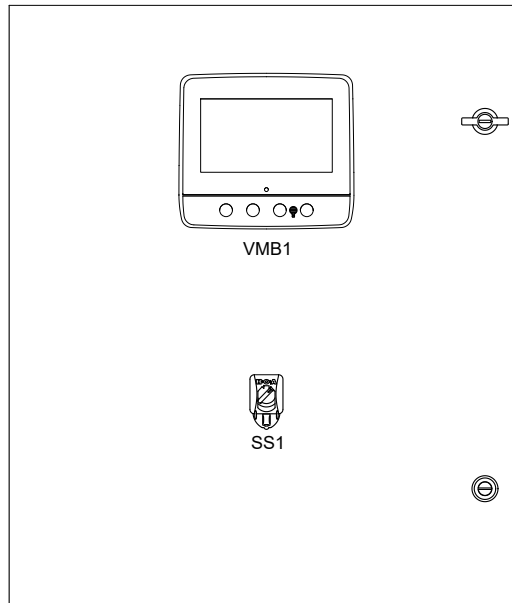
BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70



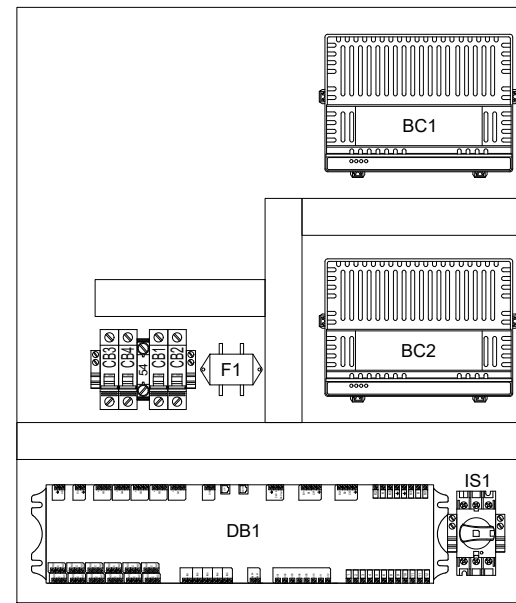
THIRD ANGLE
PROJECTION

DRAWING NUMBER	GPD-LY800/E
DWG REV. 0	
SHEET 1 OF 1	

Designation	Description
BC1-BC2	Battery Charger #1 and #2
CB1-2	Magnetic Breaker 1 Pole 10 A
CB3-4	Magnetic Breaker 1 Pole 16 A
DB1	I/O Diesel Board
F1	Filter
IS1	Isolating Switch
SS1	Lockable 3 Position Selector Switch
VMB1	Main Board



Front Door Layout



Internal Layout



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BY		DD/MM/YY	
DRAWN BY	ACD	28/02/23	
FINAL APPROVAL	FC	28/02/23	

DIESEL ENGINE FIRE PUMP CONTROLLER 12VDC OR 24VDC NEGATIVE GROUND

MODEL: GPD

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

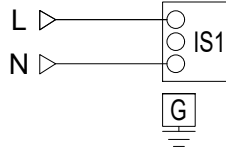


DRAWING NUMBER
GPD-TD800/E
DWG REV. 0
SHEET 1 OF 1

Power Supply

Terminals Wire Size:
14 - 6 AWG
1.8-2 Nm

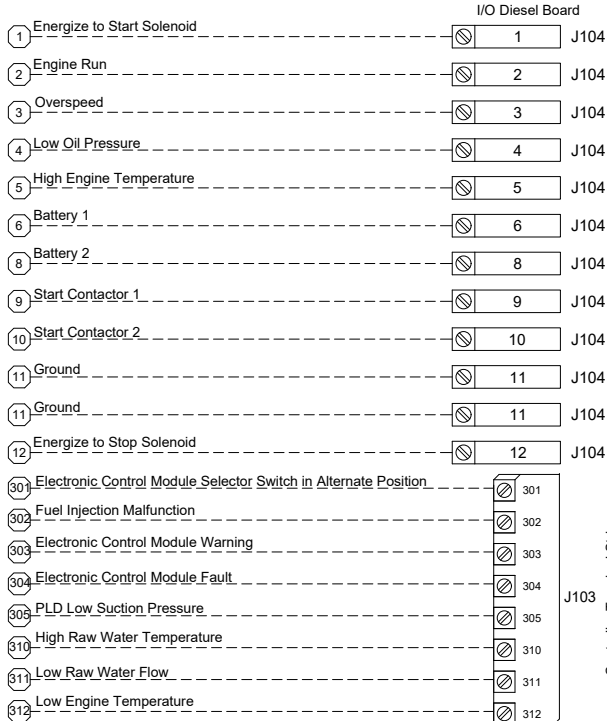
110-240Vac
50-60Hz



Engine Connections

All wiring between the controller and diesel engine shall be stranded (NFPA20)
Wiring between controller and engine (terminals 301, 302, 303, 304, 305, 310, 311, 312, 2, 3, 4, 5) must be #14AWG as minimum.
Wiring between controller and engine (terminals 12 [rated at 10A or 22A for 20 seconds] 1, 9, 10 [rated at 10A]) must be stranded #10AWG as minimum.
Wiring between controller and engine (terminals 6, 8, 11 [rated at 30A]) must be stranded and sized according to distance.

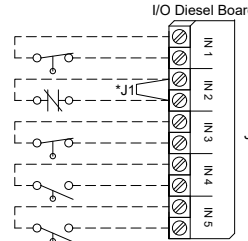
0-5' (0-1.5m) - 12 AWG (4 mm2)
6-10' (1.8-3m) - 10 AWG (6 mm2)
11-15' (3.3-4.5m) - 8 AWG (10 mm2)
16-20' (4.8-6m) - 2x10 AWG (2x6 mm2)
21-32' (6.4-9.75m) - 2x8 AWG (2x10 mm2)



Field Connections

Terminals Wire Size:
24 - 12 AWG
0.5 Nm

- Low Fuel Level
- Remote Auto Start
- Water Reservoir Low
- Fuel Tank Leak
- High Fuel Level



Network Connections

Terminals Wire Size:
Shielded Female Connector RJ45

Modbus TCP/IP

Located on Main Board



Alarm Contacts

Terminals Wire Size:
24 - 12 AWG
0.5 Nm



* Remove this jumper to use this feature

** Re-assignable



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	BY	DD/MM/YY
DRAWN BY	ACD	28/02/23
FINAL APPROVAL	FC	28/02/23

DIESEL ENGINE FIRE PUMP CONTROLLER 12VDC OR 24VDC NEGATIVE GROUND

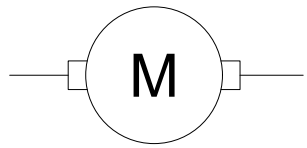
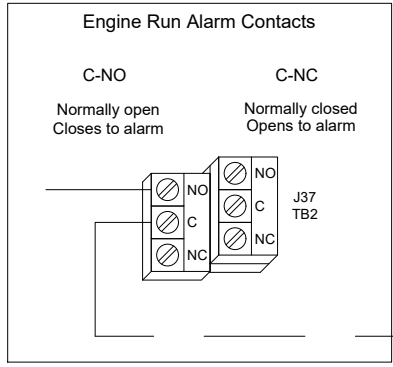
MODEL: GPD

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

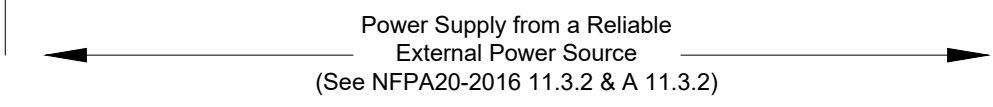



DRAWING NUMBER	GPD-TD801/E
DWG REV.	0
SHEET	1 OF 1

Located in Controller



Louvers Motor



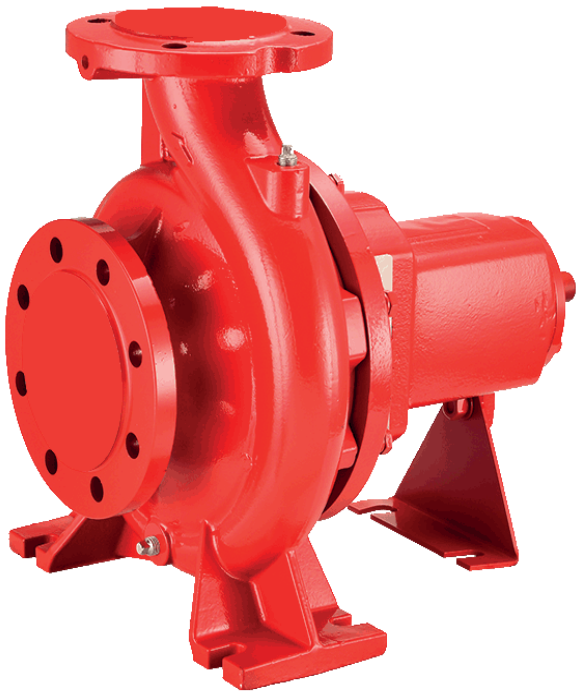
	Vendor Ref. No.	
	Contractor Ref. No.	
Project Name:	Contractor Job No.	

**ELECTRIC MOTOR DRIVEN PUMP
SPECIFICATIONS**

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date

END SUCTION FIRE PUMP

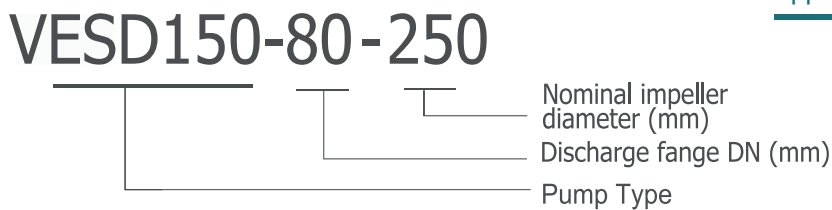
END SUCTION FIRE PUMP



Technical Specifications	
Suction fange	1.5-6 Inch
Discharge fange	2.5-4 inch
Flow	50-1000 GPM
Discharge pressure	84-230PSI

Material Specifications	
Casing	Ductile Iron
Impeller	Bronze or stainless steel
Shaft	ATSM420
Sealing	Gland packing
Bearing Housing	Rolling bearing
Suction/discharge fanges	ANSI

Pump Naming



Product Standard

UL 448, NFPA

Product Approvals



Flange Standards

Pump Installing Dimensions are confirming to ISO2858 Standard, and Tested according to with UL 448 -2013

Driver Options



Electrical



Diesel

Application Areas



Hydrant



Sprinkler



Overflow



Foam

Risk Class



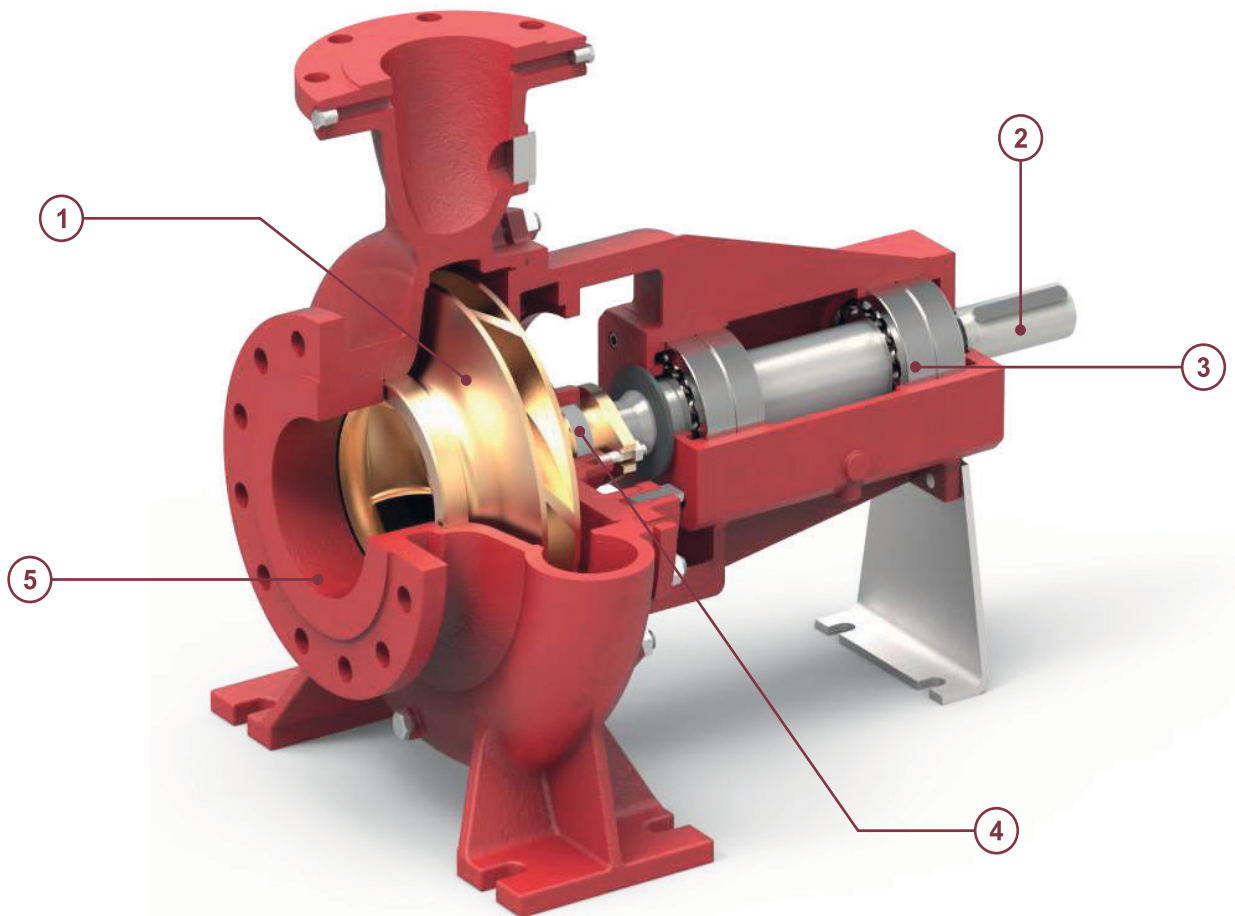
Ordinary



High

END SUCTION FIRE PUMP

General Pump Features



END SUCTION FIRE PUMP

1 - Impeller & Casing

- Impeller is dynamically balanced to grade G6.3 balance quality in accordance to ISO 1940-1.
- Impeller & Casing are designed using state of art CFD tools to ensure optimal performance.

2 - Shaft

- Heavy duty stainless steel shaft completely sealed and dry for zero corrosion available upon request.
- Short and rigid with negligible vibrations.
- Replaceable shaft protecting sleeves.
- No threads exposed to pump medium, long operating life and no corrosion.
- Adjustment-free assembly.

3 - Bearing

- Heavy duty and permanently grease lubricated antifriction bearings for long service life.
- Open gland, enough space for service activities.

4 - Seal

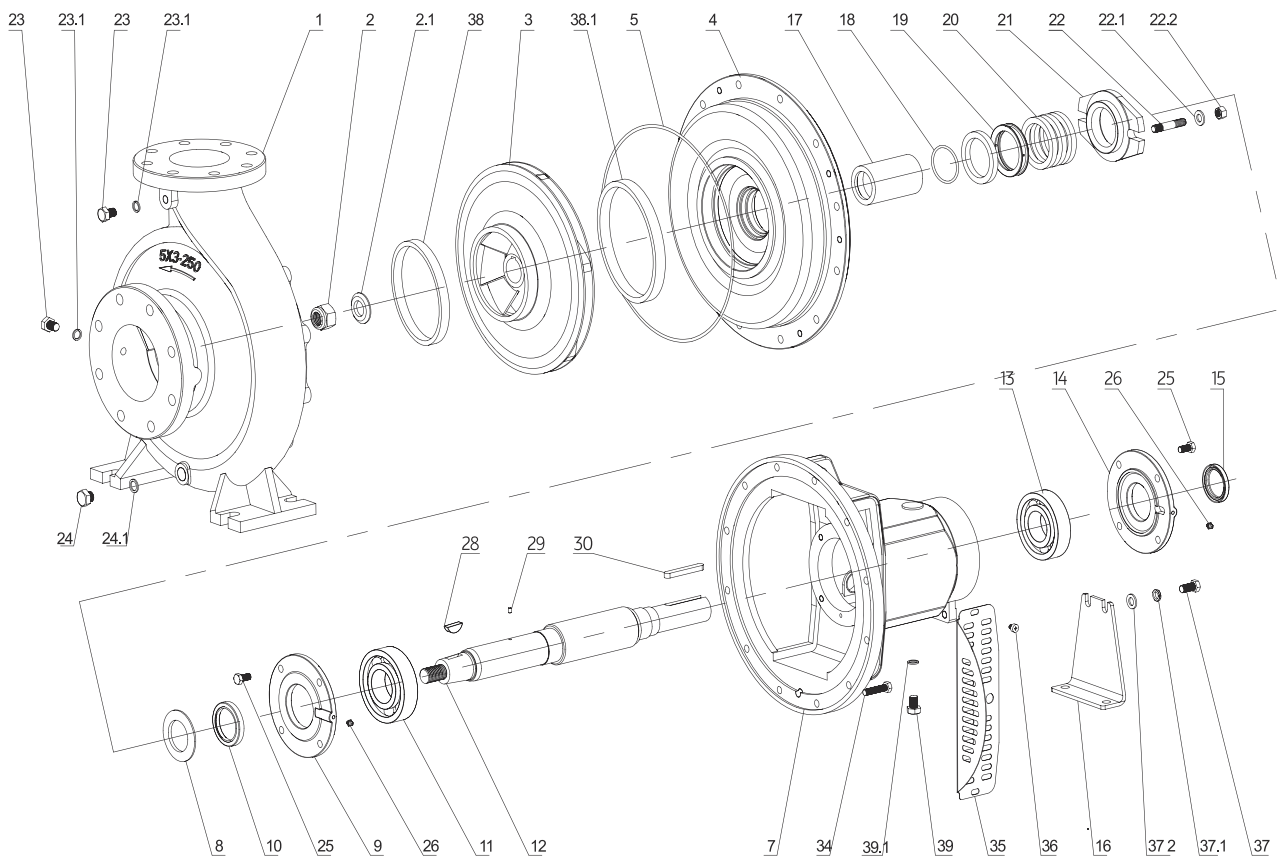
- Asbestos - free, soft packed stuffing boxes.

5 - Casing

- End Suction backpullout design permits maintenance of the pump without removing the pipes.
- Rugged Ball Bearings on Drive as well as Non Drive end.
- Flange drilled as per ANSI B16.1 class 250.
- Smooth surface inside & CED coated for superior corrosion protection.
- Replaceable wear ring protect the casing and the impeller running clearances.
- Heavy duty casing design for high working pressure.

END SUCTION FIRE PUMP

VES Series - Exploded View & Part list

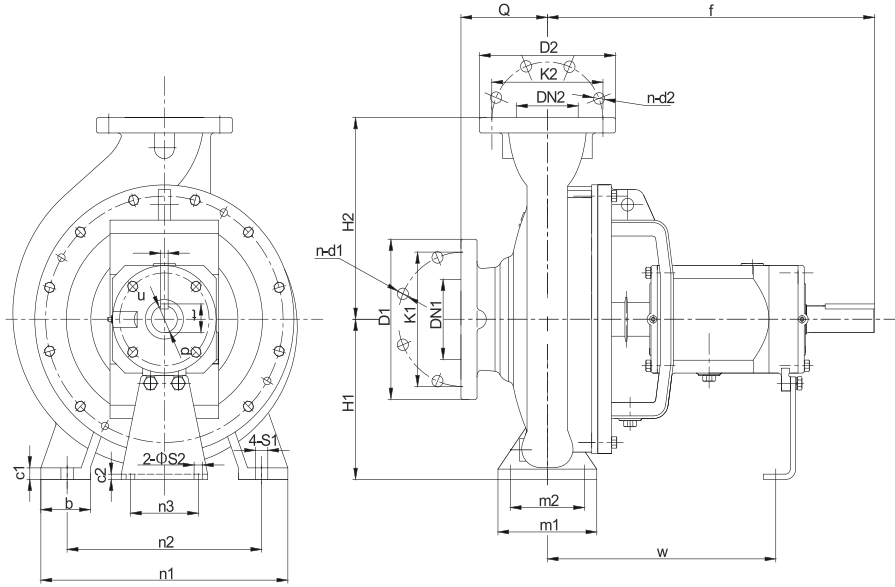


END SUCTION FIRE PUMP

Code	Part Name	Code	Part Name	Code	Part Name
1	Casing	16	Support Foot	26	Oil Cup M6
2	Impeller Nut	17	Packing Sleeve	28	key
2.1	Lock washer for impeller	18	O-ring	29	pin
3	Impeller	19	Gland Packing	30	key
4	Gland Cover	20	Packing Seal Cage	34	Screw Bolt
5	O-ring	21	Gland Cover	35	Protective cover
7	Bearing Housing	22	Stud Bolt	36	Bolt
8	Rubber Slinger	22.1	Flat Washer	37	Screw Bolt
9	NDE Bearing Cover	22.2	Screw Nut	37.1	Elastic Washer
10	NDE Oil Seal	23	Plug	37.2	Flat Washer
11	NDE Bearing	23.1	Plug Spacer	38	Front-Wearing
12	Shaft	24	Plug	38.1	Back-Wearing
13	DE Bearing	24.1	Plug Spacer	39	Plug
14	DE Bearing Cover	25	Screw Bolt	39.1	Plug Spacer
15	DE Oil Seal				

END SUCTION FIRE PUMP

VES SERIES INSTALLATION DIMENSION



END SUCTION FIRE PUMP

Model	DN1		DN2		Impeller Dia.	Shaft No.	a	f	h1	h2	b	m1	m2	n1	n2	n3	c1	c2	w	S1	S2	d	t	u	l	Weight (kg)
	inch	mm	inch	mm																						
40-250	2.5"	65	1.5"	40	250	2	100	500	180	225	65	125	95	320	250	110	14	6	370	M12	M12	32	35	10	80	71
50-250	3"	80	2"	50	250	2	125	500	180	225	65	125	95	320	250	110	15	6	370	M12	M12	32	35	10	80	76
65-250	4"	100	2.5"	65	250	2	125	500	200	250	80	160	120	360	280	110	16	6	370	M16	M12	32	35	10	80	84
80-250	5"	125	3"	80	250	2	125	500	225	280	80	160	120	400	315	110	18	6	370	M16	M12	32	35	10	80	88
80-315	5"	125	3"	80	315	3	125	530	250	315	80	160	120	400	315	110	20	8	370	M16	M12	42	45	12	110	130
100-315	5"	125	4"	100	315	3	140	530	250	315	80	160	120	400	315	110	19	8	370	M16	M12	42	45	12	110	138
100-250	5"	125	4"	100	315	3	140	530	250	315	80	160	120	400	315	110	19	8	370	M16	M12	42	45	12	110	138
100-200	5"	125	4"	100	315	3	140	530	250	315	80	160	120	400	315	110	19	8	370	M16	M12	42	45	12	110	138
80-200	5"	125	3"	80	315	3	125	530	250	315	80	160	120	400	315	110	20	8	370	M16	M12	42	45	12	110	130
150-100-200	6"	150	4"	100	200	3	125	530	250	315	80	160	120	400	315	110	20	8	370	M16	M12	42	45	12	110	130
150-100-315	6"	150	4"	100	315	3	125	530	250	315	80	160	120	400	315	110	20	8	370	M16	M12	42	45	12	110	130

	Flange standard : ASTM B16.42-1998 Class150					Flange standard : ASTM B16.42-1998 Class300				
DN1/DN2	1.5"	2"	2.5"	3"	4"	5"	3"	4"	5"	
D1/D2	127	152.4	177.8	190.5	228.6	254	209.6	254	279.4	
K1/K2	98.6	120.7	139.7	152.4	190.5	215.9	168.1	200.2	234.9	
n-d1/ n-d2	4-φ15.7	4-φ19.1	4-φ19.1	4-φ19.1	8-φ19.1	8-φ22.4	8-φ22.4	8-φ22.4	8-φ22.4	

FIRE PUMP SKIDS

MENA MECH IND CO is an established well reputed manufacturer of Premium Custom Engine Driven Centrifugal Fire Pump Skids. We specialized in designing and developing packages in compliance to NFPA 20 requirements with Listed & Approved Drivers.

MENA offers listed Centrifugal Fire Pump Skids that meet every fire protection need.

- Driven by Listed & Approved Diesel Engines or Electric Motors.
- Well aligned and Coupled for Direct Operation.
- Skid Packages are Pre-Tested and Inspected thoroughly before release to customers.
- One piece base plate with Anchor Bolt holes.
- Engineered, coated, hot rolled mild steel to resist corrosion and abrasion.
- Heavy Fabricated C-Channel Structure constructed to provide proper alignment of Pump with Diesel Engine or Pump with Motor.
- Compact skid Design with Small Foot-Print for Retrofit.
- High standard of Quality in material Construction finish and Workmanship.

DIESEL DRIVEN SKIDS

MENA maintains its standard with using it's proudly own listed & approved Black Stallion Diesel Engines and Centrifugal Fire Pumps to package Heavy Duty and High Quality Compact Skids.

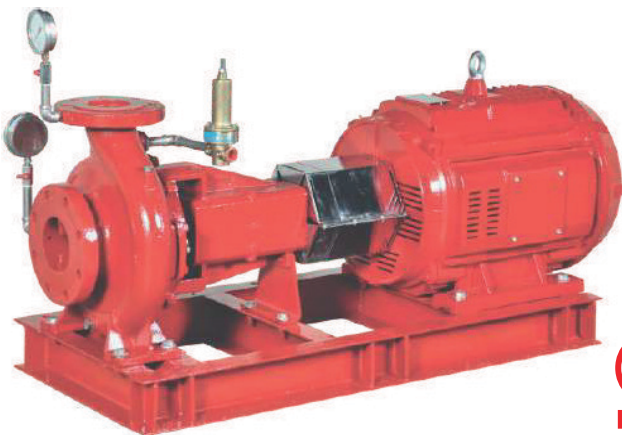
Our Listed and Approved Fire Pumps can also be coupled with any other Listed Diesel Engine of any specific brand as per customers requirement.



MOTOR DRIVEN SKIDS

MENA maintains its standard with using WEG which is High Efficiency Fire Pump Motors with our own Listed and Approved Centrifugal Fire Pumps to package Heavy Duty and High Quality Compact Skids.

Our Listed and Approved Fire Pumps can also be coupled with any other Listed Fire Pump Motors of any specific brand as per client requirement.




END SUCTION -RANGE

APPROVED UL LISTING RANGE

LISTING RANGE

Rated Capacity, US GPM	Size, In.	Model	Pressure Rating, psi	Approx Speed RPM	Maximum Working Pressure Psi
50	2.5x1.5	VES 40-250	101 - 142	2900	200
50	2.5x1.5	VES 40-250	144 - 207	3500	290
100	2.5x1.5	VES 40-250	97 - 140	2900	200
100	2.5x1.5	VES 40-250	140 - 203	3500	290
150	2.5x1.5	VES 40-250	87 - 131	2900	200
150	2.5x1.5	VES 40-250	133 - 196	3500	290
150	3x2	VES 50-250	104 - 147	2980	225
150	3x2	VES 50-250	144 - 202	3500	290
200	3x2	VES 50-250	101 - 145	2980	225
200	3x2	VES 50-250	140 - 200	3500	290
250	3x2	VES 50-250	97 - 140	2980	225
250	3x2	VES 50-250	136 - 196	3500	290
250	4x2.5	VES 65-250	91 - 143	2900	225
250	4x2.5	VES 65-250	131 - 207	3500	290
300	4x2.5	VES 65-250	89 - 142	2900	225
300	4x2.5	VES 65-250	130 - 206	3500	290
400	4x2.5	VES 65-250	82 - 137	2900	225
400	4x2.5	VES 65-250	125 - 203	3500	290
400	5x3	VES 80-200	89 - 141	3500	225
400	5x3	VES 80-250	88 - 140	2900	225
400	5x3	VES 80-250	128 - 207	3500	290
450	5x3	VES 80-200	86 - 139	3500	225
450	5x3	VES 80-250	86 - 140	2900	225
450	5x3	VES 80-250	127 - 206	3500	290
450	5x3	VES 80-315	131 - 207	2900	290
450	5x4	VES 100-200	88 - 143	3500	225
450	5x4	VES 100-250	83 - 135	2900	290
450	5x4	VES 100-250	123 - 198	3500	290
450	5x4	VES 100-315	133 - 210	2900	290
450	5x4	VES 100-315	140 - 222	2980	290
500	5x3	VES 80-200	83 - 136	3500	225
500	5x3	VES 80-250	84 - 139	2900	225
500	5x3	VES 80-250	125 - 205	3500	290
500	5x3	VES 80-315	127 - 204	2900	290
500	5x4	VES 100-200	88 - 141	3500	225
500	5x4	VES 100-250	83 - 134	2900	290
500	5x4	VES 100-250	122 - 198	3500	290
500	5x4	VES 100-315	132 - 209	2900	290
500	5x4	VES 100-315	139 - 221	2980	290
500	6x4	VESD 150-100-200	116 - 142	3500	225
500	6x4	VESD 150-100-315	119 - 192	2900	250
750	5x4	VES 100-200	82 - 138	3500	225
750	5x4	VES 100-250	74 - 128	2900	290
750	5x4	VES 100-250	115 - 191	3500	290
750	5x4	VES 100-315	125 - 202	2900	290
750	5x4	VES 100-315	133 - 214	2980	290
750	6x4	VESD 150-100-200	112 - 137	3500	225
750	6x4	VESD 150-100-315	113 - 186	2900	250
1000	6x4	VESD 150-100-200	99 - 128	3500	225
1000	6x4	VESD 150-100-315	101 - 173	2900	250



	Vendor Ref. No.	
	Contractor Ref. No.	
Project Name:	Contractor Job No.	

**ELECTRIC PUMP
ELECTRIC MOTOR SPECS**

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date

ECHTOP[®]

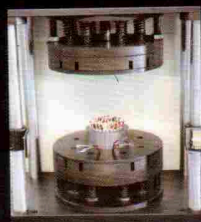
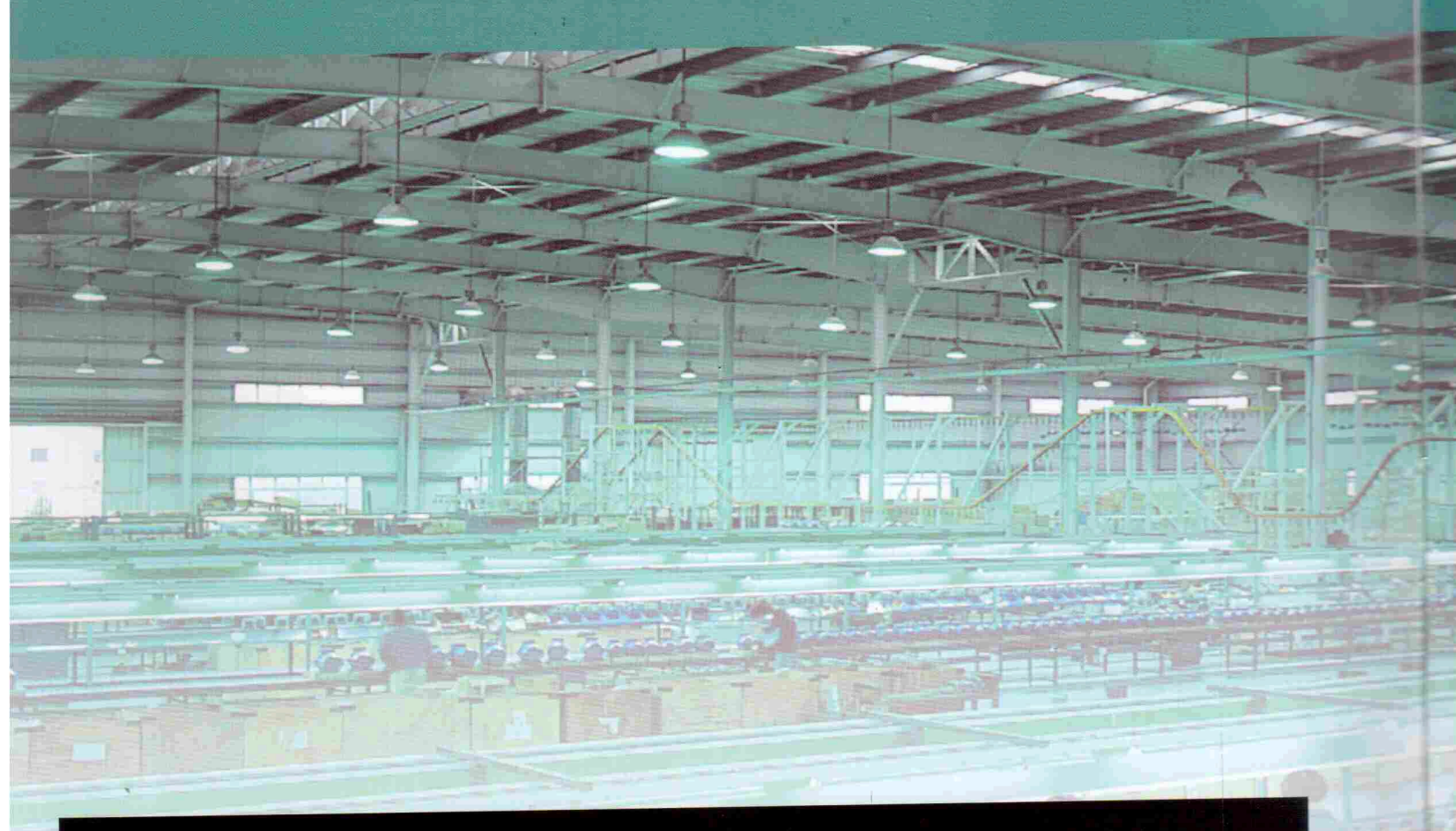
MOTOR

New! Fire Pump Motor Ready

SHANGHAI TOP MOTOR CO.,LTD.

SHANGHAI HALOTOP IMPORT & EXPORT CO., LTD.
GLOBAL POWER ENGINEERING CO. LTD.

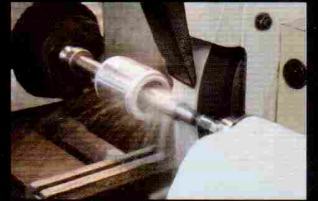
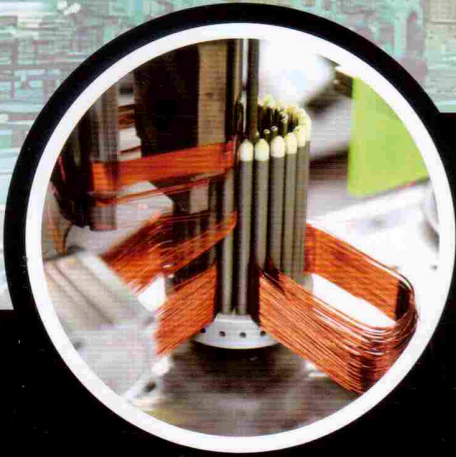




WORKSHOP & TECHNOLOGY

TECHTOP adopts computerized machine tools for metal parts; four cylinder oil hydraulic presses for stator stacking; vacuum high-pressure varnishing units for stator varnishing; clean-dry and auto-phosphorescing machines for motor housing, end shield, fan cover and other parts; electrostatic spraying-water screen-suspending line complexes for product surface painting.

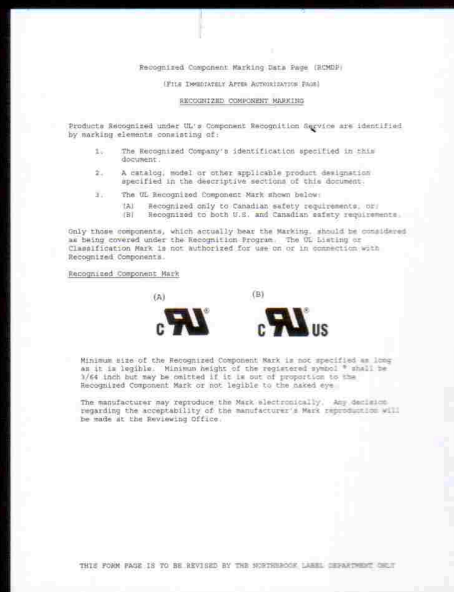
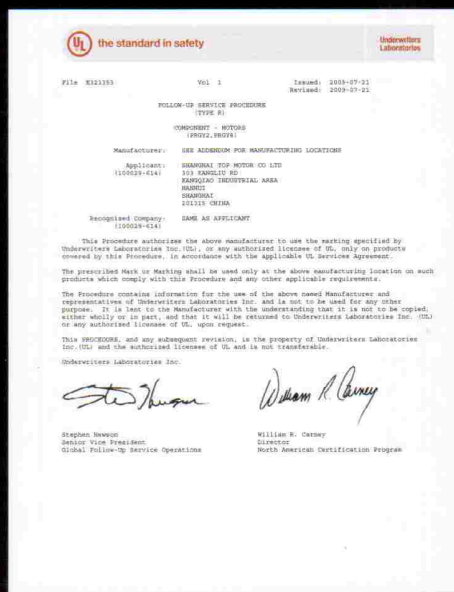
 **TECHTOP**[®]



Various Certificates



ISO9001



UL



Various Certificates

CERTIFICATE OF COMPLIANCE

Certificate Number 20150114-EX26635
Report Reference EX26635-20141231
Issue Date 2015-JANUARY-14

Issued to: SHANGHAI TOP MOTOR CO LTD
303 KANGLIU RD, KANGQIAO INDUSTRIAL AREA,
NANHUI, SHANGHAI, 201315 CHINA

This is to certify that representative samples of FIRE PUMP MOTORS
T Series, TXD Series, TDC Series, TXA Series, TXD
Series: See Addendum Page below for Models

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

Standard(s) for Safety: UL 1004-1, Rotating Electrical Machines - General
Requirements; UL 1004-5, Fire Pump Motors

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.



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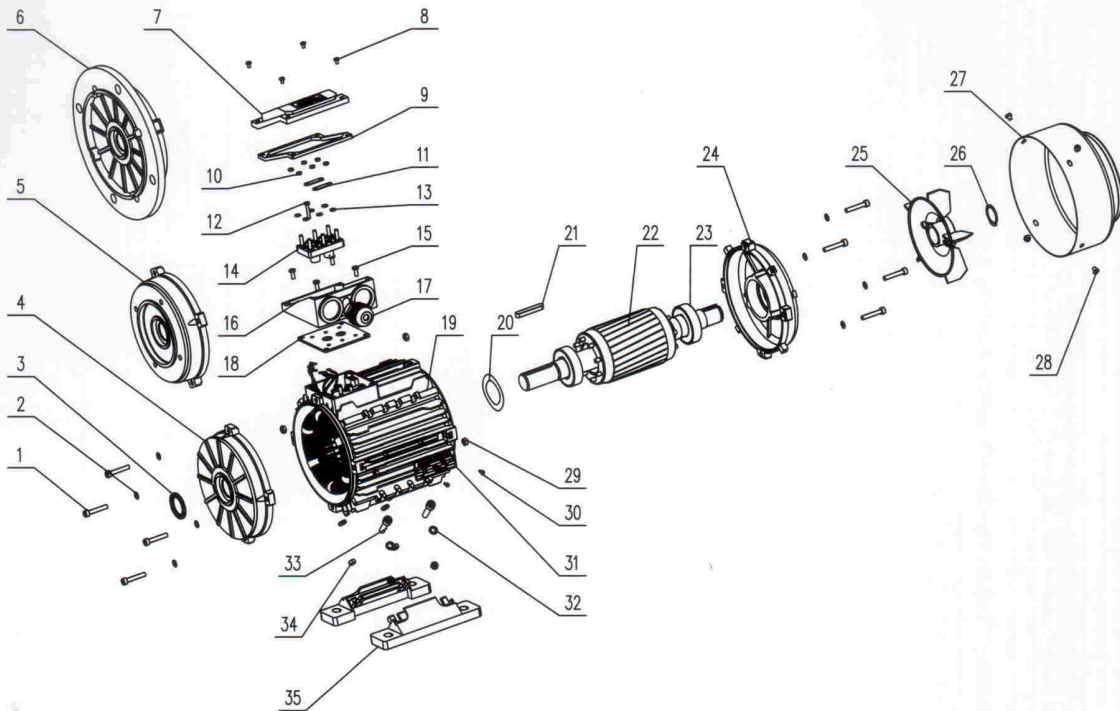
Page 1 of 3



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Motor Spare Part List "Exploded Drawing"



- | | | |
|------------------------------|---------------------|----------------------------|
| 1.screw | 13.Terminal shim | 25.Cooling fan |
| 2.Gasket | 14.Terminal board | 26.Fan circlip |
| 3.V-ring | 15.TB fixing screws | 27.Fan cover |
| 4.Front endshield | 16.TB base | 28.Fan cover fixing screws |
| 5.B14 flange | 17.Cable gland | 29.Endshield fixing nut |
| 6.B5 flange | 18.TB bottomgasket | 30.Rivet |
| 7.TB cover | 19.Frame | 31.Rivet |
| 8.TB fixing screws | 20.Preload washer | 32.Foot fixing gasket |
| 9.TB upper gasket | 21.Key | 33.Foot fixing screws |
| 10.Terminal board fixing nut | 22.Rotor | 34.Foot fixing nut |
| 11.Terminal bridge | 23.Bearing | 35.Foot |
| 12.Terminal pin | 24.NDE endshield | |



Serie Fire Pump Motors' Main Performance Parameters (IEC)

Serial NO.	Model NO.	Volts	Output (KW)	Output (HP)	Hz /DC	Locked current A(standard) 400V	Locked torque multiple (standard)	Maximum torque multiple (standard)	Minimum torque multiple (standard)	INS class	RPM	The test environment temperature
1	T 801-2	380-415V	0.75	1.0	50	19.0	175	250	120	F	2848	50°C
2	T 802-2	380-415V	1.1	1.5	50	25.7	175	250	120	F	2846	50°C
3	T 803-2	380-415V	1.5	2.0	50	32.3	170	240	120	F	2852	50°C
4	T 90S-2	380-415V	1.5	2.0	50	32.3	170	240	120	F	2852	50°C
5	T 90L1-2	380-415V	2.2	3.0	50	40.9	160	230	110	F	2845	50°C
6	T 90L2-2	380-415V	3	4.0	50	49.4	155	220	105	F	2851	50°C
7	T 100L-2	380-415V	3	4.0	50	49.4	155	220	105	F	2851	50°C
8	T 100L2-2	380-415V	4	5.5	50	61.8	145	215	105	F	2910	50°C
9	T 112M-2	380-415V	4	5.5	50	61.8	145	215	105	F	2910	50°C
10	T 112L-2	380-415V	5.5	7.5	50	79.8	140	200	100	F	2905	50°C
11	T 132S1-2	380-415V	5.5	7.5	50	79.8	140	200	100	F	2905	50°C
12	T 132S2-2	380-415V	7.5	10.0	50	101.7	135	200	100	F	2910	50°C
13	T 132M1-2	380-415V	9.2	12.0	50	118.8	130	200	100	F	2910	50°C
14	T 132M2-2	380-415V	11	15.0	50	146.3	130	200	100	F	2920	50°C
15	T 160M1-2	380-415V	11	15.0	50	146.3	130	200	100	F	2920	50°C
16	T 160M2-2	380-415V	15	20.0	50	184.3	130	200	100	F	2918	50°C
17	T 160L-2	380-415V	18.5	25.0	50	230.9	130	200	100	F	2922	50°C
18	T 180M-2	380-415V	22	30.0	50	274.6	130	200	100	F	2930	50°C
19	T 200L1-2	380-415V	30	40.0	50	367.7	125	200	100	F	2925	50°C
20	T 200L2-2	380-415V	37	50.0	50	457.9	120	200	100	F	2930	50°C
21	T 225M-2	380-415V	45	60.0	50	549.1	120	200	100	F	2930	50°C
22	T 250M-2	380-415V	55	75.0	50	685.9	105	200	95	F	2940	50°C
23	T 280S-2	380-415V	75	100.0	50	916.8	105	200	95	F	2940	50°C
24	T 280M-2	380-415V	90	125.0	50	1146.7	100	200	90	F	2940	50°C
25	T 315S-2	380-415V	110	150.0	50	1369.0	100	200	90	F	2940	50°C
26	T 315M-2	380-415V	132	175.0	50	1599.8	100	200	90	F	2940	50°C
27	T 315L1 -2	380-415V	160	215.0	50	1900.0	90	175	65	F	2945	50°C
28	T 315L2 -2	380-415V	200	270.0	50	2636.3	70	175	65	F	2945	50°C
29	T 355M-2	380-415V	250	330.0	50	3125.5	70	175	65	F	2945	50°C
30	T 355L-2	380-415V	315	420.0	50	4075.5	70	175	65	F	2945	50°C
31	T 802-4	380-415V	0.75	1.0	50	19.0	275	300	190	F	1420	50°C
32	T 803-4	380-415V	1.1	1.5	50	25.7	250	280	175	F	1425	50°C
33	T 90S-4	380-415V	1.1	1.5	50	25.7	250	280	175	F	1425	50°C
34	T 90L-4	380-415V	1.5	2.0	50	32.3	235	270	165	F	1420	50°C
35	T 90L2-4	380-415V	2.2	3.0	50	40.9	215	250	150	F	1430	50°C
36	T 100L1-4	380-415V	2.2	3.0	50	40.9	215	250	150	F	1430	50°C
37	T 100L2-4	380-415V	3	4.0	50	49.4	200	230	140	F	1430	50°C
38	T 100L3-4	380-415V	4	5.5	50	61.8	180	225	130	F	1435	50°C
39	T 112M-4	380-415V	4	5.5	50	61.8	180	225	130	F	1435	50°C
40	T 112L-4	380-415V	5.5	7.5	50	79.8	175	215	120	F	1430	50°C
41	T 132S-4	380-415V	5.5	7.5	50	79.8	175	215	120	F	1430	50°C
42	T 132M-4	380-415V	7.5	10.0	50	101.7	165	200	115	F	1430	50°C
43	T 132L1-4	380-415V	9.2	12.0	50	118.8	160	200	115	F	1430	50°C
44	T 132L2-4	380-415V	11	15.0	50	146.3	160	200	110	F	1440	50°C
45	T 160M-4	380-415V	11	15.0	50	146.3	160	200	110	F	1440	50°C
46	T 160L-4	380-415V	15	20.0	50	184.3	150	200	105	F	1445	50°C
47	T 180M-4	380-415V	18.5	25.0	50	230.9	150	200	105	F	1445	50°C
48	T 180L-4	380-415V	22	30.0	50	274.6	150	200	105	F	1460	50°C
49	T 200L-4	380-415V	30	40.0	50	367.7	140	200	100	F	1460	50°C
50	T 225S-4	380-415V	37	50.0	50	457.9	140	200	100	F	1470	50°C



Serie Fire Pump Motors' Main Performance Parameters (IEC)

Serial NO.	Model NO.	Volts	Output (KW)	Output (HP)	Hz /DC	Locked current A(standard) 400V	Locked torque multiple (standard)	Maximum torque multiple (standard)	Minimum torque multiple (standard)	INS class	RPM	The test environment temperature
51	T 225M-4	380-415V	45	60.0	50	549.1	140	200	100	F	1480	50°C
52	T 250M-4	380-415V	55	75.0	50	685.9	140	200	100	F	1480	50°C
53	T 280S-4	380-415V	75	100.0	50	916.8	125	200	100	F	1480	50°C
54	T 280M-4	380-415V	90	125.0	50	1146.7	110	200	100	F	1480	50°C
55	T 315S-4	380-415V	110	150.0	50	1369.0	110	200	100	F	1480	50°C
56	T 315M-4	380-415V	132	175.0	50	1599.8	100	200	90	F	1480	50°C
57	T 315L1-4	380-415V	160	215.0	50	1900.0	90	175	75	F	1480	50°C
58	T 315L2-4	380-415V	200	270.0	50	2636.3	80	175	75	F	1480	50°C
59	T 355M1-4	380-415V	220	300.0	50	2874.7	80	175	75	F	1480	50°C
60	T 355M2-4	380-415V	250	330.0	50	3125.5	80	175	75	F	1480	50°C
61	T 355L1-4	380-415V	280	375.0	50	3604.3	80	175	75	F	1480	50°C
62	T 355L2-4	380-415V	315	420.0	50	4075.5	80	175	75	F	1480	50°C
63	T 355L3-4	380-415V	355	475.0	50	4563.8	80	175	75	F	1480	50°C
64	T 803-6	380-415V	0.75	1.0	50	19.0	170	265	120	F	935	50°C
65	T 90S-6	380-415V	0.75	1.0	50	19.0	170	265	120	F	935	50°C
66	T 90L-6	380-415V	1.1	1.5	50	25.7	165	250	115	F	935	50°C
67	T 100L-6	380-415V	1.5	2.0	50	32.3	160	240	110	F	940	50°C
68	T 112M-6	380-415V	2.2	3.0	50	40.9	155	230	110	F	940	50°C
69	T 112M1-6	380-415V	3	4.0	50	49.4	150	220	105	F	940	50°C
70	T 112M2-6	380-415V	4	5.5	50	61.8	150	215	105	F	940	50°C
71	T 132S-6	380-415V	3	4.0	50	49.4	150	220	105	F	940	50°C
72	T 132M1-6	380-415V	4	5.5	50	61.8	150	215	105	F	945	50°C
73	T 132M2-6	380-415V	5.5	7.5	50	79.8	150	205	105	F	945	50°C
74	T 132M3-6	380-415V	7.5	10.0	50	101.7	150	200	105	F	945	50°C
75	T 160M-6	380-415V	7.5	10.0	50	101.7	150	200	105	F	955	50°C
76	T 160L-6	380-415V	11	15.0	50	146.3	140	200	100	F	960	50°C
77	T 180L-6	380-415V	15	20.0	50	184.3	135	200	100	F	960	50°C
78	T 200L1-6	380-415V	18.5	25.0	50	230.9	135	200	100	F	965	50°C
79	T 200L2-6	380-415V	22	30.0	50	274.6	135	200	100	F	965	50°C
80	T 225M-6	380-415V	30	40.0	50	367.7	135	200	100	F	975	50°C
81	T 250M-6	380-415V	37	50.0	50	457.9	135	200	100	F	975	50°C
82	T 280S-6	380-415V	45	60.0	50	549.1	135	200	100	F	980	50°C
83	T 280M-6	380-415V	55	75.0	50	685.9	135	200	100	F	980	50°C
84	T 315S-6	380-415V	75	100.0	50	916.8	125	200	100	F	980	50°C
85	T 315M-6	380-415V	90	125.0	50	1146.7	125	200	100	F	980	50°C
86	T 315L1-6	380-415V	110	150.0	50	1369.0	120	200	100	F	980	50°C
87	T 315L2-6	380-415V	132	175.0	50	1599.8	120	200	100	F	980	50°C
88	T 355M1-6	380-415V	160	215.0	50	1900.0	100	175	90	F	980	50°C
89	T 355M2-6	380-415V	200	270.0	50	2636.3	100	175	90	F	980	50°C
90	T 355L1-6	380-415V	220	300.0	50	2874.7	100	175	90	F	980	50°C
91	T 355L2-6	380-415V	250	330.0	50	3125.5	100	175	90	F	980	50°C



DC Serie Fire Pump Motors' Main Performance Parameters(NEMA 415V 50HZ)

Serial NO.	Model NO.	Volts	Output (HP)	Hz /DC	Locked current A(standard) 415V	Locked torque multiple (standard)	Maximum torque multiple (standard)	Minimum torque multiple (standard)	Service factor	INS class	RPM	The test environment temperature
1	TDC254T15U2B	380-415V	15	50	141	130	200	100	1.15	F	2920	50°C
2	TDC256T20U2B	380-415V	20	50	177	130	200	100	1.15	F	2920	50°C
3	TDC284TS25U2B	380-415V	25	50	222	130	200	100	1.15	F	2930	50°C
4	TDC286TS30U2B	380-415V	30	50	264	130	200	100	1.15	F	2930	50°C
5	TDC324TS40U2B	380-415V	40	50	354	125	200	100	1.15	F	2930	50°C
6	TDC326TS50U2B	380-415V	50	50	441	120	200	100	1.15	F	2930	50°C
7	TDC364TS60U2B	380-415V	60	50	529	120	200	100	1.15	F	2930	50°C
8	TDC365TS75U2B	380-415V	75	50	661	105	200	95	1.15	F	2940	50°C
9	TDC405TS100U2B	380-415V	100	50	883	105	200	95	1.15	F	2940	50°C
10	TDC444TS125U2B	380-415V	125	50	1105	100	200	90	1.15	F	2940	50°C
11	TDC445TS150U2B	380-415V	150	50	1319	100	200	90	1.15	F	2940	50°C
12	TDC 254T15U4B	380-415V	15	50	141	160	200	110	1.15	F	1440	50°C
13	TDC 256T20U4B	380-415V	20	50	177	150	200	105	1.15	F	1445	50°C
14	TDC 284T25U4B	380-415V	25	50	222	150	200	105	1.15	F	1450	50°C
15	TDC 286T30U4B	380-415V	30	50	264	150	200	105	1.15	F	1460	50°C
16	TDC 324T40U4B	380-415V	40	50	354	140	200	100	1.15	F	1460	50°C
17	TDC 326T50U4B	380-415V	50	50	441	140	200	100	1.15	F	1470	50°C
18	TDC364T60U4B	380-415V	60	50	529	140	200	100	1.15	F	1480	50°C
19	TDC365T75U4B	380-415V	75	50	661	140	200	100	1.15	F	1480	50°C
20	TDC405T100U4B	380-415V	100	50	883	125	200	100	1.15	F	1480	50°C
21	TDC444T125U4B	380-415V	125	50	1105	110	200	100	1.15	F	1480	50°C
22	TDC445T150U4B	380-415V	150	50	1319	110	200	100	1.15	F	1480	50°C
23	TDC 254T7.5U6B	380-415V	7.5	50	77	150	200	105	1.15	F	955	50°C
24	TDC 256T10U6B	380-415V	10	50	98	150	200	105	1.15	F	960	50°C
25	TDC 284T15U6B	380-415V	15	50	141	140	200	100	1.15	F	960	50°C
26	TDC 286T20U6B	380-415V	20	50	177	135	200	100	1.15	F	965	50°C
27	TDC 324T25U6B	380-415V	25	50	222	135	200	100	1.15	F	965	50°C
28	TDC 326T30U6B	380-415V	30	50	264	135	200	100	1.15	F	975	50°C
29	TDC364T40U6B	380-415V	40	50	354	135	200	100	1.15	F	975	50°C
30	TDC365T50U6B	380-415V	50	50	441	135	200	100	1.15	F	980	50°C
31	TDC404T60U6B	380-415V	60	50	529	135	200	100	1.15	F	980	50°C
32	TDC405T75U6B	380-415V	75	50	661	135	200	100	1.15	F	980	50°C
33	TDC444T100U6B	380-415V	100	50	883	125	200	100	1.15	F	980	50°C
34	TDC445T125U6B	380-415V	125	50	1105	125	200	100	1.15	F	980	50°C



DC Serie Fire Pump Motors' Main Performance Parameters(NEMA ODP 208~230/460V 60HZ)

Serial NO.	Model NO.	Volts	Output (HP)	Hz /DC	Locked current A(standard) 460V	Locked torque multiple (standard)	Maximum torque multiple (standard)	Minimum torque multiple (standard)	Service factor	INS class	RPM	The test environment temperature
1	TDC254T15U2B	208~230/460V	15	60	116.0	130	200	100	1.15	F	3504	50°C
2	TDC256T20U2B	208~230/460V	20	60	145.0	130	200	100	1.15	F	3504	50°C
3	TDC284TS25U2B	208~230/460V	25	60	182.5	130	200	100	1.15	F	3516	50°C
4	TDC286TS30U2B	208~230/460V	30	60	217.5	130	200	100	1.15	F	3516	50°C
5	TDC324TS40U2B	208~230/460V	40	60	290.0	125	200	100	1.15	F	3516	50°C
6	TDC326TS50U2B	208~230/460V	50	60	362.5	120	200	100	1.15	F	3516	50°C
7	TDC364TS60U2B	208~230/460V	60	60	435.0	120	200	100	1.15	F	3516	50°C
8	TDC365TS75U2B	208~230/460V	75	60	542.5	105	200	95	1.15	F	3528	50°C
9	TDC405TS100U2B	208~230/460V	100	60	725.0	105	200	95	1.15	F	3528	50°C
10	TDC444TS125U2B	460V	125	60	907.5	100	200	90	1.15	F	3528	50°C
11	TDC445TS150U2B	460V	150	60	1085.0	100	200	90	1.15	F	3528	50°C
12	TDC 254T15U4B	208~230/460V	15	60	116.0	160	200	110	1.15	F	1728	50°C
13	TDC 256T20U4B	208~230/460V	20	60	145.0	150	200	105	1.15	F	1734	50°C
14	TDC 284T25U4B	208~230/460V	25	60	182.5	150	200	105	1.15	F	1740	50°C
15	TDC 286T30U4B	208~230/460V	30	60	217.5	150	200	105	1.15	F	1752	50°C
16	TDC 324T40U4B	208~230/460V	40	60	290.0	140	200	100	1.15	F	1752	50°C
17	TDC 326T50U4B	208~230/460V	50	60	362.5	140	200	100	1.15	F	1764	50°C
18	TDC364T60U4B	208~230/460V	60	60	435.0	140	200	100	1.15	F	1776	50°C
19	TDC365T75U4B	208~230/460V	75	60	542.5	140	200	100	1.15	F	1776	50°C
20	TDC405T100U4B	208~230/460V	100	60	725.0	125	200	100	1.15	F	1776	50°C
21	TDC444T125U4B	460V	125	60	907.5	110	200	100	1.15	F	1776	50°C
22	TDC445T150U4B	460V	150	60	1085.0	110	200	100	1.15	F	1776	50°C
23	TDC 254T7.5U6B	208~230/460V	7.5	60	63.5	150	200	105	1.15	F	1146	50°C
24	TDC 256T10U6B	208~230/460V	10	60	81.0	150	200	105	1.15	F	1152	50°C
25	TDC 284T15U6B	208~230/460V	15	60	116.0	140	200	100	1.15	F	1152	50°C
26	TDC 286T20U6B	208~230/460V	20	60	145.0	135	200	100	1.15	F	1158	50°C
27	TDC 324T25U6B	208~230/460V	25	60	182.5	135	200	100	1.15	F	1158	50°C
28	TDC 326T30U6B	208~230/460V	30	60	217.5	135	200	100	1.15	F	1170	50°C
29	TDC364T40U6B	208~230/460V	40	60	290.0	135	200	100	1.15	F	1170	50°C
30	TDC365T50U6B	208~230/460V	50	60	362.5	135	200	100	1.15	F	1176	50°C
31	TDC404T60U6B	208~230/460V	60	60	435.0	135	200	100	1.15	F	1176	50°C
32	TDC405T75U6B	208~230/460V	75	60	542.5	135	200	100	1.15	F	1176	50°C
33	TDC444T100U6B	208~230/460V	100	60	725.0	125	200	100	1.15	F	1176	50°C
34	TDC445T125U6B	460V	125	60	907.5	125	200	100	1.15	F	1176	50°C



XC Serie Fire Pump Motors' Main Performance Parameters (NEMA ODP 208~230/460V 60HZ)

Serial NO.	Model NO.	Volts	Output (HP)	Hz /DC	Locked current A(standard) 460V	Locked torque multiple (standard)	Maximum torque multiple (standard)	Minimum torque multiple (standard)	Service factor	INS class	RPM	The test environment temperature
1	TXC 143T1U2B	208~230/460V	1	60	15	175	250	120	1.15	F	3450	50°C
2	TXC 143T1.5U2B	208~230/460V	1.5	60	20	175	250	120	1.15	F	3450	50°C
3	TXC 145T2U2B	208~230/460V	2	60	25	170	240	120	1.15	F	3450	50°C
4	TXC 182T3U2B	208~230/460V	3	60	32	160	230	110	1.15	F	3510	50°C
5	TXC 184T5U2B	208~230/460V	5	60	46	150	215	105	1.15	F	3510	50°C
6	TXC 213T7.5U2B	208~230/460V	7.5	60	63.5	140	200	100	1.15	F	3520	50°C
7	TXC 215T10U2B	208~230/460V	10	60	81	135	200	100	1.15	F	3520	50°C
8	TXC 254T15U2B	208~230/460V	15	60	116	130	200	100	1.15	F	3540	50°C
9	TXC 256T20U2B	208~230/460V	20	60	145	130	200	100	1.15	F	3540	50°C
10	TXC 284TS25U2B	208~230/460V	25	60	182.5	130	200	100	1.15	F	3550	50°C
11	TXC 286TS30U2B	208~230/460V	30	60	217.5	130	200	100	1.15	F	3550	50°C
12	TXC 324TS40U2B	208~230/460V	40	60	290	125	200	100	1.15	F	3560	50°C
13	TXC 326TS50U2B	208~230/460V	50	60	362.5	120	200	100	1.15	F	3560	50°C
14	TXC364TS60U2B	208~230/460V	60	60	435	120	200	100	1.15	F	3560	50°C
15	TXC365TS75U2B	208~230/460V	75	60	542.5	105	200	95	1.15	F	3560	50°C
16	TXC405TS100U2B	208~230/460V	100	60	725	105	200	95	1.15	F	3570	50°C
17	TXC444TS125U2B	460	125	60	907.5	100	200	90	1.15	F	3575	50°C
18	TXC445TS150U2B	460	150	60	1085	100	200	90	1.15	F	3575	50°C
19	TXC447TS200U2B	460	200	60	1450	100	200	90	1.15	F	3575	50°C
20	TXC449TS250U2B	460	250	60	1825	70	175	65	1.15	F	3575	50°C
21	TXC 143T1U4B	208~230/460V	1	60	15	275	300	190	1.15	F	1730	50°C
22	TXC 145T1.5U4B	208~230/460V	1.5	60	20	250	280	175	1.15	F	1730	50°C
23	TXC 145T2U4B	208~230/460V	2	60	25	235	270	165	1.15	F	1730	50°C
24	TXC 182T3U4B	208~230/460V	3	60	32	215	250	150	1.15	F	1735	50°C
25	TXC 184T5U4B	208~230/460V	5	60	46	185	225	130	1.15	F	1735	50°C
26	TXC 213T7.5U4B	208~230/460V	7.5	60	63.5	175	215	120	1.15	F	1740	50°C
27	TXC 215T10U4B	208~230/460V	10	60	81	165	200	115	1.15	F	1740	50°C
28	TXC 254T15U4B	208~230/460V	15	60	116	160	200	110	1.15	F	1750	50°C
29	TXC 256T20U4B	208~230/460V	20	60	145	150	200	105	1.15	F	1750	50°C
30	TXC 284T25U4B	208~230/460V	25	60	182.5	150	200	105	1.15	F	1760	50°C
31	TXC 286T30U4B	208~230/460V	30	60	217.5	150	200	105	1.15	F	1760	50°C
32	TXC 324T40U4B	208~230/460V	40	60	290	140	200	100	1.15	F	1770	50°C
33	TXC 326T50U4B	208~230/460V	50	60	362.5	140	200	100	1.15	F	1770	50°C
34	TXC364T60U4B	208~230/460V	60	60	435	140	200	100	1.15	F	1775	50°C
35	TXC365T75U4B	208~230/460V	75	60	542.5	140	200	100	1.15	F	1775	50°C
36	TXC405T100U4B	208~230/460V	100	60	725	125	200	100	1.15	F	1780	50°C
37	TXC444T125U4B	460	125	60	907.5	110	200	100	1.15	F	1780	50°C
38	TXC445T150U4B	460	150	60	1085	110	200	100	1.15	F	1780	50°C
39	TXC447T200U4B	460	200	60	1450	100	200	90	1.15	F	1780	50°C
40	TXC449T250U4B	460	250	60	1825	80	175	75	1.15	F	1780	50°C
41	TXC 145T1U6B	208~230/460V	1	60	15	170	265	120	1.15	F	1150	50°C
42	TXC 182T1.5U6B	208~230/460V	1.5	60	20	165	250	115	1.15	F	1150	50°C
43	TXC 184T2U6B	208~230/460V	2	60	25	160	240	110	1.15	F	1150	50°C
44	TXC 213T3U6B	208~230/460V	3	60	32	155	230	110	1.15	F	1150	50°C
45	TXC 215T5U6B	208~230/460V	5	60	46	150	215	105	1.15	F	1160	50°C
46	TXC 254T7.5U6B	208~230/460V	7.5	60	63.5	150	200	105	1.15	F	1160	50°C
47	TXC 256T10U6B	208~230/460V	10	60	81	150	200	105	1.15	F	1165	50°C
48	TXC 284T15U6B	208~230/460V	15	60	116	140	200	100	1.15	F	1165	50°C
49	TXC 286T20U6B	208~230/460V	20	60	145	135	200	100	1.15	F	1170	50°C
50	TXC 324T25U6B	208~230/460V	25	60	182.5	135	200	100	1.15	F	1170	50°C
51	TXC 326T30U6B	208~230/460V	30	60	217.5	135	200	100	1.15	F	1175	50°C
52	TXC364T40U6B	208~230/460V	40	60	290	135	200	100	1.15	F	1175	50°C
53	TXC365T50U6B	208~230/460V	50	60	362.5	135	200	100	1.15	F	1180	50°C
54	TXC404T60U6B	208~230/460V	60	60	435	135	200	100	1.15	F	1180	50°C
55	TXC405T75U6B	208~230/460V	75	60	542.5	135	200	100	1.15	F	1180	50°C
56	TXC444T100U6B	208~230/460V	100	60	725	125	200	100	1.15	F	1180	50°C
57	TXC445T125U6B	460	125	60	907.5	125	200	100	1.15	F	1180	50°C
58	TXC447T150U6B	460	150	60	1085	120	200	100	1.15	F	1180	50°C
59	TXC449T200U6B	460	200	60	1450	120	200	100	1.15	F	1180	50°C



TECHNICAL DATA

PRODUCT FEATURES

Model	F-TDC365TS75U2B		
Standard	NEMA MG-1	Output rating	75 HP
Frequency	60 Hz	Mounting	Foot-mounted
Voltage	380-400 V	Flange	Without
Number of poles	2	Mounting	F-1
Degree of Protection	IP23	Terminal box ¹	Left position
Synchronous speed	3600 rpm	Enclosure	IC01 - ODP

PRODUCT DETAILS

Frame	365TS	Frequency	60 Hz
Output	75 HP (55 kW)	Number of Poles	2
Slip	0.02333	Rated speed	3516 rpm
Rated voltage	380-400 V	Temperature rise	80 K
Rated current	102.2-97.1 A	Duty Cycle	Cont.(S1)
L. R. Amperes	656-624 A	Starting Method	Wye-Delta
LRC	6.4x(Code G)	Ambient temperature	50°C
No load current	24-22 A	Altitude	1000 m.a.s.l.
Rated torque	112.1 ft.lb	Noise level	94.0 dB(A)
Locked rotor torque	105%	Approx. weight	641 lb
Breakdown torque	200%	Service factor	1.15
Locked rotor time	30s (cold) 16s (hot)	Design	B
Moment of inertia	5.12 ft.lb²	Insulation Class	F
Efficiency/Power factor	Load	Efficiency	Power factor
	100%	92.4	0.9
	75%	93.1	0.86
	50%	91.8	0.8
Bearing	Drive-end	6313C3	
	Opposite drive-end	6313C3	



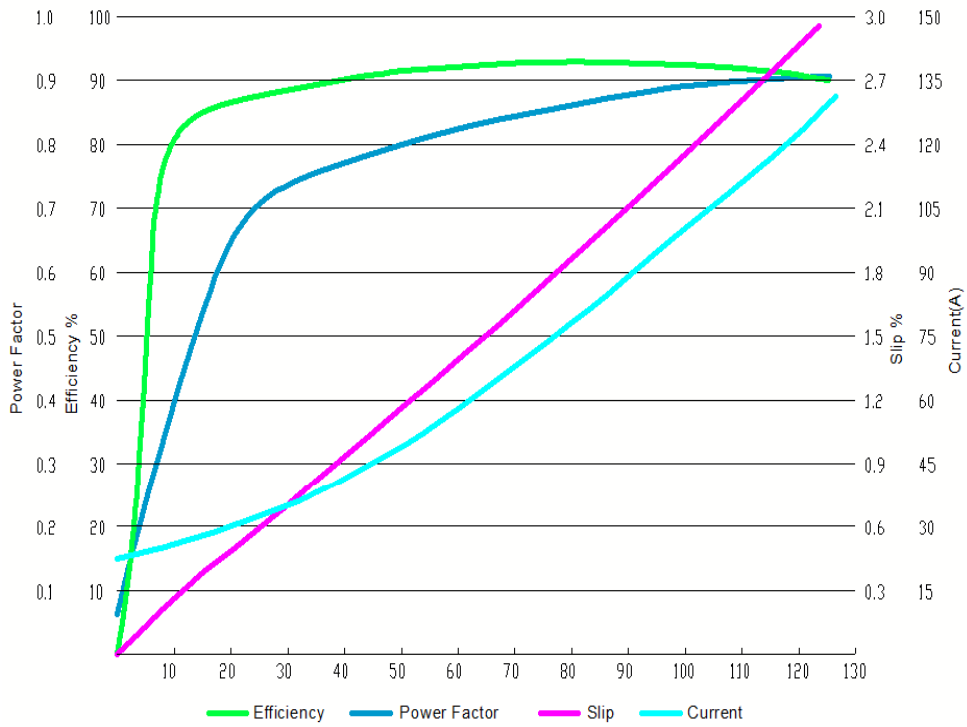
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FIRE PUMP MOTOR
EX26635



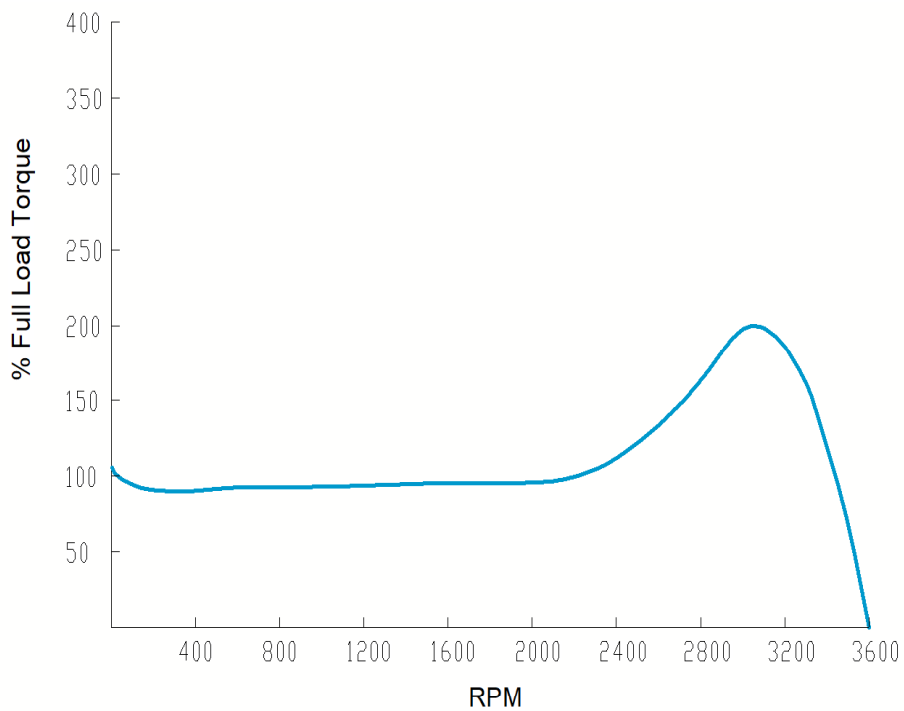
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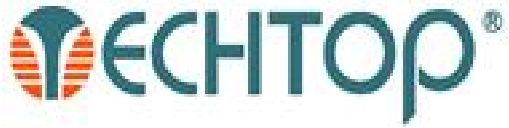
Torque Values	Torque (lb-ft)	Torque Values	Torque (lb-ft)
Locked Rotor Torque	117.71	Breakdown Torque	224.20
Pull-Up Torque	106.50	Full Load Torque	112.1

Load Performance Curve



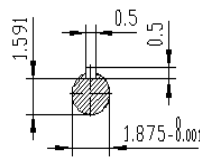
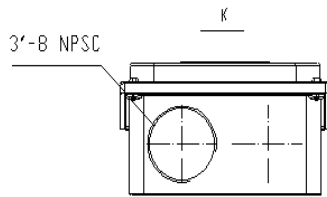
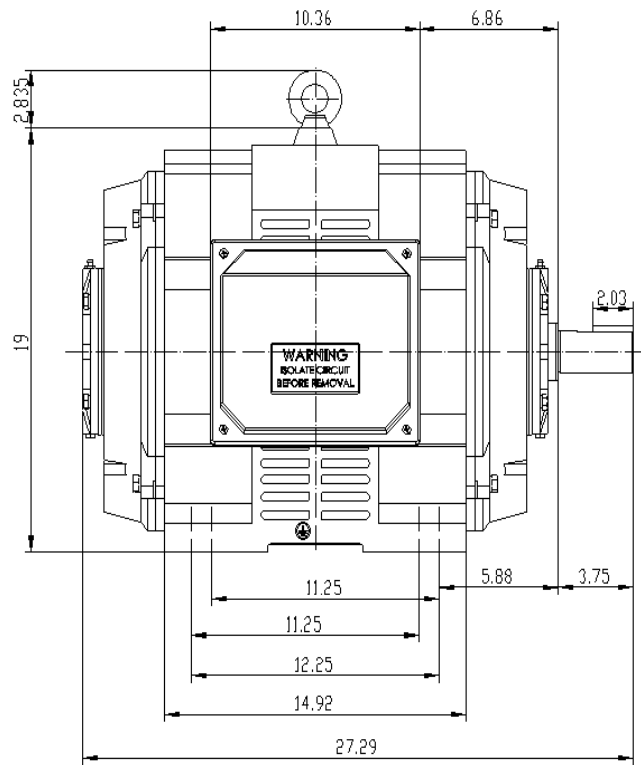
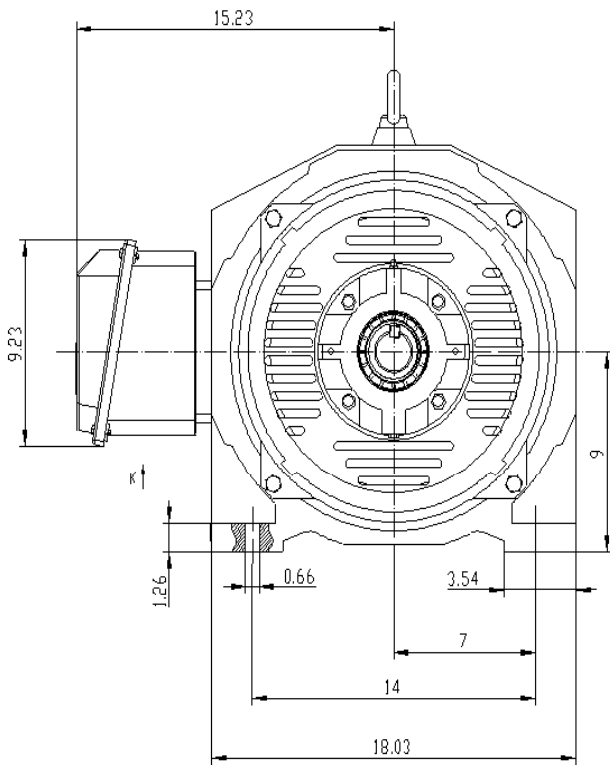
Torque Speed(T-n)Curve






DRAWINGS

Frame size	365TS	Frame Material	Cast iron
Poles	2	DWG NO	CY230.A16.001
Units	Inch		



	Vendor Ref. No.	
	Contractor Ref. No.	
Project Name:	Contractor Job No.	

ELECTRIC PUMP CONTROLLER SPECIFICATIONS

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date

GPx Models / Starting Methods

	ACROSS-THE-LINE	PART WINDING	AUTO TRANSFORMER	SOFT START SOFT STOP	PRIMARY RESISTOR	WYE-DELTA CLOSED TRANSITION	WYE-DELTA OPEN TRANSITION
MODELNUMBER	GPA	GPP	GPR	GPS	GPV	GPW	GPY
VOLTAGE	FULL	REDUCED	REDUCED	REDUCED	REDUCED	REDUCED	REDUCED
TYPICAL VOLTAGE APPLIED MOTOR STARTING	100%	100%	65%	30% (adjustable)	70%	100%	100%
INRUSH CURRENT	6 X FULL LOAD CURRENT	60% OF FULL LOAD CURRENT WITH 1ST WINDING	42% OF FULL LOAD CURRENT	30% OF FULL LOAD CURRENT (adjustable)	50% OF FULL LOAD CURRENT	33% OF FULL LOAD CURRENT	33% OF FULL LOAD CURRENT
STARTING TORQUE	100%	48%	42%	30%	50%	33%	33%
MOTOR TYPE	STANDARD	SPECIAL	STANDARD	STANDARD	STANDARD	SPECIAL	SPECIAL
# OF WIRE CONNECTIONS	3 WIRE	6 WIRE	3 WIRE	3 WIRE	3 WIRE	6 WIRE	6 WIRE

Based on NEMA B type motors.

GPx Series / Voltage / HP / Short Circuit Withstand Rating / Seismic Certification

Model	Voltage	HP	Short Circuit Withstand Rating	Seismic Certified
GPA GPA+GPU	200V - 208V	5-150	100kA	Yes
		200	50kA	No
	220V - 240V	5-200	100kA	Yes
		250	50kA	No
GPP GPP+GPU	380V - 416V	5-300	100kA	Yes
		350-450	50kA	No
GPY GPY+GPU	440V - 480V	5-400	100kA	Yes
		450	50kA	No
	575V - 600V	5-500	50kA	Yes
GPR GPR+GPU	200V - 208V	5-150	100kA	Yes
		200	50kA	No
	220V - 240V	5-200	100kA	Yes
		250	50kA	No
	380V - 416V	5-300	100kA	Yes
		350-450	50kA	No
	440V - 480V	5-400	100kA	Yes
		450	50kA	No
575V - 600V	5-500	50kA	Yes	
GPS GPS+GPU	200V - 208V	5-100	100kA	Yes
		150	50kA	No
		200	50kA	Yes
		250	50kA	No
	220V - 240V	5-150	100kA	Yes
		200	50kA	No
		250	50kA	Yes
	380V - 416V	5-250	100kA	Yes
		300	50kA	No
		350-450	50kA	Yes
	440V - 480V	5-300	100kA	Yes
		350	100kA	No
400		100kA	No	
450		100kA	No	
575V - 600V	5-400	50kA	Yes	
	450	50kA	No	
	500	50kA	Yes	



Full Service - Electric Fire Pump Controllers



Standard Features

- ViZiTouch operator interface
- NEMA 2 assembly
- Pressure and event recorder
- Voltage and amperage display
- Single operator for both isolating switch and circuit breaker
- Surge arrestor
- Lifting lugs
- Run test push button
- Available with automatic power transfer switch
- Emergency start handle
- Start and stop pushbuttons
- Locked rotor protector
- Phase reversal indication
- Remote start / deluge valve start provision
- Pressure transducer and run test solenoid valve externally mounted
- Gland plate
- Audible alarm
- Alarm contacts for remote indication
- Available with full voltage and reduced voltage starting

Americas

Europe

Middle East

Asia

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TORNATECH

Project: _____

Customer: _____

Engineer: _____

Pump Manufacturer: _____

Technical Data Submittal Document

GPx Series

Full Service

Electric Fire Pump Controller



Contents:

Data Sheets

Dimensional Data

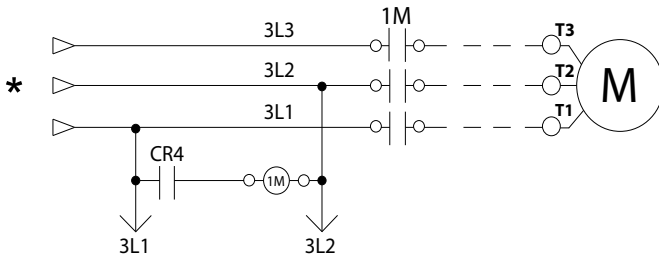
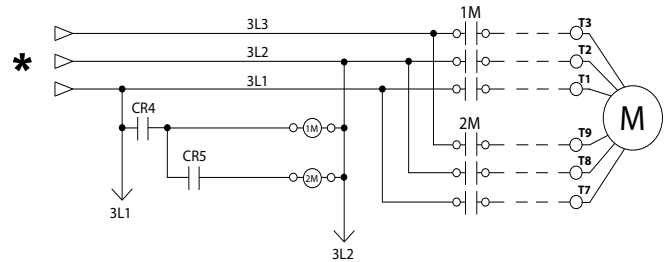
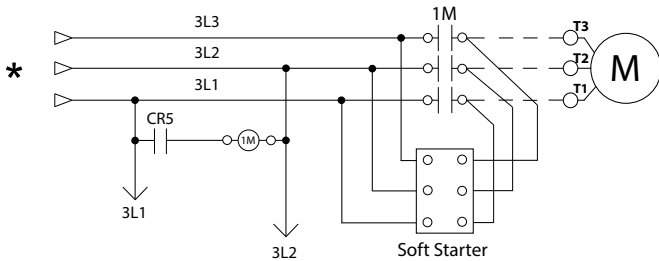
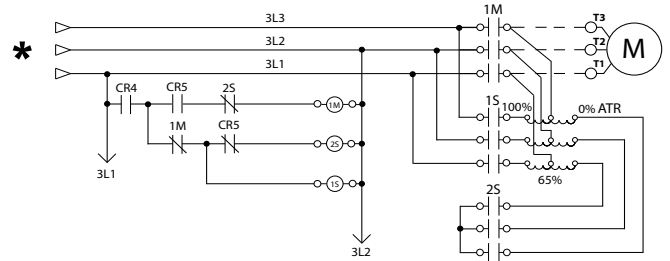
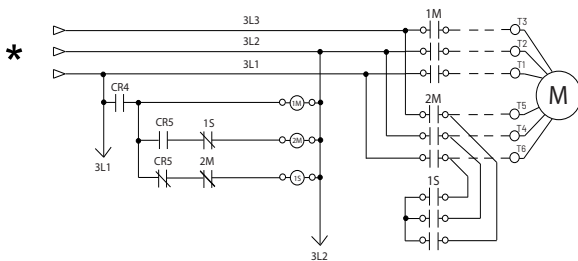
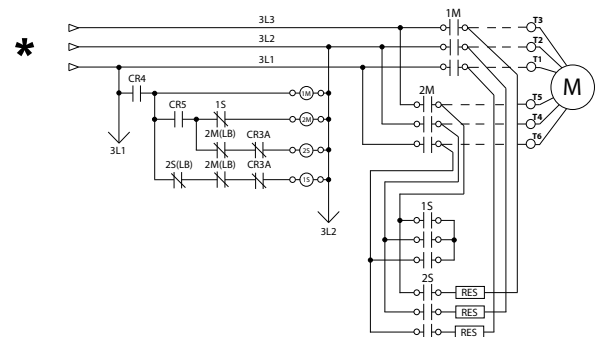
Wiring Schematics

Field Connections

Note: The drawings included in this package are for controllers covered under our standard offering. Actual AS BUILT drawings may differ from what is shown in this package.



June 2022

Select starting method
Model GPA
Across the line

Model GPP
Partwinding

Model GPS
Soft Start Soft Stop

Model GPR
Autotransformer

Model GPY
Wye-Delta Open

Model GPW
Wye-Delta Closed


*From normal incoming power through Disconnecting Means (IS/CB)





Standard, Listings, Approvals and Certifications	Built to NFPA 20 (latest edition)		
	Underwriters Laboratory (UL)	UL218 - Fire Pump Controllers	
	FM Global	Class 1321/1323	
	New York City	Accepted for use in the City of New York by the Department of Buildings	
	CE Mark	Various EN, IEC & CEE directives and standards	
	Built in Canada or U.A.E	Built in Europe	
	CE Mark Option	Supplied as Standard	
Enclosure	Protection Rating		
	Built in Canada or U.A.E	Built in Europe	
	Standard: NEMA 2	Standard: IP55	
	Optional		
	NEMA 12	NEMA 4X-304 sst painted	IP54
	NEMA 3	NEMA 4X-304 sst brushed finish	IP55
	NEMA 3R	NEMA 4X-316 sst painted	IP65
	NEMA 4	NEMA 4X-316 sst brushed finish	IP66
	Accessories • Bottom entry gland plate • Lifting Lugs • Keylock handle	Paint Specifications • Red RAL3002 • Powder coating • Glossy textured finish	

Shortcircuit Withstand Rating	200V to 208V 60Hz	220V to 240V 60Hz	380V to 415V 50 Hz / 60Hz	440V to 480V 60Hz	575V to 600V 60Hz
	HP (kw)				
Standard 100kA	5 - 150 (3.7 - 110)	5 - 200 (3.7 - 149)	5 - 300 (3.7 - 223)	5 - 400 (3.7 - 298)	N/A
Optional 150kA					
Standard 50kA	200 (149)	250 (186)	350 - 450 (261-335)	450 - 500 (335 - 373)	5 - 500 (3.7- 373)
Optional 100kA	N/A	N/A	350 - 500 (261 - 373)	450 - 500 (335 - 373)	
Optional 200kA	5 - 150 (3.7 - 110)	5 - 200 (3.7 - 149)	5 - 300 (3.7 - 223)	5 - 400 (3.7 - 298)	N/A

*Please see Disconnecting Means details on page 4



Ambient Temperature Rating	Standard: 4°C to 40°C / 39°F to 104°F Optional: 4°C to 55°C / 39°F to 131°F Controllers built in Dubai, UAE (Tornatech FZE) are supplied standard with 55°C rating.
Surge Suppression	Surge arrestor rated to suppress surges above line voltage
Disconnecting Means	<ul style="list-style-type: none"> • Isolating switch and circuit breaker assembly: <ul style="list-style-type: none"> - Door interlocked in the ON position - Isolating switch rated not less than 115% of motor full load current - Circuit breaker continuous rating not less than 115% of motor full load current - Overcurrent sensing non-thermal type, magnetic only - Instantaneous trip setting of not more than 20 times the motor full load current • Common flange mounted operating handle
Service Entrance Rating	Suitable as service entrance equipment
Emergency Start Handle	<ul style="list-style-type: none"> • Flange mounted • Pull and latch activation • Integrated limit switch • Across the line start (direct on line)
Locked Rotor Protector	<ul style="list-style-type: none"> • Operate shunt trip to open circuit breaker • Factory set at 600% of motor full load current • Trip between 8 and 20 seconds
Electrical Readings	<ul style="list-style-type: none"> • Voltage phase to phase (normal power) • Amperage of each phase when motor is running
Pressure Readings	<ul style="list-style-type: none"> • Continuous system pressure display • Cut-in and Cut-out pressure settings
Pressure and Event recorder	<ul style="list-style-type: none"> • Pressure readings with date stamp • Event recording with date stamp • Under regular maintained operation, events are stored in memory for the life of the controller. • Data viewable on operator interface display screen • Downloadable by USB port to external memory device
Pressure Sensing	<ul style="list-style-type: none"> • Pressure transducer and run test solenoid valve assembly for fresh water application • Pressure sensing line connection 1/2" Female NPT • Drain connection 3/8" • Rated for 0-500PSI working pressure (standard display at 0-300PSI) • Externally mounted with protective cover



Audible Alarm	6" alarm bell - 85 dB at 10ft. (3m)		
Visual Indications	<ul style="list-style-type: none"> • Power available • Motor run • Periodic test • Manual start 	<ul style="list-style-type: none"> • Deluge valve start • Remote automatic start • Remote manual start • Emergency start 	<ul style="list-style-type: none"> • Pump on demand/Automatic start • Pump room temperature (°F or °C) • Lockout
Visual & Audible Alarms	<p>Visual</p> <ul style="list-style-type: none"> • Control voltage not healthy • Invalid cut-in • Lock rotor current • Loss of power • Low ambient temperature • Low water level • Motor trouble • Phase reversal (normal power) <p>Visual and audible</p> <ul style="list-style-type: none"> • Fail to start 		
Remote Alarm Contacts	<p>DPDT-8A-250V.AC</p> <ul style="list-style-type: none"> • Power available • Phase reversal • Motor run • Common pump room alarm (field re-assignable)** <ul style="list-style-type: none"> • Overvoltage • Undervoltage • Phase unbalance • Low pump room temperature • High Pump room temperature • Common motor trouble (field re-assignable)** <ul style="list-style-type: none"> • Overcurrent • Fail to start • Undercurrent • Ground fault • Free (field programmable)** 		

**Tornatech reserves the right to use any of these three alarm points for special specific application requirements.



ViZiTouch V2 Operator Interface	<ul style="list-style-type: none"> • Embedded microcomputer with software PLC logic • 7.0" color touch screen (HMI technology) • Upgradable software • Multi-language 			
Communication Protocol Capability	<ul style="list-style-type: none"> • Protocol: Modbus • Connection type: Shielded female connector RJ45 • Frame Format: TCP/IP • Addresses: See bulletin MOD-GPx 			
Operation	Automatic Start	<ul style="list-style-type: none"> • Start on pressure drop • Remote start signal from automatic device • Deluge valve start 		
	Manual Start	<ul style="list-style-type: none"> • Start pushbutton • Run test pushbutton • Remote start from manual device 		
	Stopping	<ul style="list-style-type: none"> • Manual with Stop pushbutton • Automatic after expiration of minimum run timer *** 		
	Timers	Field Adjustable & Visual Countdown	<ul style="list-style-type: none"> • Minimum run timer ***(off delay) • Sequential start timer (on delay) • Periodic test timer 	
	Actuation	Visual Indication	<ul style="list-style-type: none"> • Pressure • Non-pressure 	
	Mode		<ul style="list-style-type: none"> • Automatic • Non-automatic 	

***Can only be used if approved by the AHJ



A4	Flow switch provision	C19	Emergency start alarm contact (DPDT)
A8	Foam pump application w/o pressure transducer and run test solenoid valve.	C20	Manual start alarm contact (DPDT)
A9	Low zone pump control function	C21	Deluge valve start alarm contact (DPDT)
A10	Middle zone pump control function	C22	Remote automatic start alarm contact (DPDT)
A11	High zone pump control function	C23	Remote manual start alarm contact (DPDT)
A13	Non-pressure actuated controller w/o pressure transducer and run test solenoid valve	C24	High pump room temperature alarm contact (DPDT)
A16	Lockout/interlock circuit from equipment installed inside the pump room	C25	Second set of standard alarm contacts (DPDT) (Typical for city of Los Angeles and Denver)
B11	Built in alarm panel (120V.AC supervisory power) providing indication for: • Audible alarm & silence pushbutton for motor run, phase reversal, loss of phase. • Pilot lights for loss of phase & supervisory power available	Cx	Additional visual and alarm contact (Specify function) (DPDT)
B11B	Built in alarm panel same as B11 but 220-240VAC supervisory power	D1	Low suction pressure transducer for fresh water rated at 0-300PSI with visual indication and alarm contact
B19A	High motor temperature c/w thermostat relay and alarm contacts (DPDT)	D1A	Low suction pressure transducer for sea water rated at 0-300PSI with visual indication and alarm contact
B19B	High motor temperature c/w PT100 relay and alarm contacts (DPDT)	D5	Pressure transducer and run test solenoid valve for fresh water rated for 0-500PSI (for factory calibration purposes only)
B21	Ground fault alarm detection c/w visual indication and alarm contact (DPDT)	D5D	Pressure transducer and run test solenoid valve for sea water rated for 0-500PSI
C1	Extra motor run alarm contact (DPDT)	D10	Omit mounting feet (when applicable)
C4	Periodic test alarm contact (DPDT)	D13	High withstand rating for: • 200V to 208V @ 150HP max. = 150kA* • 200V to 208V @ 200HP = 100kA* • 220V to 240V @ 200HP max. = 150kA* • 220V to 240V @ 250HP = 100kA* • 380V to 415V @ 300HP max. = 150kA* • 380V to 415V @ 350HP to 450HP = 100kA* • 440V to 480V @ 400HP max. = 150kA* • 440V to 480V @ 450HP to 500HP = 100kA* • 600V @ 500HP max. = 100kA*
C6	Low discharge pressure alarm contact (DPDT)	D13A	High withstand rating for: • 380V to 480V = 65kA* • 600V = 25kA*
C7	Low pump room temperature alarm contact (DPDT)	D13B	High withstand rating for: • 200V to 208V @ 150HP max. = 200kA* • 220V to 240V @ 200HP max. = 200kA* • 380V to 415V @ 300HP max. = 200kA* • 440V to 480V @ 400HP max. = 200kA*
C10	Low water reservoir level alarm contact (DPDT)	D14	Anti-condensation heater & thermostat
C11	High electric motor temperature alarm contact (DPDT)	D14A	Anti-condensation heater & humidistat
C12	High electric motor vibration c/w visual indication and alarm contact (DPDT)	D14B	Anti-condensation heater & thermostat & humidistat
C14	Pump on demand / automatic start alarm contact (DPDT)		
C15	Pump fail to start alarm contact (DPDT)		
C16	Control voltage healthy alarm contact (DPDT)		
C17	Flow meter valve loop open c/w visual indication and alarm contact (DPDT)		
C18	High water reservoir level c/w visual indication and alarm contact (DPDT)		

*For fire pump controller section only.

Note: Options chosen from this page are not electrically represented on the wiring schematics in this submittal package.



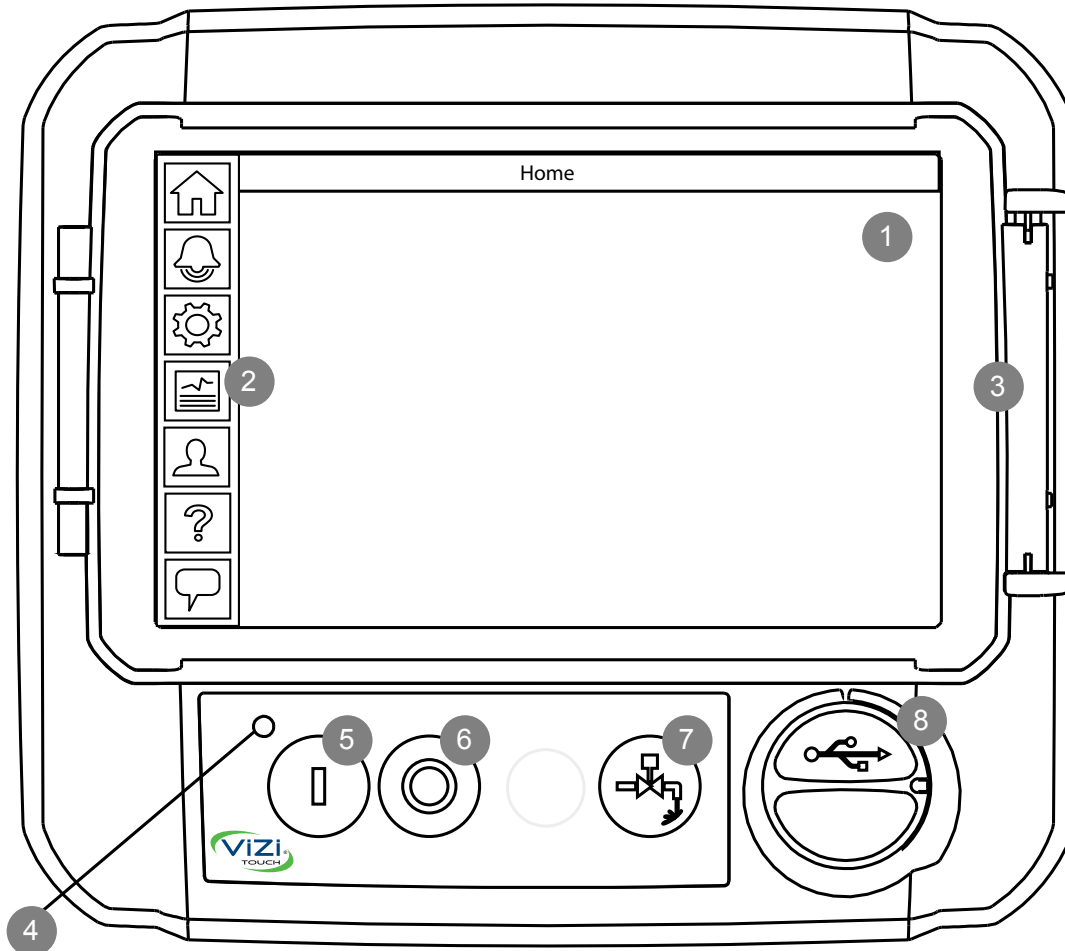
D15	Tropicalization
D18	CE Mark with factory certificate
D26	Modbus with RTU frame format and RS485 connection
D27	Motor heater connection (external single phase power source and heater on/off contact)
D27A	Motor heater connection (internal single phase power source and heater on/off contact)
D28	Customized drawing set
D34A	Field programmable I/O board - 5 Input / 5 output
D43	Seismic Certification compliant to CBC 2019, IBC 2018 rigid base/wall mounted only
D44	Special Seismic Certification compliant to OSHPD rigid base/wall mounted only

L01	Other language and English (bilingual)
L02	French
L03	Spanish
L04	German
L05	Italian
L06	Polish
L07	Romanian
L08	Hungarian
L09	Slovak
L10	Croatian
L11	Czech
L12	Portuguese
L13	Dutch
L14	Russian
L15	Turkish
L16	Swedish
L17	Bulgarian
L18	Thai
L19	Indonesian
L20	Slovenian
L21	Danish
L22	Greek
L23	Arabic
L24	Hebrew
L25	Chinese

Additional Options:

Note: Options chosen from this page are not electrically represented on the wiring schematics in this submittal package.

ViZiTouch V2 Operator Interface



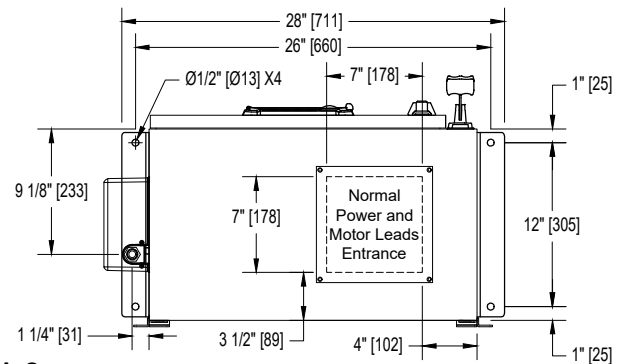
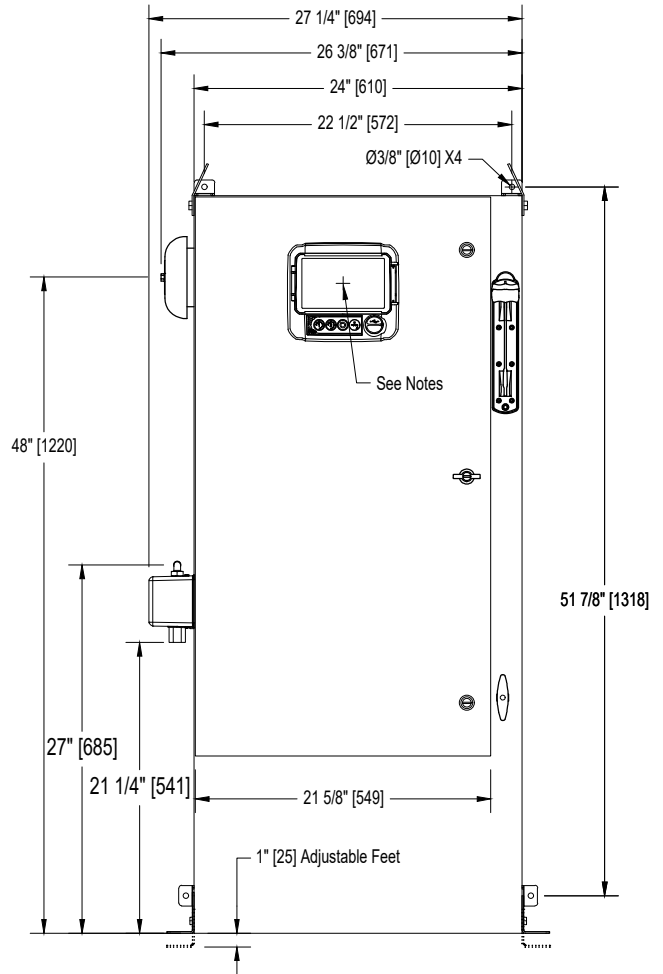
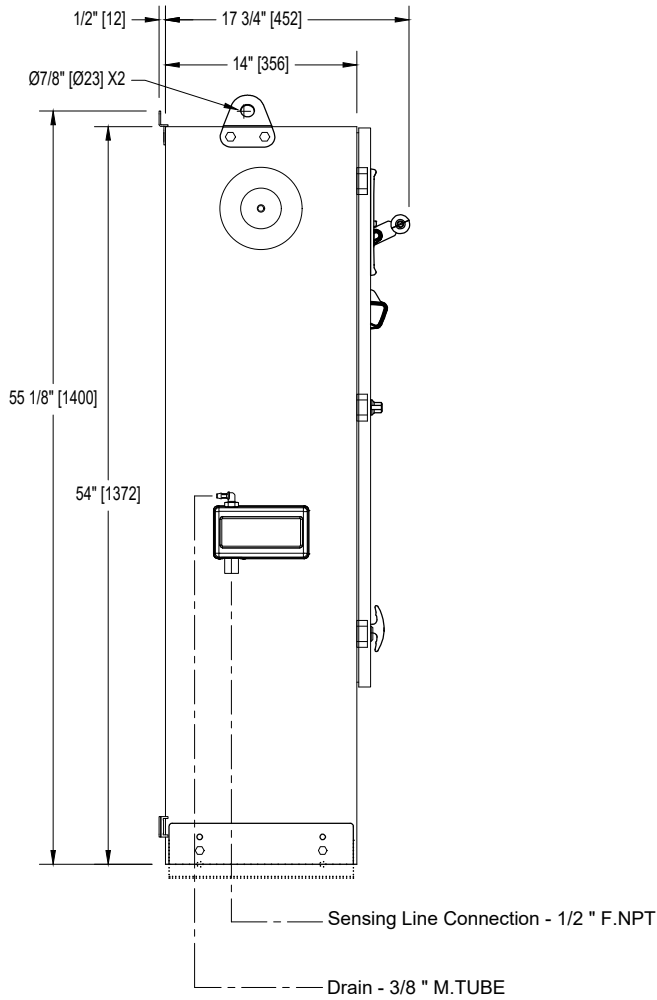
- | | |
|------------------------|--------------------------|
| 1 - Color touch screen | 3 - Screen protector |
| 2 - Onscreen menu | 4 - Power LED (3 colors) |
| • HOME page | 5 - START button |
| • ALARM page | 6 - STOP button |
| • CONFIGURATION page | 7 - RUN TEST button |
| • HISTORY page | 8 - USB port |
| • SERVICE page | |
| • MANUAL page | |
| • LANGUAGES page | |

Electric Fire Pump Controller

Model: GPA/GPP/GPY

Dimensions

Built to the latest edition of the NFPA 20 standard

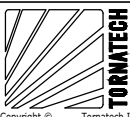
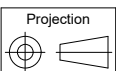


Voltage	Min HP	Max HP
208	40	60
220 - 240	40	75
380 - 400 - 415	75	125
440 - 480	75	150
600	100	200

Notes:

- Standard NEMA: NEMA 2
- Standard paint : textured red RAL 3002.
- All dimensions are in inches [millimeters].
- Center of ViZiTouch screen: 47-5/8" [1208] from Bottom.
- Bottom conduit entrance through removable gland plate recommended.
- Use watertight conduit and connector only.
- Protect equipment against drilling chips.
- Door swing equal to door width.

Drawing for information only.
 Manufacturer reserves the right to modify this drawing without notice.
 Contact manufacturer for "As Built" drawing.



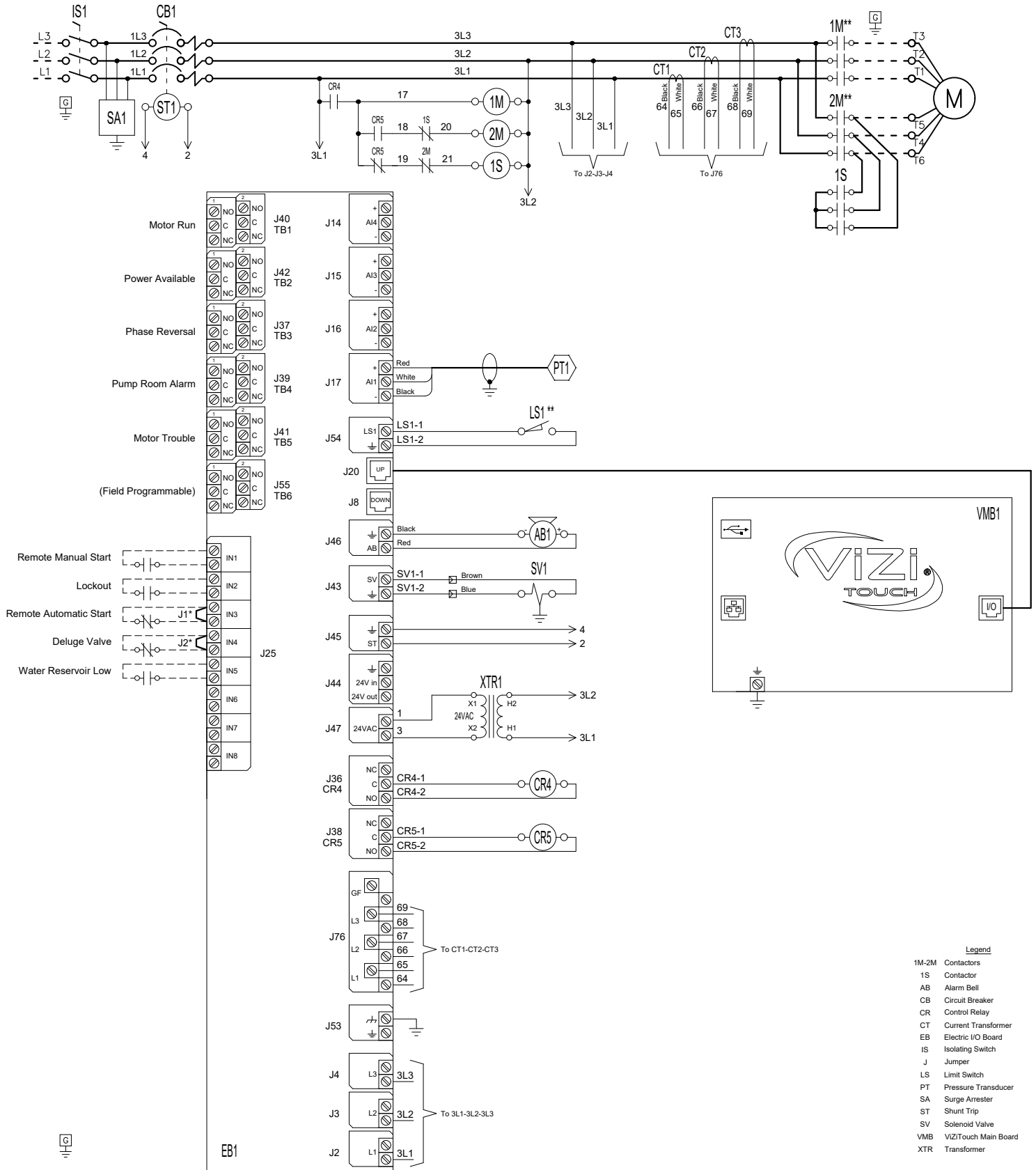
REV.	DESCRIPTION	DD/MM/YY	Drawing number
4.	Removed Seismic logo (optional)	18/05/22	GPX-DI261 /E
3.	HP Table Modified	22/12/20	
2.	New Logo	10/05/18	

Electric Fire Pump Controller Reduced Voltage / Wye-Delta (Open Transition)

Model: GPY

Wiring schematic

Built to the latest edition of the NFPA 20 standard



Legend

- 1M-2M Contactors
- 1S Contactor
- AB Alarm Bell
- CB Circuit Breaker
- CR Control Relay
- CT Current Transformer
- EB Electric I/O Board
- IS Isolating Switch
- J Jumper
- LS Limit Switch
- PT Pressure Transducer
- SA Surge Arrester
- ST Shunt Trip
- SV Solenoid Valve
- VMB VIZITouch Main Board
- XTR Transformer

* Remove jumper to use this feature
 ** Contact closes when emergency start is in "ON" position

Drawing for information only.
 Manufacturer reserves the right to modify this drawing without notice.
 Contact manufacturer for "As Built" drawing.



REV.	DESCRIPTION	DD/MM/YY	Drawing number
3	Removed Seismic logo (optional)	18/05/22	GPY-WS600 /E
2	Update Logo	23/04/18	
1	Removed (fail safe) text from Power Available relay	20/02/17	

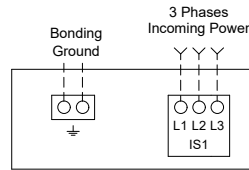
Electric Fire Pump Controller

Model: GPX

Terminal Diagram and Sizing for Isolating Switch

Built to the latest edition of the NFPA 20 standard

Power Terminals



Notes:

- 1 - For proper wire sizing, refer to NFPA70 and NEC (USA) or CEC (Canada) or local code.
- 2 - Controller suitable for service entrance in USA.
- 3 - For more accurate motor connections refer to motor manufacturer or motor nameplate.
- 4 - Controller is phase sensitive. Incoming lines must be connected in ABC sequence.

COPPER CONDUCTORS for Isolating Switch (IS1).

Field Wiring According to Bending Space (AWG or MCM). Terminals L1 - L2 - L3

Bending Space	5" (127 mm)							8" (203 mm)		
	HP	5	7.5	10	15	20	25	30	40	50
208	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (2 to 1/0)	1x (1/0 to 3/0)	1x (3/0 to 250)	1x (4/0 to 250)
220 to 240	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (1 to 3/0)	1x (2/0 to 3/0)	1x (3/0 to 250)
380 to 416	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (3 to 1/0)
440 to 480	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)
600	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)

Bending Space	12" (305 mm)				16" (406 mm)							
	HP	75	100	125	150	200	250	300	350	400	450	500
208	2x (1/0 to 500)	2x (2/0 to 500)	2x (4/0 to 500)	2x (250 to 500)	3x (4/0 to 500)	-----	-----	-----	-----	-----	-----	-----
220 to 240	1x (250)	2x (2/0 to 500)	2x (3/0 to 500)	2x (4/0 to 500)	2x (350 to 500)	3x (250 to 500)	-----	-----	-----	-----	-----	-----
380 to 416	1x (1/0 to 3/0)	1x (3/0 to 250)	1x (250)	2x (1/0 to 500)	2x (3/0 to 500)	2x (4/0 to 500)	2x (300 to 500)	2x (400 to 500)	3x (250 to 500)	3x (300 to 500)	-----	-----
440 to 480	1x (1 to 3/0)	1x (2/0 to 3/0)	1x (3/0 to 250)	1x (4/0 to 250)	2x (1/0 to 500)	2x (3/0 to 500)	2x (4/0 to 500)	2x (300 to 500)	2x (350 to 500)	2x (400 to 500)	3x (250 to 500)	-----
600	1x (3 to 1/0)	1x (1 to 3/0)	1x (2/0 to 3/0)	1x (3/0 to 250)	1x (250)	2x (2/0 to 500)	2x (3/0 to 500)	2x (4/0 to 500)	2x (250 to 500)	2x (300 to 500)	2x (350 to 500)	2x (350 to 500)

ALUMINUM CONDUCTORS for Isolating Switch (IS1).

Field Wiring According to Bending Space (AWG or MCM). Terminals L1 - L2 - L3

Bending Space	5" (127 mm)							8" (203 mm)		10" (254 mm)
	HP	5	7.5	10	15	20	25	30	40	50
208	1x (10 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (1 to 1/0)	1x (1/0)	1x (3/0)	1x (4/0 to 250)	1x (300)** or 1x (250) 90°C *
220 to 240	1x (10 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (3 to 1/0)	1x (2 to 1/0)	1x (1 to 1/0)	1x (2/0 to 3/0)	1x (3/0) 90°C *	1x (250)
380 to 416	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (4 to 1/0)	1x (2 to 1/0)	1x (1 to 1/0)	1x (1/0)
440 to 480	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (2 to 1/0)	1x (1 to 1/0)
600	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (10 to 1/0)	1x (8 to 1/0)	1x (6 to 1/0)	1x (6 to 1/0)	1x (4 to 1/0)	1x (4 to 1/0)	1x (2 to 1/0)

Bending Space	12" (305 mm)				16" (406 mm)							
	HP	75	100	125	150	200	250	300	350	400	450	500
208	2x (2/0 to 500)	2x (4/0 to 500)	2x (300 to 500)	2x (350 to 500)	3x (300 to 500)	-----	-----	-----	-----	-----	-----	-----
220 to 240	1x (350)** N/A	2x (3/0 to 500)	2x (250 to 500)	2x (300 to 500)	2x (500)	3x (400 to 500)	-----	-----	-----	-----	-----	-----
380 to 416	1x (3/0)	1x (250 to 350)	1x (350)** N/A	2x (3/0 to 500)	2x (4/0 to 500)	2x (300 to 500)	2x (500)	3x (300 to 500)** 2x (500) 90°C *	3x (350 to 500)	3x (400 to 500)	-----	-----
440 to 480	1x (1/0 to 3/0)	1x (3/0)	1x (250)	1x (300 to 350)** 1x (250) 90°C *	2x (3/0 to 500)	2x (250 to 500)	2x (300 to 500)	2x (400 to 500)	2x (500)	2x (500) 90°C *	3x (350 to 500)	-----
600	1x (1 to 1/0)	1x (2/0 to 3/0)	1x (3/0) 90°C *	1x (4/0 to 250)	1x (350 to 500)	2x (3/0 to 500)	2x (4/0 to 250)	2x (300 to 500)	2x (350 to 500)	2x (400 to 500)	2x (400 to 500)	2x (500)

*For standard enclosure, use 90°C aluminium wire. Consult Factory for Use of Conductors Rated Lower than 90°C.
** Consult Factory

Drawing for information only.
Manufacturer reserves the right to modify this drawing without notice.
Contact manufacturer for "As Built" drawing.



REV.	DESCRIPTION	DD/MM/YY	Drawing number
1	Removed Seismic logo (optional)	18/05/22	GPX-TD612 1/2 /E
0	First issue	22/12/20	

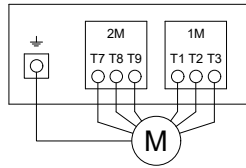
Electric Fire Pump Controller

Model: GPX

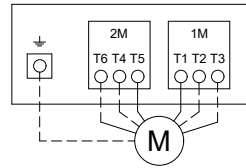
Terminal Diagram and Sizing For GPP, GPY & GPW

Built to the latest edition of the NFPA 20 standard

Motor Terminals



Model : GPP



Models : GPW & GPY

Notes:

- 1 - For proper wire sizing, refer to NFPA70 and NEC (USA) or CEC (Canada) or local code.
- 2 - Controller suitable for service entrance in USA.
- 3 - For more accurate motor connections refer to motor manufacturer or motor nameplate.
- 4 - Controller is phase sensitive. Incoming lines must be connected in ABC sequence.

COPPER CONDUCTORS for Motor Connection (1M-2M).

Field Wiring According to Bending Space (AWG or MCM). Terminals T1-T2-T3-T4-T5-T6-T7-T8-T9

HP Voltage	5	7.5	10	15	20	25	30	40	50	60
208	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (8 to 4)	1x (8 to 4)	1x (6 to 4)	1x (6 to 4)	1x (4 to 2/0)	1x (2 to 2/0)	1x (1 to 2/0)
220 to 240	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (8 to 4)	1x (8 to 4)	1x (6 to 4)	1x (6 to 4)	1x (4)	1x (3 to 2/0)	1x (2 to 2/0)
380 to 416	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (8 to 4)	1x (8 to 4)	1x (6 to 4)	1x (4)
440 to 480	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (8 to 4)	1x (8 to 4)	1x (6 to 4)
600	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (10 to 4)	1x (8 to 4)	1x (8 to 4)

HP Voltage	75	100	125	150	200	250	300	350	400	450	500
208	1x (2/0 to 3/0)	1x (3/0 to 300)	1x (250 to 300)	2x (1/0 to 300)	2x (3/0 to 350)	-----	-----	-----	-----	-----	-----
220 to 240	1x (1/0 to 2/0)	1x (3/0)	1x (4/0 to 300)	1x (300)	2x (2/0 to 300)	2x (4/0 to 350)	-----	-----	-----	-----	-----
380 to 416	1x (4 to 2/0)	1x (2 to 2/0)	1x (1/0 to 2/0)	1x (2/0 to 3/0)	1x (4/0 to 300)	1x (300)	2x (2/0 to 300)	2x (3/0 to 300)	2x (4/0 to 350)	2x (4/0 to 350)	-----
440 to 480	1x (4 to 2/0)	1x (3 to 2/0)	1x (2 to 2/0)	1x (1/0 to 3/0)	1x (2/0 to 3/0)	1x (4/0 to 300)	1x (300)	2x (1/0 to 300)	2x (2/0 to 300)	2x (3/0 to 350)	2x (4/0 to 350)
600	1x (6 to 4)	1x (4)	1x (3 to 2/0)	1x (2 to 2/0)	1x (1/0 to 3/0)	1x (2/0 to 3/0)	1x (4/0 to 300)	1x (250 to 300)	1x (300)	2x (1/0 to 300)	2x (2/0 to 300)

ALUMINUM CONDUCTORS for Contactor (1M-2M).

Field Wiring According to Bending Space (AWG or MCM). Terminals T1-T2-T3-T4-T5-T6-T7-T8-T9

HP Voltage	5	7.5	10	15	20	25	30	40	50	60
208	1x (12 to 2/0) **	1x (10 to 2/0) **	1x (10 to 2/0) **	1x (8 to 2/0) **	1x (6 to 2/0) **	1x (4 to 2/0) **	1x (4 to 2/0) **	1x (2 to 2/0)	1x (1/0 to 2/0)	1x (2/0)
220 to 240	1x (12 to 2/0) **	1x (10 to 2/0) **	1x (10 to 2/0) **	1x (8 to 2/0) **	1x (8 to 2/0) **	1x (6 to 2/0) **	1x (4 to 2/0) **	1x (2 to 2/0) **	1x (1 to 2/0)	1x (1/0 to 2/0)
380 to 416	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (10 to 2/0) **	1x (10 to 2/0) **	1x (8 to 2/0) **	1x (8 to 2/0) **	1x (6 to 2/0) **	1x (4 to 2/0) **	1x (3 to 2/0) **
440 to 480	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (10 to 2/0) **	1x (10 to 2/0) **	1x (8 to 2/0) **	1x (8 to 2/0) **	1x (6 to 2/0) **	1x (4 to 2/0) **
600	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (10 to 2/0) **	1x (10 to 2/0) **	1x (10 to 2/0) **	1x (8 to 2/0) **	1x (8 to 2/0) **	1x (6 to 2/0) **

HP Voltage	75	100	125	150	200	250	300	350	400	450	500
208	1x (3/0)	Consult Factory	1x (300) 90°C *	2x (3/0 to 300)	2x (250 to 350)	-----	-----	-----	-----	-----	-----
220 to 240	1x (2/0) 90°C *	Consult Factory	1x (300)	1x (300) 90°C *	2x (4/0 to 300)	2x (300 to 350)	-----	-----	-----	-----	-----
380 to 416	1x (2 to 2/0)	1x (1/0 to 2/0)	1x (1/0 to 2/0)	1x (3/0) 90°C *	1x (300)	1x (300) 90°C *	2x (4/0 to 300)	2x (250 to 300)	2x (300 to 350)	2x (300 to 350)	-----
440 to 480	1x (3 to 2/0) **	1x (2 to 2/0)	1x (2/0) 90°C *	1x (2/0 to 3/0)	1x (3/0) 90°C *	1x (300)	1x (300) 90°C *	2x (3/0 to 300)	2x (4/0 to 300)	2x (250 to 350)	2x (300 to 350)
600	1x (4 to 2/0) **	1x (3 to 2/0) **	1x (2 to 2/0)	1x (1/0 to 3/0)	1x (3/0)	1x (3/0) 90°C *	1x (300)	1x (300) 90°C *	Consult Factory	2x (3/0 to 300)	2x (4/0 to 300)

*For standard enclosure, use 90°C aluminium wire. Consult Factory for Use of Conductors Rated Lower than 90°C.

** Option V659 required.

Drawing for information only.
Manufacturer reserves the right to modify this drawing without notice.
Contact manufacturer for "As Built" drawing.



REV.	DESCRIPTION	DD/MM/YY	Drawing number
1	Removed Seismic logo (optional)	18/05/22	GPX-TD612 2/2 /E
0	First issue	22/12/20	

Electric Fire Pump Controller

Model: GPX

Terminal Diagram and Sizing

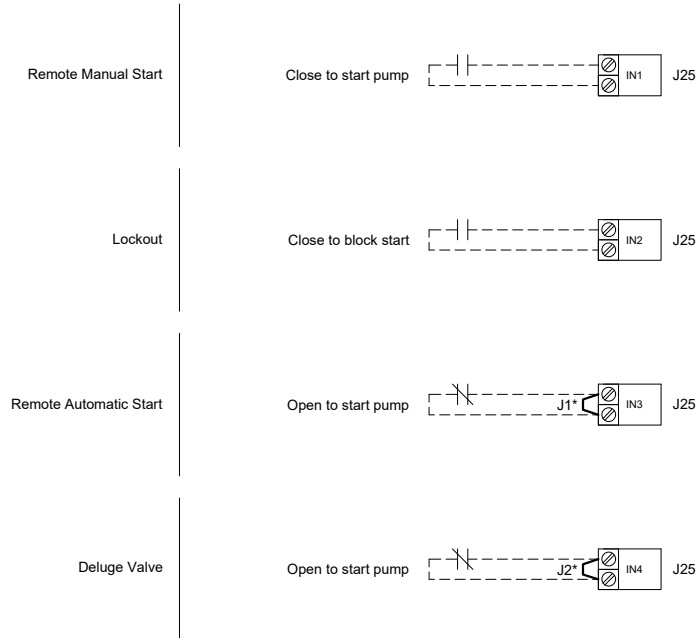
Built to the latest edition of the NFPA 20 standard

Control Terminals (EB1)

Terminals Wire Size:
24 - 12 AWG
0.5 Nm

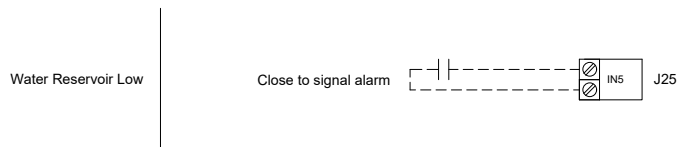
Remote Alarm Terminals (EB1)

Terminals Wire Size:
24 - 12 AWG
0.5 Nm



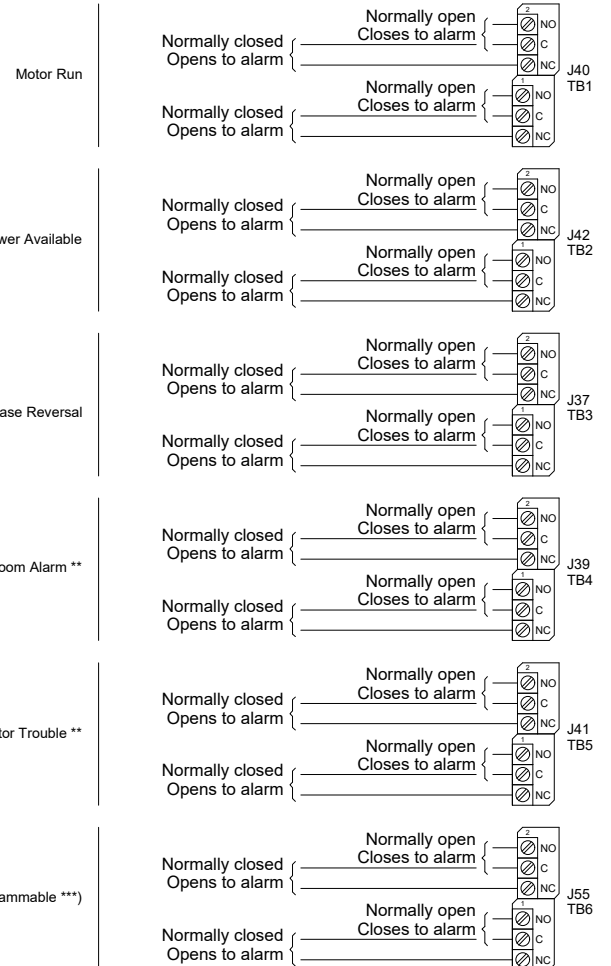
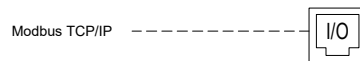
Alarm Inputs (EB1)

Terminals Wire Size:
24 - 12 AWG
0.5 Nm



Network Connection (VMB1)

Shielded Female Connector RJ45




* Remove jumper to use this feature
** Re-assignable
*** Not available on GPS models

Drawing for information only.
Manufacturer reserves the right to modify this drawing without notice.
Contact manufacturer for "As Built" drawing.



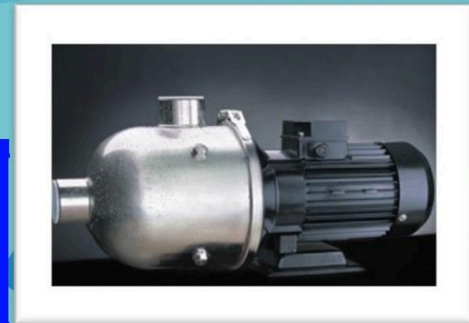
REV.	DESCRIPTION	DD/MM/YY	Drawing number
3	Removed Seismic logo (optional)	18/05/22	GPX-TD603 / E
2	Revised logo	18/06/18	
1	General Revision (added AL coverage)	10/07/17	

	Vendor Ref. No.	
	Contractor Ref. No.	
Project Name:	Contractor Job No.	

JOCKEY PUMP

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date

PACIFIC STAINLESS STEEL WATER PUMP



HIGH PERFORMANCE PUMPS FOR ALL WATER APPLICATIONS

Product introduction

Performance range	2
Applications	3
Product range	4
Pump	5
Motor	5
Ambient temperature	5
Terminal box positions	5
Viscosity	5

Construction

RV/RVA1,2,3,4,5	6
RV/RVA10,15,20	7
RV/RVA32,45,64,90	8

Instruction and codes

Operating and inlet pressures

Max. operation pressure and liquid temperature...	10
Operation range of the shaft seal	10
Max. Inlet Pressure	11

Selection and sizing

Selection of pumps	12~14
How to read the curve charts	14
Guidelines to performance curve.....	15

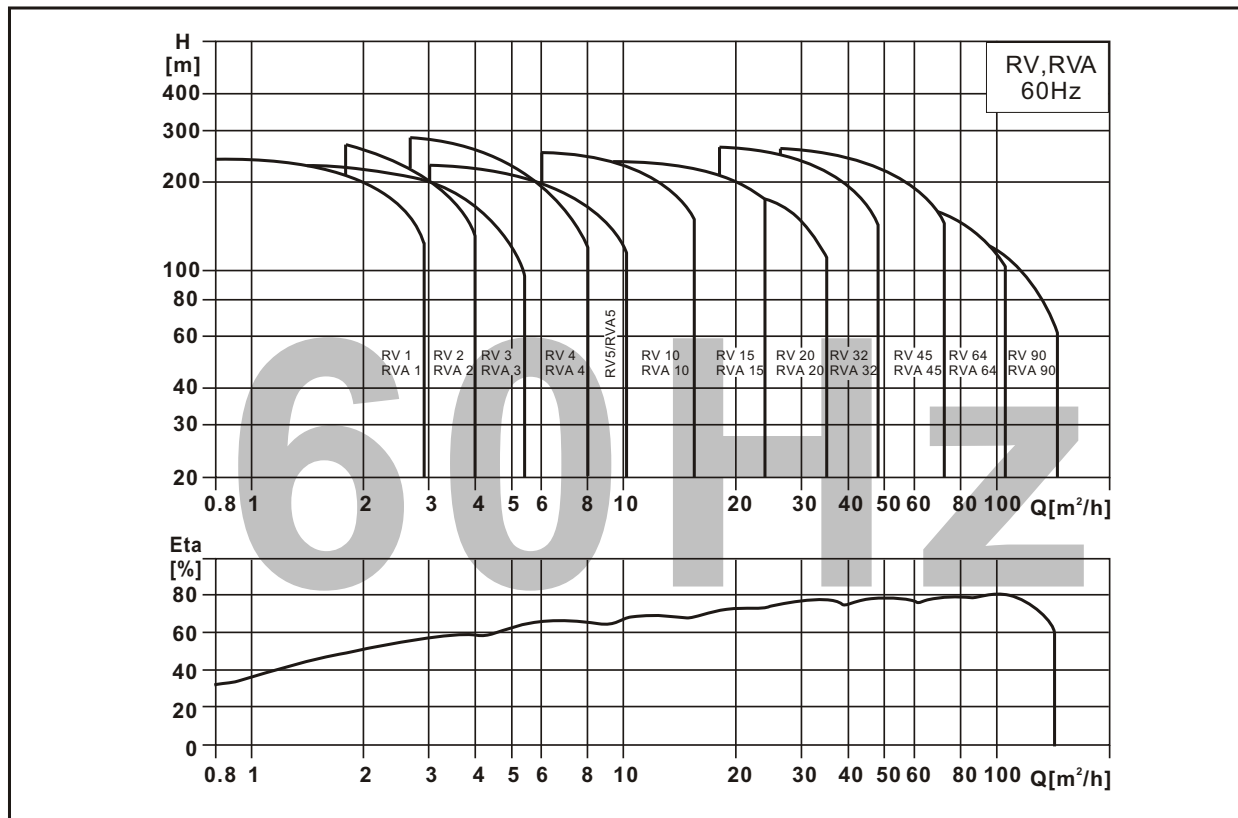
Performance Curves and Technical Data

RVA1	16~17
RV1	18~19
RVA2	20~21
RV2	22~23
RVA3	24~25
RV3	26~27
RVA4	28~29
RV4	30~31

RVA5	32~33
RV5	34~35
RVA10	36~37
RV10	38~39
RVA15	40~41
RV15	42~43
RVA20	44~45
RV20	46~47
RVA32	48~49
RV32	50~51
RVA45	52~53
RV45	54~55
RVA64	56~57
RV64	58~59
RVA90	60~61
RV90	62~64
Accessories	65~69

Product introduction

Performance range



Applications

Application	RVA	RV
Water supply		
Filtration and transfer at waterworks	●	●
Distribution from waterworks	●	●
Pressure boosting in mains	●	●
Pressure boosting in high-rise buildings, hotels, etc.	●	●
Pressure boosting for industrial water supply	●	●
Industry		
Pressure boosting		
Process water systems	●	●
Washing and cleaning systems	●	●
Vehicle washing tunnels	●	●
Fire fighting systems	●	●
Liquid transfer		
Cooling and air-conditioning systems (refrigerants)	●	●
Boiler feed and condensate systems	●	●
Machine tools (cooling lubricants)	●	●
Aquafarming	●	●
Transfer		
Oil and alcohol	●	●
Glycol and coolants	●	●
Water treatment		
Ultra-filtration systems	●	○
Reverse osmosis systems	●	○
Softening, ionising, demineralizing systems	●	○
Distillation systems	●	○
Separators	●	○
Swimming baths	●	●
Irrigation		
Field irrigation (flooding)	●	●
Sprinkler irrigation	●	●
Drip-feed irrigation	●	●

- Recommended pump model
- Option pump model

Product introduction

Vertical Multistage Centrifugal Pump

Product range

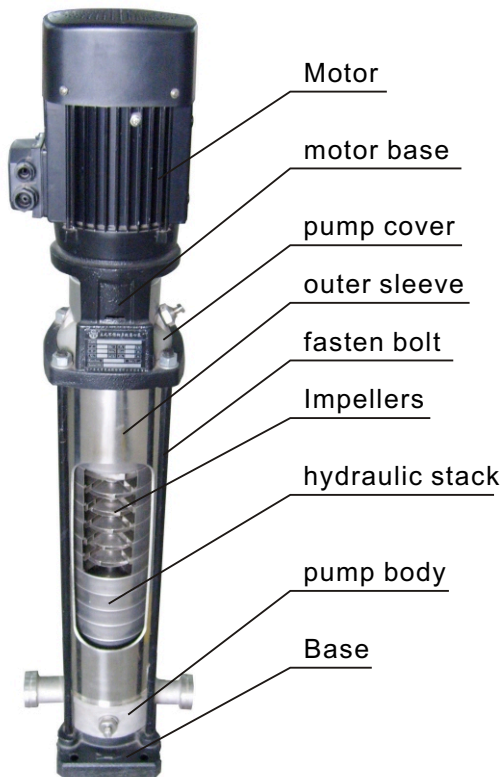
Range	RV1 RVA1	RV2 RVA2	RV3 RVA3	RV4 RVA4	RV5 RVA5	RV10 RVA10	RV15 RVA15	RV20 RVA20	RV32 RVA32	RV45 RVA45	RV64 RVA64	RV90 RVA90
Nominal rated [m ³ /h]	1	2	3	4	5	10	15	20	32	45	64	90
Temperature range [°C]	-20~+104											
Temperature on range [°C]	-40~+180								-40~+180			
Max Efficiency [%]	44	45	56	58	65	66	68	69	77	78	80	81
RVpump												
Flow range [m ³ /h]	0.7-2.4	1-3.2	1.2-4.5	2-4.8	2.5-8	5-13	9-24	10-29	14-40	20-56	30-85	40-120
Max Pressure [bar]	22	25	24	25	24	22	23	25	28	26	20	20
High Pressure on request [bar]	47	47	47	47	47	47	47	47	39	40	39	39
Motor power [kW]	0.37-2.2	0.37-3	0.37-3	0.37-4	0.37-5.5	0.37-7.5	1.1-15	1.1-18.5	1.5-30	3-45	4-45	5.5-45
Material type												
RV cast iron, S.S EN1.4301/AISI 304	●	●	●	●	●	●	●	●	●	●	●	●
RVA S.S EN1.4301/AISI 304	●	●	●	●	●	●	●	●	●	●	●	●
RVN S.S EN1.4401/AISI 316	●	●	●	●	●	●	●	●	●	●	●	●
RVpump pipe connection												
Flange	DN25 DN32	DN25 DN32	DN25 DN32	DN25 DN32	DN25 DN32	DN40	DN50	DN50	DN65	DN80	DN100	DN100
Flange on request	-	-	-	-	-	DN50	DN65	DN65	DN80	DN100	DN125	DN125
RVA/RV pump pipe connection												
column pipe thread★	G1 G1¼	G1 G1¼	G1 G1¼	G1 G1¼	G1 G1¼	G1½ G2	G2½	G2½	-	-	-	-
column pipe thread on request★	G1½	G1½	G1½	G1½	G1½	-	G2	G2	-	-	-	-
Flange	DN25 DN32	DN25 DN32	DN25 DN32	DN25 DN32	DN25 DN32	DN40	DN50	DN50	DN65	DN80	DN100	DN100
Flange on request	-	-	-	-	-	DN50	DN65	DN65	DN80	DN100	DN125	DN125
Cutting ferrule joint [PJE] ★	G1¼ DN32	G1¼ DN32	G1¼ DN32	G1¼ DN32	G1¼ DN32	G2 DN50	G2 DN50	G2 DN50	-	-	-	-

★NPT thread are on request

Pump

RVA and RV are non-self priming vertical multistage centrifugal pump, the pumps are available with standard motor, the inlet and outlet are located at the pump bottom at the same plane (inline type). All pumps are equipped with a maintenance-free mechanical seal set of the cartridge type.

Fig.1 RVA



Motor

RVA and RV are fitted with a totally enclosed, fan-cooled, 2-pole, three-phase standard motor. From 0.37kW to 2.2kW, are also available with single-phase motor. (1*220-230V/240V).

Motor Protection

Single-phase motor have a built-in thermal overload switch. Three-phase motors must be connected to a motor protective circuit breaker according to local regulations.

Ambient temperature

Ambient temperature: maximum +40°C, if the ambient temperature exceeds +40°C, or the pump is installed at an altitude exceeding 1000 meters, the motor must not be fully loaded due to the risk of overheating. Overheating may result from excessive ambient temperatures or the low density and consequently low cooling effect of the air. In such cases, it may be necessary to use a motor with a higher rated output.

Terminal box positions

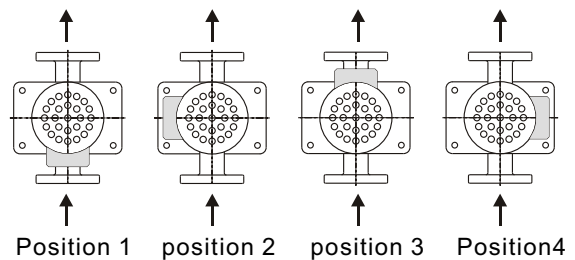
As standard the terminal box is mounted on the suction side of the pump, meanwhile, 0°, 90°, 180°, 270° could be adjusted according to the following proceeding:

1. If necessary, disassembling the protective cover of the shaft connector, but did not disassembling the shaft connector.
2. Disassembling the motor fixation screws.
3. Turn the motor to the required direction.
4. Fasten the motor screws.
5. Install the shaft connector's protective cover.

The voltage and frequency are marked on the label, the correct power should be confirm with the label before usage.

To ensure the electric connection is conformity to the drawing marked on the label inside the terminal box.

Fig2. Terminal box positions

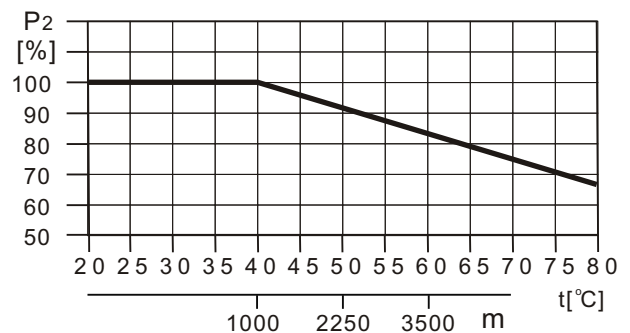


Viscosity

The pumping of liquids with densities or kinematic viscosities higher than those of water will cause a considerable pressure drop, a drop in the hydraulic performance and a rise in the power consumption.

In such situations the pump should be fitted with a larger motor, if in doubt.

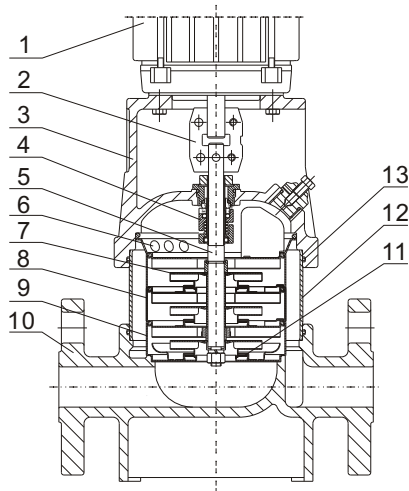
Fig.3 Relationship between motor output (P2) and temperature



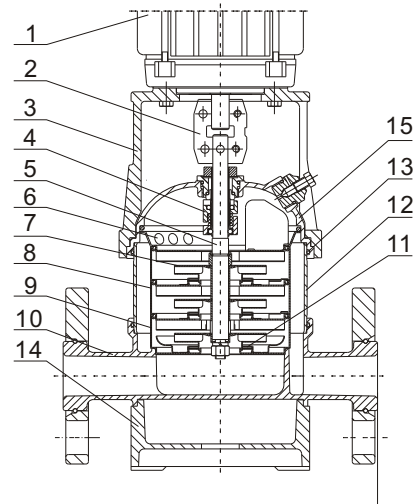
Example:

From the Fig.3, the pump is installed at an altitude exceeding altitude 3500 meters, P2 will decrease to 88%, if the ambient temperature is up to 70°C, P2 will decrease to 78%.

RV1,2,3,4,5
Sectional drawing



RVA1,2,3,4,5
Sectional drawing



Material RV

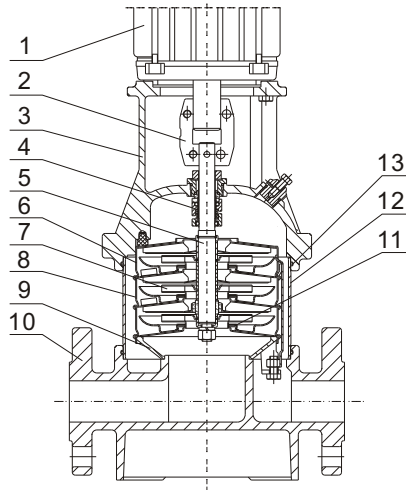
No.	Description	Material	EN/DIN	AISI/ASTM
1	Motor			
2	Shaft connector			
3	Pump head	Castiron	EN-JL1030	ASTM25B
4	Mechanical seal			
5	Shaft	S.S		AISI420
6	Outlet	S.S	1.4301	AISI304
7	Impeller	S.S	1.4301	AISI304
8	Hydraulic stack	S.S	1.4301	AISI304
9	Inlet	S.S	1.4301	AISI304
10	Pump body	Castiron	EN-JL1030	ASTM25B
11	Neck ring	PTFE		
12	Outer sleeve	S.S	1.4301	AISI304
13	O-ring	EPDM/FKM		

Material RVA

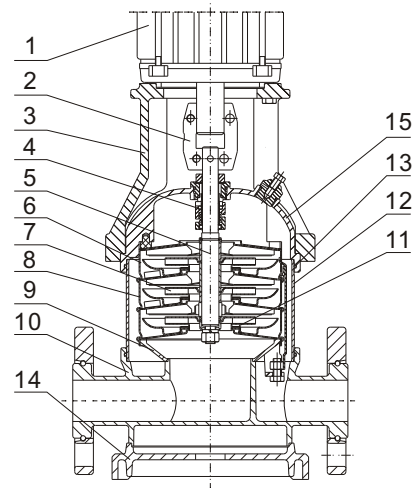
No.	Description	Material	EN/DIN	AISI/ASTM
1	Motor			
2	Shaft connector			
3	Pump head	Castiron	EN-JL1030	ASTM25B
4	Mechanical seal			
5	Shaft	S.S	1.4057	AISI431
6	Outlet	S.S	1.4301	AISI304
7	Impeller	S.S	1.4301	AISI304
8	Hydraulic stack	S.S	1.4301	AISI304
9	Inlet	S.S	1.4301	AISI304
10	Pump body	S.S	1.4301	AISI304
11	Neck ring	PTFE		
12	Outer sleeve	S.S	1.4301	AISI304
13	O-ring	EDM/FKM		
14	Bottom base	Castiron	EN-JL1030	ASTM25B
15	Pump cover	S.S	1.4301	AISI304

Construction

RV10,15,20
Sectional drawing



RVA10,15,20
Sectional drawing



Material RV

No.	Description	Material	EN/DIN	AISI/ASTM
1	Motor			
2	Shaft connector			
3	Pump head	Cast iron	EN-JL1030	ASTM25B
4	Mechanical seal			
5	Shaft	S.S		AISI420
6	Outlet	S.S	1.4301	AISI304
7	Impeller	S.S	1.4301	AISI304
8	Hydraulic stack	S.S	1.4301	AISI304
9	Settled cover	S.S	1.4301	AISI304
10	Pump body	Cast iron	EN-JL1030	ASTM25B
11	Neck ring	PTFE		
12	Outer sleeve	S.S	1.4301	AISI304
13	O-ring	EPDM/FKM		

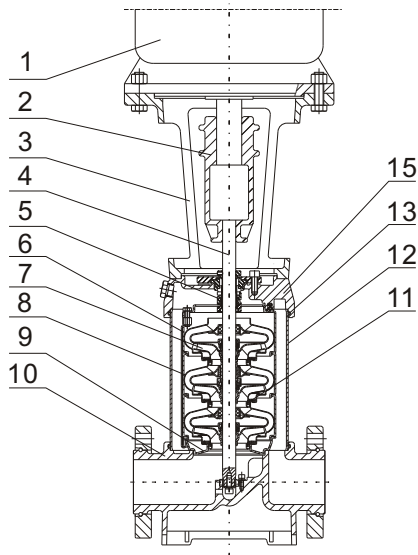
Material RVA

No.	Description	Material	EN/DIN	AISI/ASTM
1	Motor			
2	Shaft connector			
3	Pump head	Cast iron	EN-JL1030	ASTM25B
4	Mechanical seal			
5	Shaft	S.S	1.4057	AISI431
6	Outlet	S.S	1.4301	AISI304
7	Impeller	S.S	1.4301	AISI304
8	Hydraulic stack	S.S	1.4301	AISI304
9	Settled cover	S.S	1.4301	AISI304
10	Pump body	S.S	1.4301	AISI304
11	Neck ring	PTFE		
12	Outer sleeve	S.S	1.4301	AISI304
13	O-ring	EPDM/FKM		
14	Bottom base	Cast iron	EN-JL1030	ASTM25B
15	Pump cover	S.S	1.4301	AISI304

Construction

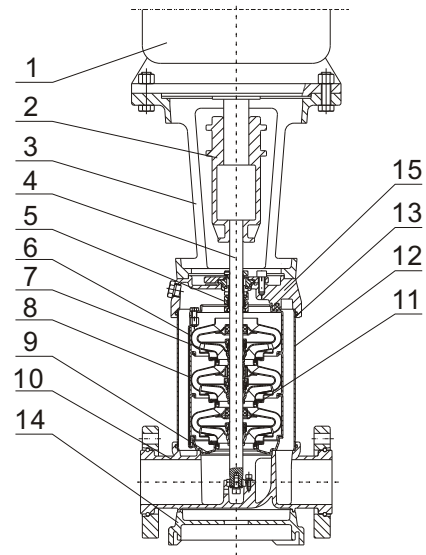
RV32,45,64,90

Sectional drawing



RVA32,45,64,90

Sectional drawing



Material RV

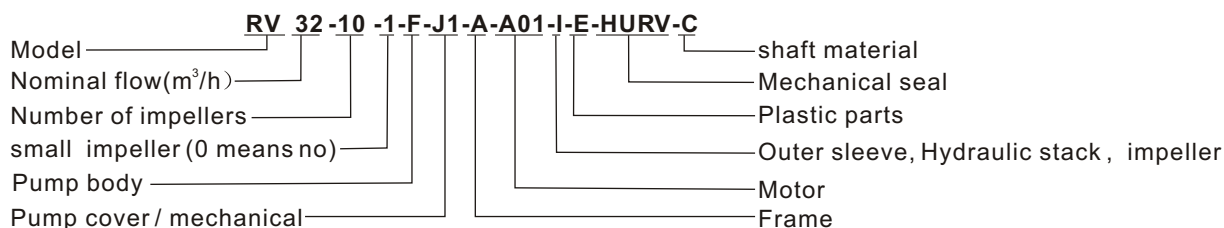
No.	Description	Material	EN/DIN	AISI/ASTM
1	Motor			
2	Shaft connector			
3	Pump head	Cast iron	EN-JL1030	ASTM25B
4	Shaft	S.S		AISI420
5	Mechanical sea			
6	Outlet	S.S	1.4301	AISI304
7	Impeller	S.S	1.4301	AISI304
8	Hydraulic stack	S.S	1.4301	AISI304
9	Inlet	S.S	1.4301	AISI304
10	Pump body	Cast iron	EN-JL1030	ASTM25B
11	Neck ring	PTFE		
12	Outer sleeve	S.S	1.4301	AISI304
13	O-ring	EPDM/FKM		
14	Pump cover	Cast iron	EN-JL1030	ASTM25B

Material RVA

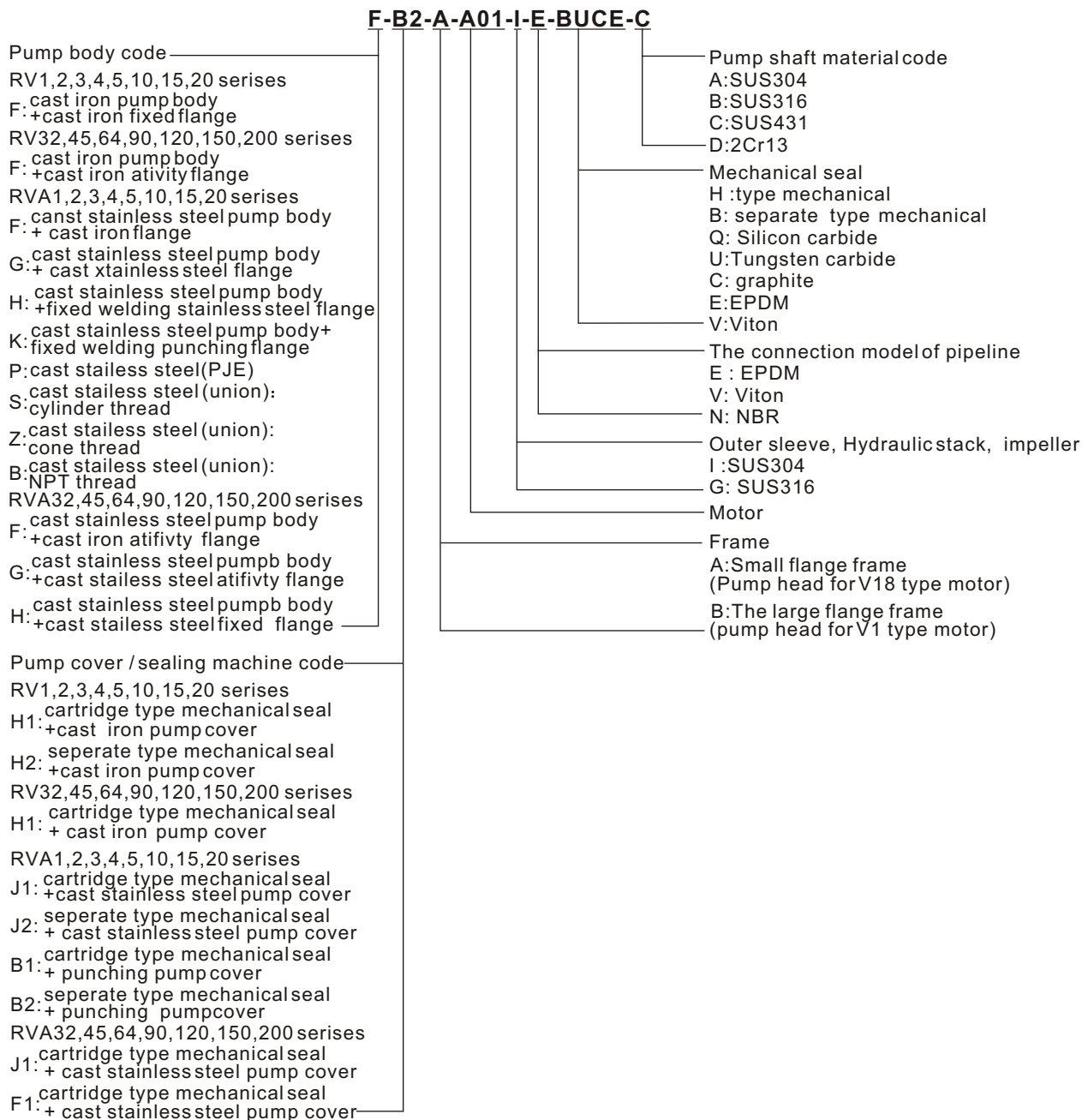
No.	Description	Material	EN/DIN	AISI/ASTM
1	Motor			
2	Shaft connector			
3	Pump head	Cast iron	EN-JL1030	ASTM25B
4	Shaft	S.S	1.4057	AISI431
5	Mechanical seal			
6	Outlet	S.S	1.4301	AISI304
7	Impeller	S.S	1.4301	AISI304
8	Hydraulic stack	S.S	1.4301	AISI304
9	Inlet	S.S	1.4301	AISI304
10	Pump body	S.S	1.4301	AISI304
11	Neck ring	PTFE		
12	Outer sleeve	S.S	1.4301	AISI304
13	O-ring	EPDM/FKM		
14	Bottom base	Cast iron	EN-JL1030	ASTM25B
15	Pump cover	S.S	1.4301	AISI304

Model instruction

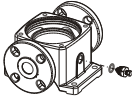
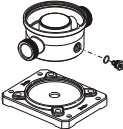
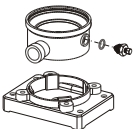
RV/RVA1,2,3,4,5,10,15 and 20... ..



Codes



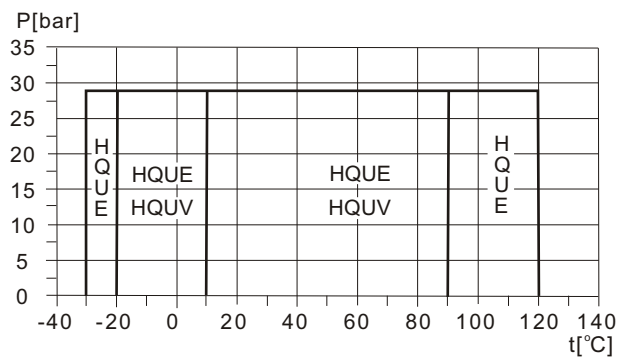
Maximum operating pressure and temperature range

	DIN-FGJ	UNION	PJE
			
	Max. permissible operating pressure		Liquid temperature range
RV,RVA1	25bar		-20 °C to +104 °C
RV,RVA2	25bar		-20 °C to +104 °C
RV,RVA3	25bar		-20 °C to +104 °C
RV,RVA4	25bar		-20 °C to +104 °C
RV,RVA5	25bar		-20 °C to +104 °C
RV,RVA10-1→RV,RVA10-10	16bar		-20 °C to +104 °C
RV,RVA10-12→RV,RVA10-17	25bar		-20 °C to +104 °C
RV,RVA15-1→RV,RVA15-8	16bar		-20 °C to +104 °C
RV,RVA15-9→RV,RVA15-12	25bar		-20 °C to +104 °C
RV,RVA20-1→RV,RVA20-7	16bar		-20 °C to +104 °C
RV,RVA20-8 →RV,RVA20-10	25bar		-20 °C to +104 °C
RV,RVA32-1-1→RV,RVA32-5	16bar		-20 °C to +104 °C
RV,RVA32-6-2→RV,RVA32-8	25bar		-20 °C to +104 °C
RV,RVA32-9-2→RV,RVA32-10-2	30bar		-20 °C to +104 °C
RV,RVA45-1-1→RV,RVA45-4	16bar		-20 °C to +104 °C
RV,RVA45-5-2→RV,RVA45-6-1	25bar		-20 °C to +104 °C
RV,RVA45-6→RV,RVA45-7	30bar		-20 °C to +104 °C
RV,RVA64-1-1→RV,RVA64-3	16bar		-20 °C to +104 °C
RV,RVA64-4-2→RV,RVA64-5-2	25bar		-20 °C to +104 °C
RV,RVA90-1-1→RV,RVA90-3	16bar		-20 °C to +104 °C
RV,RVA90-4-2	25bar		-20 °C to +104 °C

Operating range of the shaft seal

The operating range of the shaft seal depends on operating pressure, pump type, type of shaft seal and liquid temperature. The range shown in fig 4. Applies to cleanwater and water with glycol liquids.

Fig.4 Operating range of standard shaft seals



maximum inlet pressure

The following table shows the maximum permissible inlet pressure. However, the actual inlet pressure the pressure against a closed valve must always be lower than the maximum permissible operating pressure. If the maximum permissible operating pressure is exceeded, the bearing in the motor may be damaged and the life of the shaft seal reduced.

RV,RVA 1 RV,RVA1-2 → RV,RVA1-25 RV,RVA1-27	10bar 15bar
RV,RVA 2 RV,RVA2-2 → RV,RVA2-26	10bar
RV,RVA 3 RV,RVA3-2 → RV,RVA3-15 RV,RVA3-17 → RV,RVA3-25	10bar 15bar
RV,RVA 4 RV,RVA4-2 → RV,RVA4-22	15bar
RV,RVA 5 RV,RVA5-2 → RV,RVA5-9 RV,RVA5-10 → RV,RVA5-24	10bar 15bar
RV,RVA 10 RV,RVA10-1 → RV,RVA10-5 RV,RVA10-6 → RV,RVA10-17	8bar 10bar
RV,RVA 15 RV,RVA 15-1 → RV,RVA 15-2 RV,RVA 15-3 → RV,RVA 15-12	8bar 10bar
RV,RVA20 RV,RVA20-1 RV,RVA20-2 → RV,RVA20-10	8bar 10bar
RV,RVA 32 RV,RVA32-1-1 → RV,RVA32-2 RV,RVA32-3-2 → RV,RVA32-6 RV,RVA32-7-2 → RV,RVA32-10-2	4bar 10bar 15bar
RV,RVA 45 RV,RVA45-1-1 → RV,RVA45-1 RV,RVA45-2-2 → RV,RVA45-3 RV,RVA45-4-2 → RV,RVA45-7	4bar 10bar 15bar
RV,RVA 64 RV,RVA64-1-1 RV,RVA64-1 → RV,RVA64-2-1 RV,RVA64-2 → RV,RVA64-5-2	4bar 10bar 15bar
RV,RVA 90 RV,RVA90-1-1 → RV,RVA90-2-2 RV,RVA90-2-1 → RV,RVA90-4-2	10bar 15bar

Example of operating and inlet pressures :

The values for operating and inlet pressures shown in the table must not be considered individually but must always be compared, see the following examples.

Example 1:

pump model:RVA-5-20-A-FGJ-E-HQUE

Max.operating pressure:25bar

Max.inlet pressure:15bar

discharge pressure against a closed valve:

13.7bar, see page31.

the pump is not allowed to start at an inlet pressure of 15 bar, but at an inlet pressure of $25-13.7=11.3$ bar.

Example 2:

MODEL:RVA15-3-A-P-E-HQUE

Max.operating pressure:16bar

Max.inlet pressure:8bar

discharge pressure against a closed valve:

4.2bar, see page39 curves chart.

This pump is allowed to start at an inlet pressure of 6bar, as the discharge pressure against a closed valve is only 4.2bar, which results in an operating pressure of $6+4.2=10.2$ bar. On the contrary, the max. Operating pressure of this pump limited to 12.2bar, as a higher operating pressure bigger than 8bar will require on the Inlet.

selection of pumps

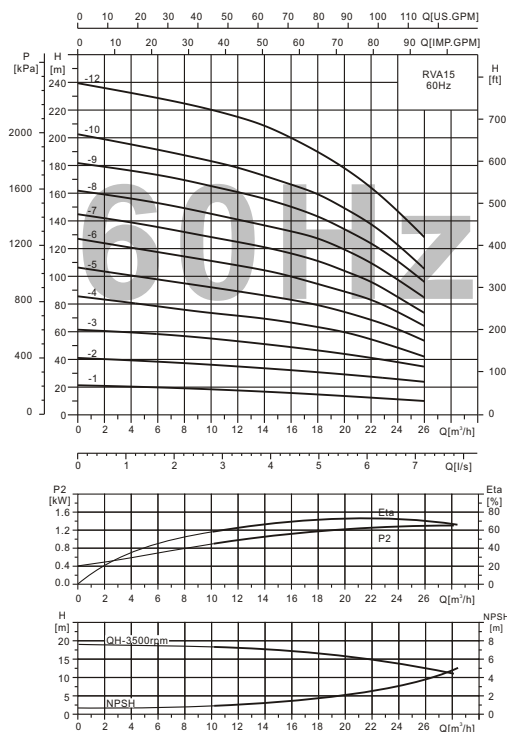
selection of pumps should be based on:

- the duty point of the pump(see page12).
- dimensional data such as pressure loss as a
- result of height differences,friction loss in the pipework,pump efficiency etc.(see page12).
- pump materials(see page6,7,8)
- pump connections(see page13)
- shaft seal(see page13)

1. Duty point of the pump

From a duty point it is possible to select a pump on the basis of the curve charts shown in "performance curves/technical" data.

Fig.5 example of curve chart



2. dimensional data

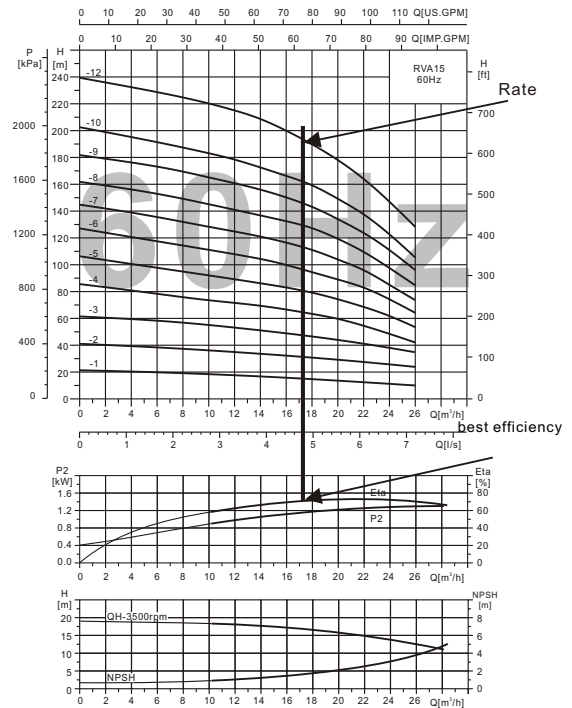
When sizing a pump the following must be taken into accounting:

- Required flow and pressure at the draw-off point.
- Pressure loss as a result of height differences(H_{geo}).
- Friction loss in the pipework(H_f) It may.
- Best efficiency at the estimated duty point.
- NPSH value.
- For calculation of the NPSH value, see corresponding curves chart.

pump efficiency

Before determining the best efficiency point, the operation pattern of the pump needs to be identified. If the pump expected to operate as the same duty point, then select a RVA pump which is operating at a duty point corresponding with the best efficiency of the pump.

Fig.6 example of duty point



As the pump is sized on the basis of the highest possible flow, it is important always to have the duty point to the right on the efficiency curve (eta) in order to keep efficiency high when the flow drops.

Fig.7 best efficiency

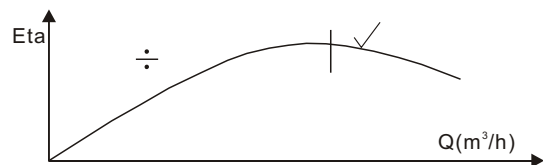
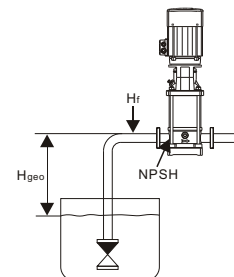


Fig.8 dimensional data



3. pump material

The material variant(RV,RVA)should be selected based of the liquid to be pump.
RVA wetted parts are made of AISI304.
RV pump body is made of cast-iron and .
Wetted parts are made of AISI304.

4. Pump connections

selection of pump connection depend on the rated pressure and pipework. To meet any requirement the RV, RVA pump offer a wide range of flexible connection such as:

- DIN frange.
- PJE coupling.
- union connection.
- Other connections on request.

5.shaft seal

As standard, the RV AND RVA range is fitted with a cartridge type suitable for themost common applications. The following key parameters must be taken into account ,when selecting the shaft seal:

- type of pumped liquid.
- liquid temperature and
- maximum pressure.

Inlet pressure and operating pressure

The limit values stated on page 10 and page 11 must not be exceeded as regards

- maximum inlet pressure and
- maximum operating pressure.

Fig. 9 RV pump

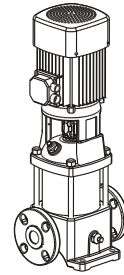
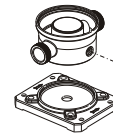


Fig. 10 pump connections

DIN-FGJ



UNION



PJE

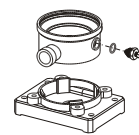


Fig.11 Shaft seal (cartridge type)

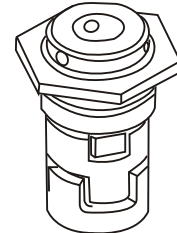
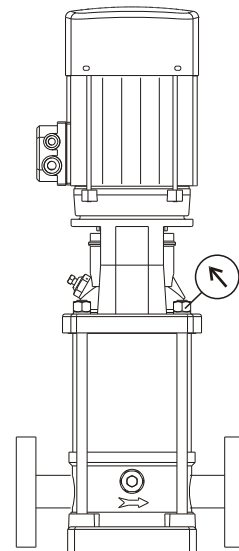


Fig.12 Inlet pressure and operating pressure



Minimum inlet pressure-NPSH

Calculation of the inlet pressure "H" is recommended in these situations :

- the liquid temperature is high.
 - the flow is significantly higher than the rated flow.
 - water is drawn from depths.
 - water is drawn through long pipes.
- inlet conditions are poor. to avoid cavitation, make sure that there is a minimum pressure on the suction side of the pump.

The maximum suction lift "H" in metres head can be calculated as follows:

$$H = P_b * 10.2 - NPSH - H_f - H_v - H_s$$

P_b = Barometric pressure in bar.
(Barometric pressure can be set to 1 bar).
in closed systems, P_b indicates the system pressure in bar.

NPSH = Net positive suction Head in metres head.
(To be read from the NPSH curve at the highest flow the pump will be delivering).

H_f = Friction loss in suction pipe (unit:m).
(At the highest flow the pump will be delivering.)

H_v = Vapour pressure (unit:m).
(To be read from the vapour pressure scale).

H_s = safety margin = minimum 0.5 metres head.

If the "H" calculated is positive, the pump can operate at a suction lift of maximum "H" metres head. If the "H" calculated is negative, an inlet pressure of minimum "H" metres head is required.

Example:

$P_b = 1 \text{ bar}$
 pump model: RVA10, 50Hz
 flow: $10 \text{ m}^3/\text{h}$
 NPSH (P36 reference): 2.1 metres head.
 liquid temperature: $+50^\circ\text{C}$
 H_v (reference picture 4): 1.3 metres head.
 $H = P_b * 10.2 - NPSH - H_f - H_v - H_s$
 $H = 1 * 10.2 - 2.1 - 3.0 - 1.3 - 0.5 = 3.3 \text{ (metres)}$

It means the pump can operate at a suction lift of maximum 3.3 metres head.

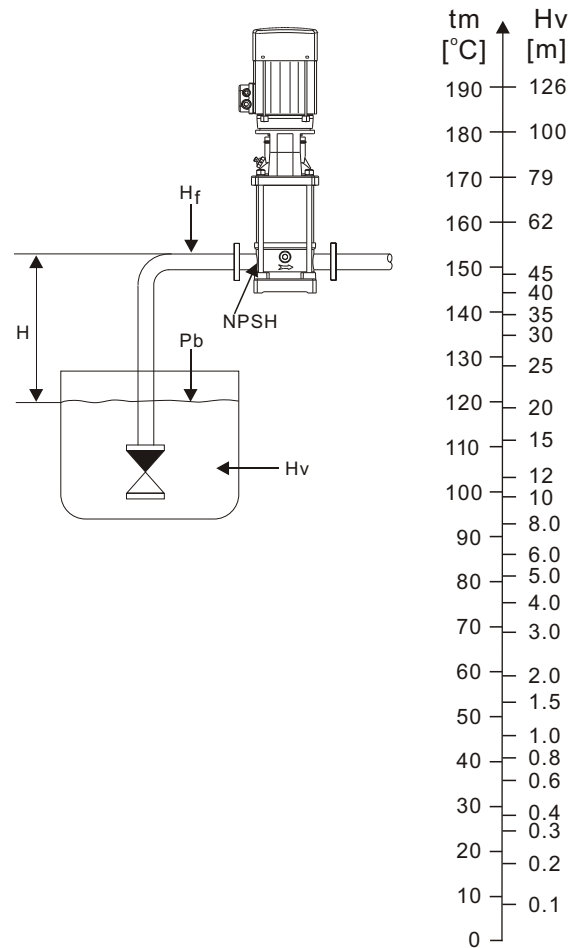
exchanged meter head to bar:

$$1 \text{ metre head} = 1 * 0.0981 = 0.0981 \text{ bar}$$

exchanged metre head to kpa:

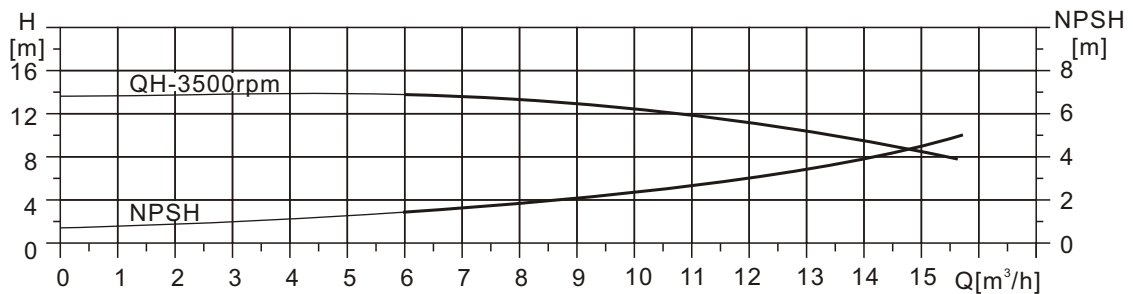
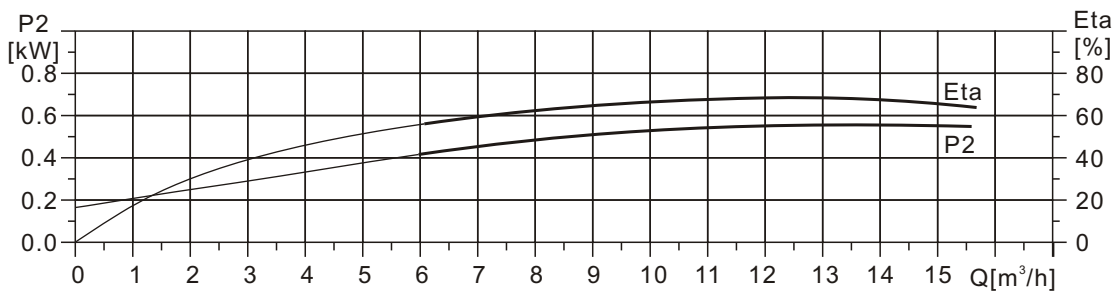
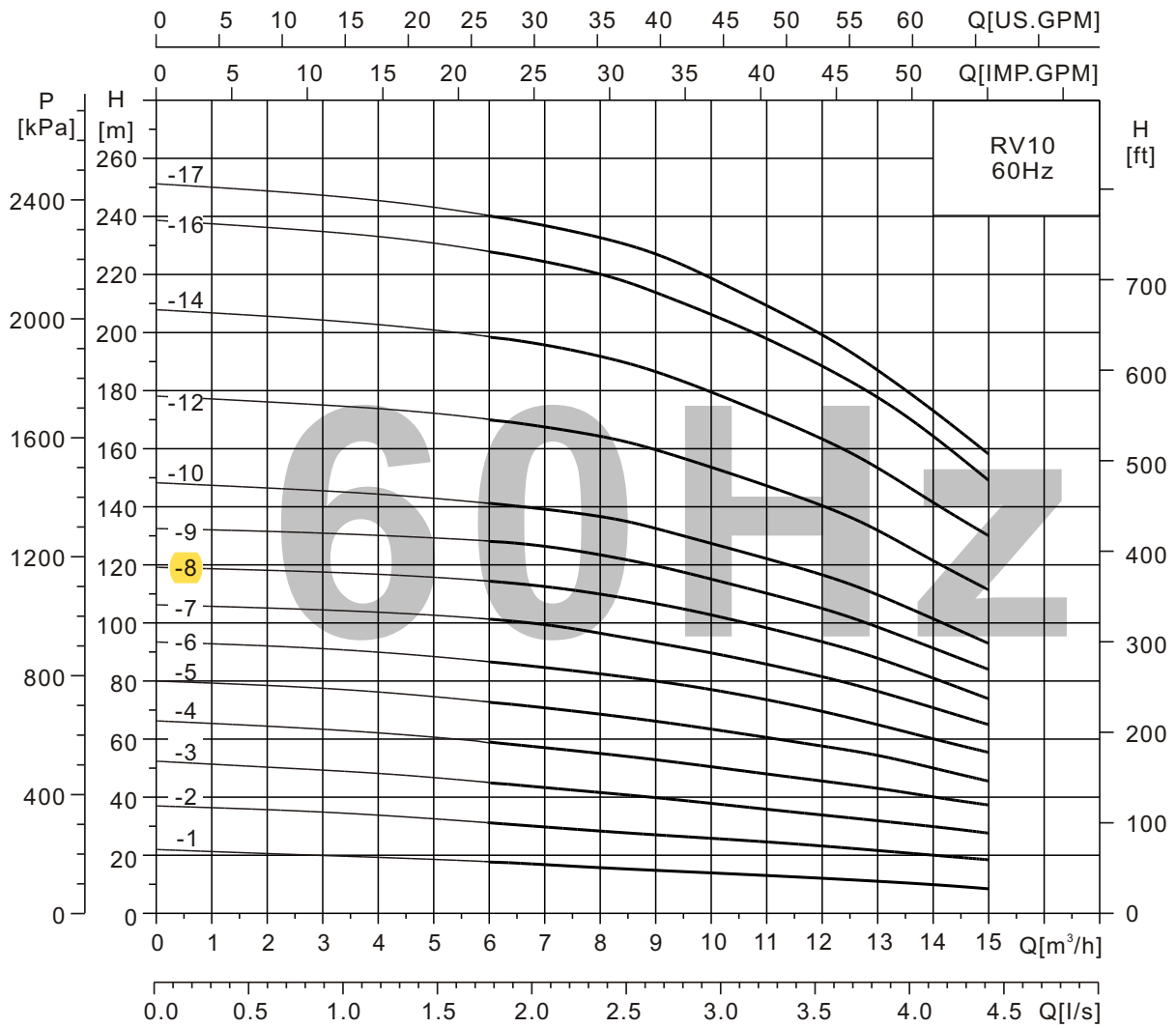
$$1 \text{ metre head} = 1 * 9.81 = 9.81 \text{ kpa.}$$

Fig.13 Minimum inlet pressure-NPSH



Performance Curve

RV10-60Hz

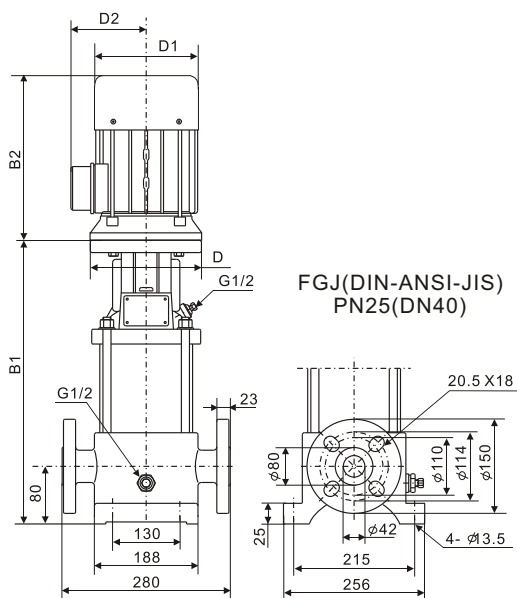


Performance Table

Model	Power P ₂ (kW)	Q (m ³ /h)	H (m)									
			7.0	8.0	9.0	10	11	12	13	14	15	16
RV10-1	0.75	H (m)	14	13.5	13.3	12.5	12	11.5	11	10	9.5	8
RV10-2	1.5		28	27	26	25.5	24	23	22	20	19	16
RV10-3	2.2		43	41	40	38	36	35	33	30	28	24
RV10-4	3.0		57	55	53	51	48	47	44	40	37	32
RV10-5	3.0		71	69	67	64	60	58	55	50	46	40
RV10-6	4.0		82	82	80	77	73	70	66	60	56	48
RV10-7	5.5		100	96	93	90	85	82	77	70	65	56
RV10-8	5.5		114	110	107	104	97	94	88	80	74	64
RV10-9	5.5		128	124	120	115	109	106	99	90	84	72
RV10-10	7.5		142	137	133	128	121	117	100	100	93	80
RV10-12	7.5		171	165	160	151	145	141	132	121	111	96
RV10-14	11		202	192	187	184	170	164	154	141	130	112
RV10-16	11		228	220	214	205	194	188	175	163	149	128
RV10-17	11		242	234	227	218	206	200	187	173	158	136

Installation sketches

Dimensions and weights



Model	Dimensions(mm)						Weight (kg)
	B1	B2	B1+B2	D	D1	D2	
RV10-1	322	205	527	-	133	102	36
RV10-2	388	241/293	629	-	154	111	44
RV10-3	426	275/293	701	-	177	116	47
RV10-4	456	293	731	-	177	116	52
RV10-5	486	293	761	-	177	116	53
RV10-6	536	305	841	-	197	148	64
RV10-7	587	390	977	300	275	210	86
RV10-8	617	390	1007	300	275	210	87
RV10-9	647	390	1037	300	275	210	88
RV10-10	677	390	1067	300	275	210	91
RV10-12	737	390	1127	300	275	210	94
RV10-14	897	505	1402	350	330	255	127
RV10-16	957	505	1462	350	330	255	129
RV10-17	987	505	1492	350	330	255	131

Technical Data

Standard motor

Power P_2 (kW)	Voltage (V)	Current I_N (A)	Power factor $\cos \varphi$	EFFiciency (%)	I_{st}/I_N
0.37	Δ 220/Y380	Δ 1.8/Y1.0	0.78	70.0	6.2
0.55	Δ 220/Y380	Δ 2.5/Y1.5	0.81	71.0	6.4
0.75	Δ 220/Y380	Δ 3.3/Y1.9	0.82	72.0	6.5
1.1	Δ 220/Y380	Δ 4.6/Y2.7	0.82	76.5	7.2
1.5	Δ 220/Y380	Δ 6.2/Y3.6	0.83	76.8	7.3
2.2	Δ 220/Y380	Δ 8.5/Y4.9	0.84	81.1	7.5
3.0	Δ 220/Y380	Δ 11.5/Y6.7	0.84	81.5	7.5
4.0	Δ 380/Y660	Δ 8.2/Y4.7	0.88	84.2	7.5
5.5	Δ 380/Y660	Δ 11.1/Y6.4	0.88	85.7	8.1
7.5	Δ 380/Y660	Δ 14.9/Y8.6	0.88	87.0	8.3
11	Δ 380/Y660	Δ 21.2/Y12.2	0.89	88.4	8.4
15	Δ 380/Y660	Δ 28.6/Y16.5	0.89	89.4	8.5
18.5	Δ 380/Y660	Δ 34.7/Y20.0	0.90	90.0	8.5
22	Δ 380/Y660	Δ 41.0/Y23.6	0.90	90.5	8.4
30	Δ 380/Y660	Δ 55.4/Y31.9	0.90	91.4	7.5
37	Δ 380/Y660	Δ 67.9/Y39.1	0.90	92.0	7.5
45	Δ 380/Y660	Δ 82.1/Y47.3	0.90	92.5	7.5

High efficiency motor

Power P_2 (kW)	Voltage (V)	Current I_N (A)	Power factor $\cos \varphi$	EFFiciency (%)	I_{st}/I_N
0.75	Δ 220/Y380	Δ 3.1/Y1.8	0.83	77.6	6.7
1.1	Δ 220/Y380	Δ 4.2/Y2.4	0.83	82.9	7.4
1.5	Δ 220/Y380	Δ 5.6/Y3.2	0.84	84.2	7.7
2.2	Δ 220/Y380	Δ 7.9/Y4.6	0.85	85.7	7.6
3.0	Δ 220/Y380	Δ 10.4/Y6.0	0.87	86.8	7.6
4.0	Δ 380/Y660	Δ 7.9/Y4.5	0.88	87.7	7.6
5.5	Δ 380/Y660	Δ 10.7/Y6.2	0.88	88.7	7.6
7.5	Δ 380/Y660	Δ 14.5/Y8.3	0.88	89.6	7.3
11	Δ 380/Y660	Δ 21.0/Y12.1	0.88	90.6	7.4
15	Δ 380/Y660	Δ 28.3/Y16.3	0.88	91.4	7.6
18.5	Δ 380/Y660	Δ 34.8/Y20.0	0.88	91.9	7.7
22	Δ 380/Y660	Δ 41.2/Y23.7	0.88	92.3	7.6
30	Δ 380/Y660	Δ 55.8/Y32.1	0.88	92.9	7.1
37	Δ 380/Y660	Δ 68.4/Y39.4	0.88	93.4	7.1
45	Δ 380/Y660	Δ 83.0/Y47.8	0.88	93.6	7.1

Remark: Special motor is available on request.

Accessories

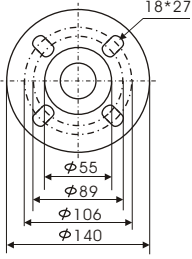
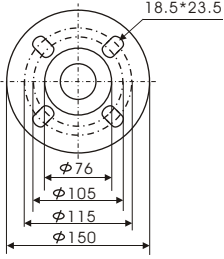
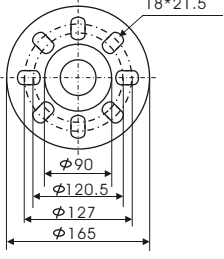
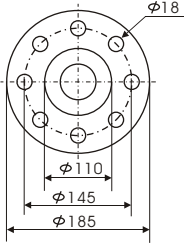
Pipe connection

Various sets of counter flanges and couplings are available.

Counter flange for RV series

A set consists of one counter flange, one gasket, bolts and nuts.

(Remarks: The above accessories are not necessary for pumps, there will be extra charge for them if needed)

counter flange	pump type	description	rated pressure	pipe work Connection	product Number
	RV1 RV2 RV3 RV4 RV5	Threaded	16 bar, EN 1092-2	G1	
		For welding	25 bar, EN 1092-2	25mm, nominal	
		Threaded	16 bar, EN 1092-2	G1 ¹ / ₄	
		For welding	25 bar, EN 1092-2	32mm, nominal	
	RV10	Threaded	16 bar, EN 1092-2	G1 ¹ / ₂	
			16 bar, EN 1092-2	G2	
		For welding	25 bar, EN 1092-2	40mm, nominal	
		For welding	40bar, special flange	50mm, nominal	
	RV15 RV20	Threaded	16 bar, EN 1092-2	G2	
		Threaded	16bar, special flange	G2 ¹ / ₂	
		Threaded	16bar, special flange	G2 ¹ / ₂	
		For welding	25 bar, EN 1092-2	50mm, nominal	
	RV32	Threaded	16 bar, EN 1092-2	G2 ¹ / ₂	
		Threaded	16bar, special flange	G3	
		For welding	16 bar, EN 1092-2	65mm, nominal	
		For welding	40 bar, DIN 2635	65mm, nominal	
		For welding	16bar, special flange	80mm, nominal	

Accessories

Vertical multistage centrifugal pumps

counter flange	pump type	description	rated pressure	pipe work Connection	product Number
	RV45	Threaded	16 bar	G3	
		For welding	16 bar	80mm,nominal	
		For welding	40 bar	80mm,nominal	
	RV64 RV90	Threaded	16 bar	G4	
		For welding	16 bar	100mm,nominal	
		For welding	25 bar	100mm,nominal	

Accessories

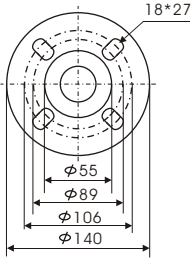
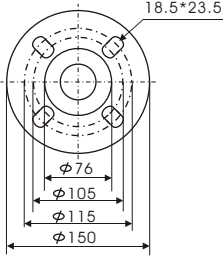
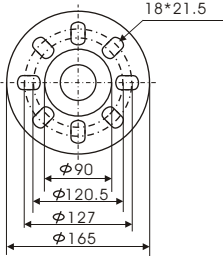
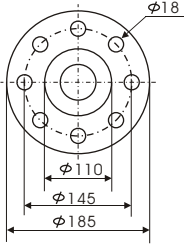
Vertical multistage centrifugal pumps

Counter flange for RVA series

they are made of stainless steel EN1.4403(AISI304)

A set consists of one counter flange, one gasket, bolts and nuts.

(Remarks: The above accessories are not necessary for pumps, there will be extra charge for them if needed)

counter flange	pump type	description	rated pressure	pipe work Connection	product Number
	RVA1	Threaded	16 bar, EN 1092-2	G1	
	RVA2	For welding	25 bar, EN 1092-2	25mm, nominal	
	RVA3				
	RVA4	Threaded	16 bar, EN 1092-2	G1 ¹ / ₄	
	RVA5	For welding	25 bar, EN 1092-2	32mm, nominal	
	RVA10	Threaded	16 bar, EN 1092-2	G1 ¹ / ₂	
		Threaded	16 bar, EN 1092-2	G2	
		For welding	25 bar, EN 1092-2	40mm, nominal	
		For welding	25 bar, special flange	50mm, nominal	
	RVA15	Threaded	16 bar, EN 1092-2	G2	
	RVA20	Threaded	16 bar, special flange	G2 ¹ / ₂	
		Threaded	16 bar, special flange	G2 ¹ / ₂	
		For welding	25 bar, EN 1092-2	50mm, nominal	
		For welding	25 bar, special flange	65mm, nominal	
	RVA32	Threaded	16 bar	G2 ¹ / ₂	
		Threaded	16 bar, special flange	G3	
		For welding	16 bar	65mm, nominal	
		For welding	40 bar	65mm, nominal	
		For welding	16 bar, special flange	80mm, nominal	
		For welding	25 bar, special flange	80mm, nominal	

Accessories

Vertical multistage centrifugal pumps

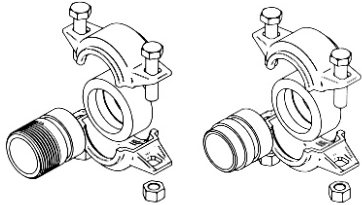
counter flange	pump type	description	rated pressure	pipe work Connection	product Number
	RVA45	Threaded	16 bar	G3	
		For welding	16 bar	80mm,nominal	
		For welding	40 bar	80mm,nominal	
	RVA64 RVA90	Threaded	16 bar	G4	
		For welding	16 bar	100mm,nominal	
		For welding	40 bar	100mm,nominal	

PJE Couplings for RVA series

they are made of stainless steel EN1.4403(AISI304)


A set consists of one clamp, one gasket, bolts and nuts.

(Remarks: The above accessories are not necessary for pumps, there will be extra charge for them if needed)

counter flange	pump type	description	PN	pipe work Connection	rubber parts	Number of coupling sets needed
	RVA1 RVA2 RVA3	Threaded	80bar	G1 ¹ / ₄	EPDM	2
	RVA4 RVA5	For welding	80bar	DN32	FKM	2
	RVA10 RVA15 RVA20	Threaded	70bar	G2	EPDM	2
		For welding	70bar	DN50	FKM	2

Edition:2013.08

The technical data are subject to amend without notice.

	Vendor Ref. No.	
	Contractor Ref. No.	
Project Name:	Contractor Job No.	

JOCKEY PUMP CONTROLLER

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date



TORNATECH

Project: _____

Customer: _____

Engineer: _____

Pump Manufacturer: _____

Technical Data Submittal Document

Model JP3

Across the Line Start
Jockey Pump Controller



Contents:

Data Sheets

Dimensional Data

Wiring Schematics

Field Connections

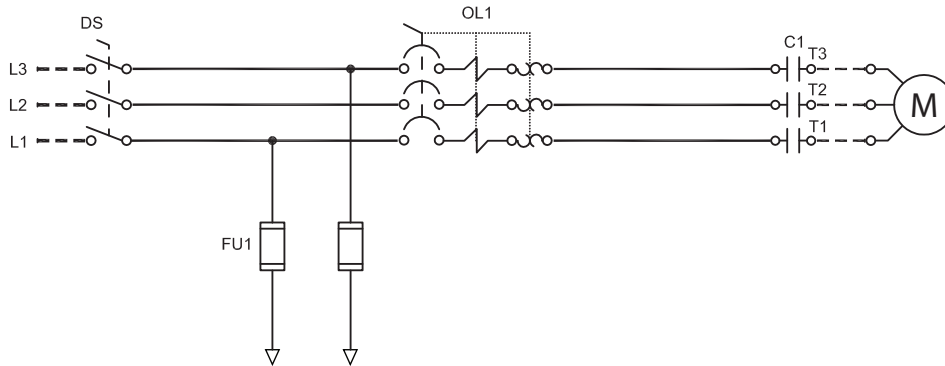
Note: The drawings included in this package are for controllers covered under our standard offering. Actual AS BUILT drawings may differ from what is shown in this package.



N.Y.C.
APPROVED



March 2020



N.Y.C.
APPROVED



Listing	Underwriters Laboratory (UL)	UL508A - Industrial Pump Controllers
	CSA	CSA C22.2 No. 14 Industrial Control Equipment
	New York City	Accepted for use in the City of New York by the Department of Buildings
	Seismic Certification	See page 4 for details
	Optional	
<input type="checkbox"/> CE Mark	Various EN, IEC & CEE directives and standards	
Enclosure	Protection Rating	
	<input type="checkbox"/> Standard: NEMA 2	
	Optional	
	<input type="checkbox"/> NEMA 12 <input type="checkbox"/> NEMA 3 <input type="checkbox"/> NEMA 3R <input type="checkbox"/> NEMA 4	<input type="checkbox"/> NEMA 4X-304 sst painted <input type="checkbox"/> NEMA 4X-304 sst brushed finish <input type="checkbox"/> NEMA 4X-316 sst painted <input type="checkbox"/> NEMA 4X-316 sst brushed finish
Accessories		Paint Specifications
• Wall mounting lugs (x4)		• Red RAL3002 • Powder coating • Glossy textured finish

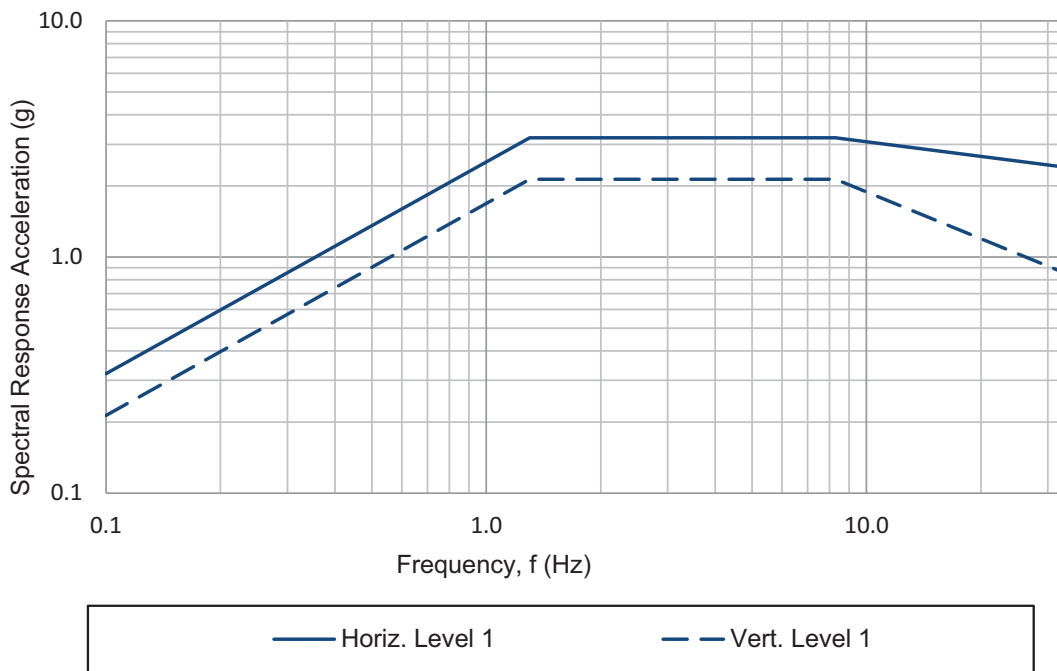


Fuseless Motor Starter	<ul style="list-style-type: none"> • Main disconnect – padlockable – rotary type handle – door interlocked • Thermo-magnetic motor protector • Contactor 		
Control Circuit	<ul style="list-style-type: none"> • 24V.AC 		
iPD+ Operator Interface	<ul style="list-style-type: none"> • Solid state controls • All adjustments on door front • Navigation pushbuttons 		
Pressure Sensing	<ul style="list-style-type: none"> • Pressure transducer for fresh water application 316 stainless steel construction • Rated for 0-600psi working pressure • Pressure sensing line connection 1/2" brass Male NPT 		
Visual Indications	<ul style="list-style-type: none"> • Manual motor start/run LED • Automatic motor start/run LED • Motor overload • Pressure reading <ul style="list-style-type: none"> • Start pressure • Stop pressure • System pressure • System pressure diagnostic LED's <ul style="list-style-type: none"> • Green: system pressure at or above stop pressure • Yellow: system pressure between start and stop pressure • Red: system pressure at or below start pressure • AUTO mode • OFF mode 		
Timers	<ul style="list-style-type: none"> • Minimum run timer (off delay) • Delay start timer (on delay) • Visual countdown 		
Counters	<ul style="list-style-type: none"> • Pump start counter • Elapsed timer meter (hours / non-resettable) 		
Operators	<ul style="list-style-type: none"> • OFF-AUTO pushbutton • Start and Stop pushbutton 		
Operation	Automatic Start	Start on pressure drop	
	Manual Start	Start pushbutton	
	Stopping	Stop pushbutton	
	Timers	Field adjustable & visual countdown	<ul style="list-style-type: none"> • Minimum run timer (off delay) • Delay start timer (on delay)



Seismic Certification	Seismic Certification Company	TRU Compliance, LLC A Tobalski Watkins Affiliate					TWEI Project No.: 15014				
	Mounting details	Rigid wall mounting									
	Seismic Information	Building Code	Test Criteria	Seismic Parameters	S_{Ds}	z/h	I_p	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
	IBC 2015, CBC 2016	ICC-ES AC156	ASCE 7-10 Chapter 13	2.0	1.0	1.5	3.20	2.40	1.33	0.53	
				3.2	0.0	1.5	3.20	1.28	2.13	0.85	

RRS for Nonstructural Components Testing



Notes:

- Components are tested in accordance with ICC-ES AC156, IBC 2015 & CBC 2016.
- OSHPD Special Seismic Certification Preapproval (OSP)

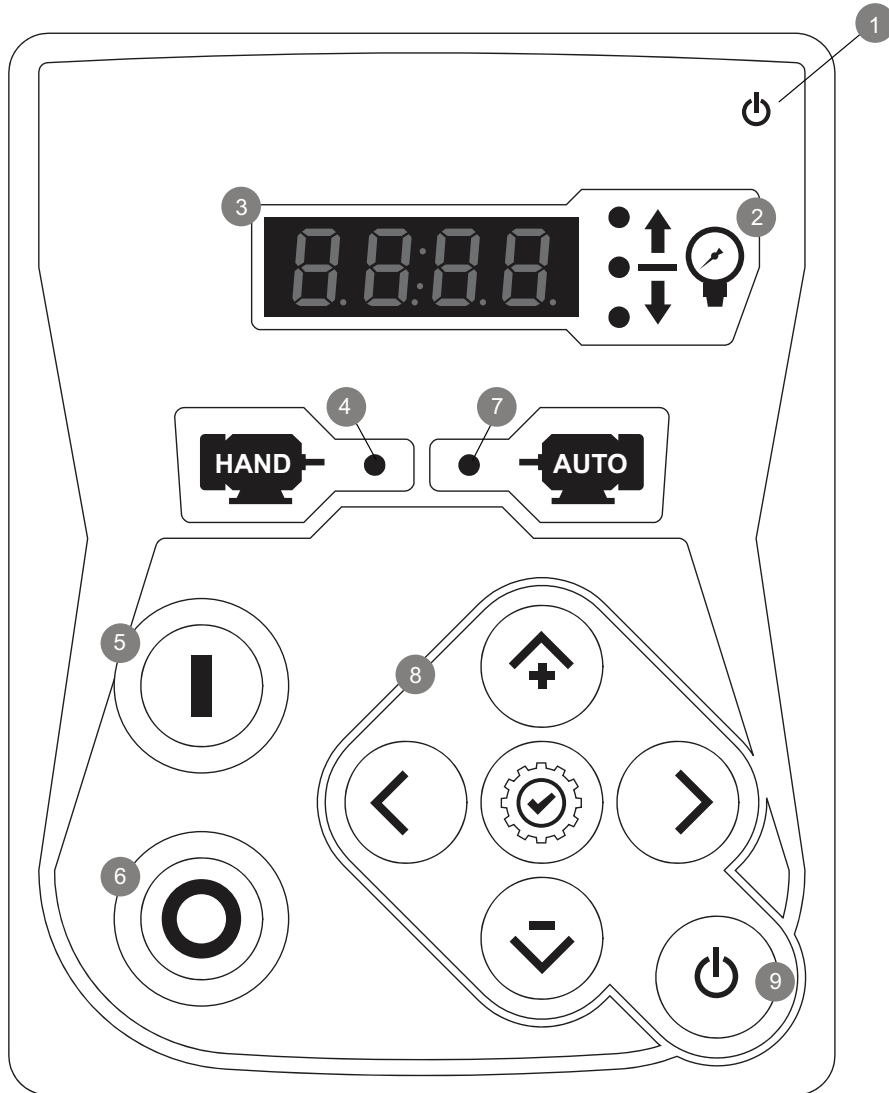


<input type="checkbox"/> A4	Elapsed time meter (time totalizer)
<input type="checkbox"/> A5	Motor run alarm contact
<input type="checkbox"/> A6	Loss of power alarm contact
<input type="checkbox"/> A7	Overload or short circuit alarm contact
<input type="checkbox"/> D11D	Pressure transducer 0-600psi with ½" MNPT 316 stainless steel bushing
<input type="checkbox"/> D14	Export packing for 1 controller
<input type="checkbox"/> D13A	Externally mounted wetted parts
<input type="checkbox"/> D14	Export packing for 1 controller
<input type="checkbox"/> D18	Audible alarm
<input type="checkbox"/> D19	Anti-condensation heater and thermostat
<input type="checkbox"/> D20	Anti-condensation heater and humidistat
<input type="checkbox"/> D21	Tropicalization
<input type="checkbox"/> D22	Phase reversal / failure pilot light and alarm contact
<input type="checkbox"/> D23	Controller power healthy pilot light and alarm contact
<input type="checkbox"/> D24	Pump failure via current sensing relay with pilot light and dry alarm contact
<input type="checkbox"/> D25	Low zone pump control function
<input type="checkbox"/> D26	Mid zone pump control function
<input type="checkbox"/> D27	High zone pump control function
<input type="checkbox"/> D28	Selector switch in auto alarm contacts
<input type="checkbox"/> D29	Selector switch in off alarm contacts
<input type="checkbox"/> D30	Motor heater circuit
<input type="checkbox"/> D32	Service entrance rated - 100kA short circuit withstand rating: • 120V/1ph (0.5hp max.) • 240V/1ph (1hp max.) • 200V-208V - 60hz (2hp max.) • 220V-240V - 60hz (3hp max.) • 380V-416V - 50hz - 60hz (5hp max.) • 440V-480V - 60hz (5hp max.)
<input type="checkbox"/> D33	Service entrance rated - 65kA short circuit withstand rating: • 120V/1ph (0.5hp max.) • 240V/1ph (1hp max.) • 200V-208V - 60hz (3hp-15hp max.) • 220V-240V - 60hz (515hp max.) • 380V-416V - 50hz - 60hz (7.5hp - 40hp max.) • 440V-480V - 60hz (7.5hp-40hp max.)
<input type="checkbox"/> D34	Service entrance rated - 42kA short circuit withstand rating: • 600V - 60hz (7.5hp max.)

<input type="checkbox"/> L01	Other language and English (bilingual)
<input type="checkbox"/> L02	French
<input type="checkbox"/> L03	Spanish
<input type="checkbox"/> L04	German
<input type="checkbox"/> L05	Italian
<input type="checkbox"/> L06	Polish
<input type="checkbox"/> L07	Romanian
<input type="checkbox"/> L08	Hungarian
<input type="checkbox"/> L09	Slovak
<input type="checkbox"/> L10	Croatian
<input type="checkbox"/> L11	Czech
<input type="checkbox"/> L12	Portuguese
<input type="checkbox"/> L13	Dutch
<input type="checkbox"/> L14	Russian
<input type="checkbox"/> L15	Turkish
<input type="checkbox"/> L16	Swedish
<input type="checkbox"/> L17	Bulgarian
<input type="checkbox"/> L18	Thai
<input type="checkbox"/> L19	Indonesian
<input type="checkbox"/> L20	Slovenian
<input type="checkbox"/> L21	Danish
<input type="checkbox"/> L22	Greek
<input type="checkbox"/> L23	Arabic
<input type="checkbox"/> L24	Hebrew
<input type="checkbox"/> L25	Chinese

Note: Options chosen from this page are not electrically represented on the wiring schematics in this submittal package.

iPD+ Operator Interface



- | | |
|-----------------------|-------------------------|
| 1 - Power on LED | 6 - STOP pushbutton |
| 2 - System status LED | 7 - Auto start LED |
| 3 - Digital display | 8 - Navigation keypad |
| 4 - Hand start LED | 9 - ON - OFF pushbutton |
| 5 - START pushbutton | |

Jockey Pump Controller

Across the Line / 3 Phase

Model:JP3

Dimensions

Built to the latest edition of the UL 508A & CSA C22.2 No.14 standard

PER QUOTE DRAWING No.

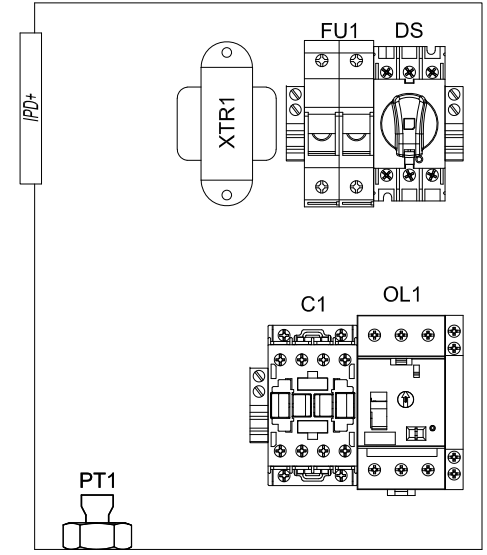
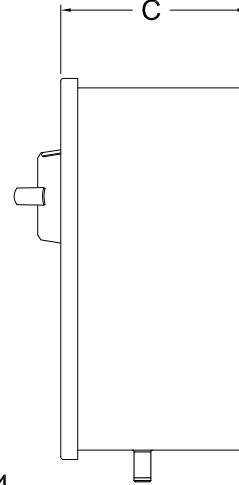
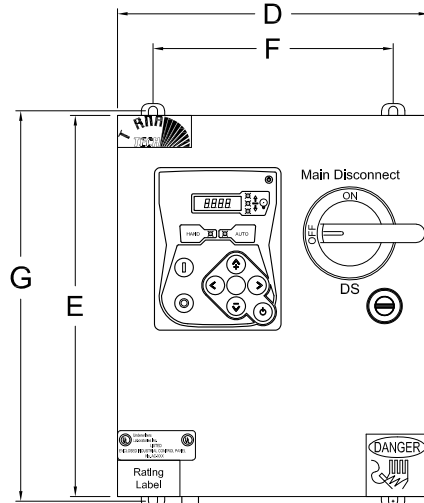
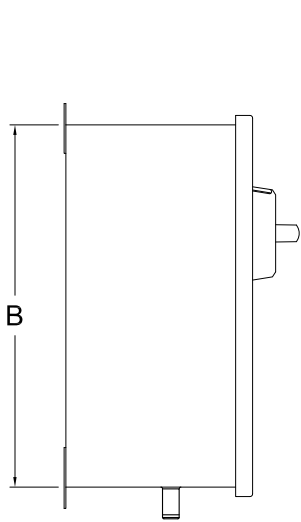


NYC
Dept of Building
Approved



REV.	DESCRIPTION	DD/MM/YY
6	Modified J19 Outputs ID	10/06/16
7	Revised logo	18/06/18
8	Sensing line connection changed	25/03/25

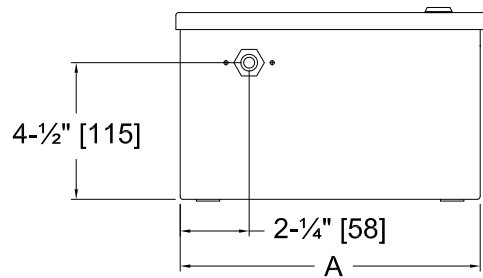
Drawing No:
JP3-DI500/E



Standard Internal Layout

Ø $\frac{3}{8}$ " [9] x4

Sensing Line Connection 1/2" M.NPT



Dimensions*					Enclosure Dimensions A X B X C	Door Dimensions D X E	Anchor Dimensions F X G
Maximum Motor Horsepower							
200-208V	220-240V	380-416V	440-480V	575-600V	10"X12"X6-1/2"	10-3/4"X12-3/4"	8"X12-3/4"
10HP	10HP	15HP	20HP	25HP	16"X16"X7-1/2"	16-1/2"X16-1/2"	14"X16-3/4"
20HP	30HP	40HP	60HP	60HP			

Notes:

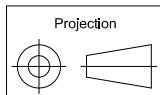
- Standard NEMA: NEMA 2
- Standard Paint: Textured Red RAL 3002.
- All Dimensions are in Inches [Millimeters]
- Use Watertight Conduit and Connector Only.
- Protect Equipment Against Drilling Chips.
- Door Swing Equal to Door Width

Drawing for information only.

Manufacturer reserves the right to modify this drawing without notice.

Contact manufacturer for "As Built" drawing.

*Dimensions may change depending on option required. Consult Factory for exact dimensions.




Jockey Pump Controller

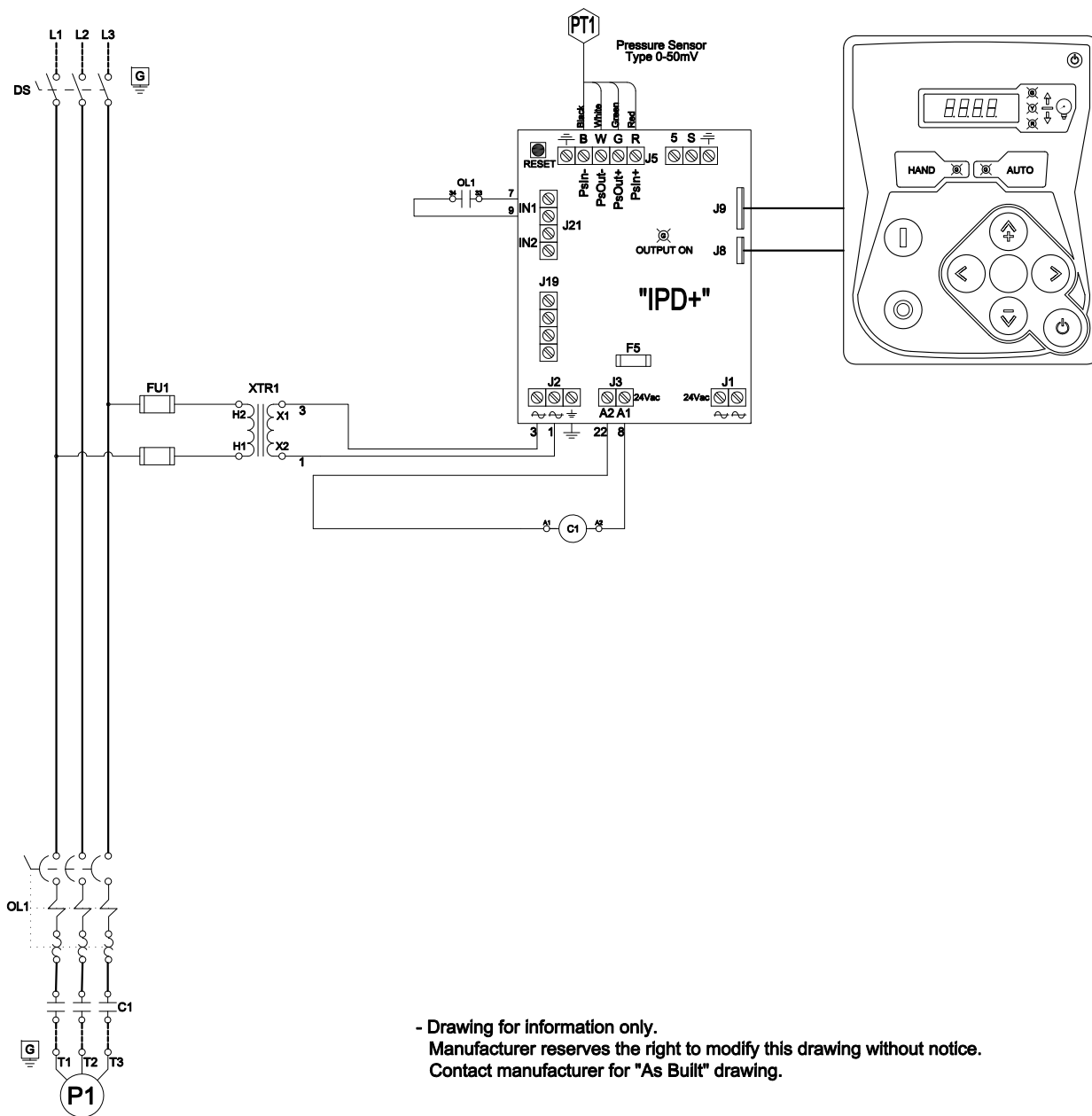
Across the Line / 3 Phase

Model:JP3

Wiring schematic

Built to the latest edition of the UL 508A & CSA C22.2 No.14 standard

PER QUOTE DRAWING No.		SEISMIC COMPLIANT	UL	SF	NYC Dept of Building Approved	
REV.	DESCRIPTION	DD/MM/YY			Drawing No.	
5	Modified Tormatech & Seismic Logo	14/04/16			JP3-WS500/E	
6	Modified J19 Outputs ID	10/06/16				
7	Revised logo	18/06/18				



- Drawing for information only.
 Manufacturer reserves the right to modify this drawing without notice.
 Contact manufacturer for "As Built" drawing.

Jockey Pump Controller

Across the Line / 3 Phase

Model:JP3

Line and Motor Terminal Size

Built to the latest edition of the UL 508A & CSA C22.2 No.14 standard

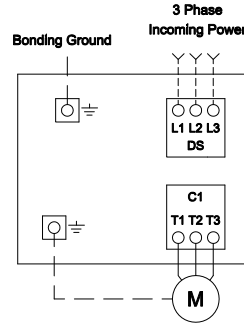
PER QUOTE DRAWING No.



REV.	DESCRIPTION	DD/MM/YY
5	Modified Tomatech & Seismic Logo	14/04/16
6	Modified J19 Outputs ID	10/06/16
7	Revised logo	18/06/18

Drawing No. **JP3-TD500/E**

Power Connections and Motor Connections




Line Terminals (L1,L2,L3,GND)

Maximum Motor Horsepower					Wire Size Copper Only	Torque	Wire Size Ground Copper Only
200-208V	220-240V	380-416V	440-480V	575-600V			
10HP	10HP	20HP	20HP	25HP	#14 AWG - #6 AWG	2 Nm	#14 AWG - #2 AWG
20HP	30HP	40HP	60HP	60HP	#12 AWG - #1 AWG	6 Nm	#6 AWG - #2 AWG

Motor Terminals (T1,T2,T3,GND)

Maximum Motor Horsepower					Wire Size Copper Only	Torque	Wire Size Ground Copper Only
200-208V	220-240V	380-416V	440-480V	575-600V			
5HP	7.5HP	10HP	15HP	20HP	#14 AWG - #10 AWG	1.8 Nm	#14 AWG - #2 AWG
10HP	10HP	15HP	20HP	25HP	#14 AWG - #6 AWG	2.5 Nm	#12 AWG - #2 AWG
15HP	20HP	30HP	50HP	50HP	#10 AWG - #3 AWG	5 Nm	#12 AWG - #2 AWG
20HP	30HP	40HP	60HP	60HP	#10 AWG - #2 AWG	11.3 Nm	#12 AWG - #2 AWG

	Vendor Ref. No.	
	Contractor Ref. No.	
Project Name:	Contractor Job No.	

ACCESSORIES

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date



Vendor Ref. No.

Contractor Ref. No.

Project Name:

Contractor Job No.

Flow Meter

0	SUBMITTED FOR APPROVAL				
Rev	Description	Prepared	Checked	Approved	Date



GERAND ENGINEERING

"MODEL G" FIRE PUMP TEST METERS

Accurate Pump Performance and Quality Service for 50 Years



**BEST VALUE
IN THE
INDUSTRY**

**5 YEAR
WARRANTY**

**MANUFACTURED
IN THE USA**

**HIGH GRADE
MATERIALS:**

*CARBON STEEL,
STAINLESS STEEL,
EPOXY AND
MONEL*



MODEL-G METERS

-- RATING 500 PSI --
(Buttweld, Grooved,
300# Flanged)

-- RATING 275 PSI --
(150# Flanged)

CALIBRATED VENTURI &
ATTACHED GPM METER

4½" DIAL METER
MOUNTS ON
VENTURI BRACKET



**ADDITIONAL SIZES LISTED
AT WWW.GERAND.COM**

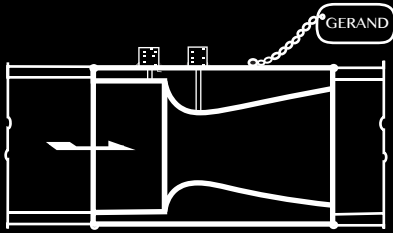
PUMP GPM	PIPE SIZE	VENTURI STYLE	METER RANGE (GPM)	VENTURI LENGTH (BUTTWELD OR GROOVED)	VENTURI LENGTH (150# FLANGED)	VENTURI LENGTH (300# FLANGED)
50	2"	685	25-100	4½" THREADED	-	-
100	2 1/2"	746	50-200	3" BUTTWELD 4" GROOVED	9½"	10"
250	4"	744	125-500	3½" BUTTWELD 3¾" GROOVED	9½"	10¾"
300	4"	744	150-600			
450	4"	744	225-900	5"	12"	13¾"
500	5"	715	250-1000			
500	6"	743	250-1000			
750	6"	743	375-1500	6"	13"	14¾"
1000	6"	743	500-2000			
1250	6"	743	625-2500			
1500	8"	750	750-3000	7"	15'	16¾"
2000	8"	750	1000-4000			
2500	8"	750	1250-5000			

WWW.GERAND.COM FOR MORE INFORMATION

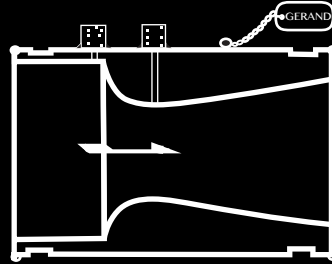
*Venturi available in Raised or Flat Face; Steel, Stainless Steel or Monel
**Dual LPM/GPM Scales Available

VENTURI STYLES

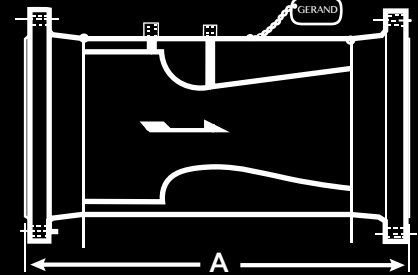
BUTTWELD



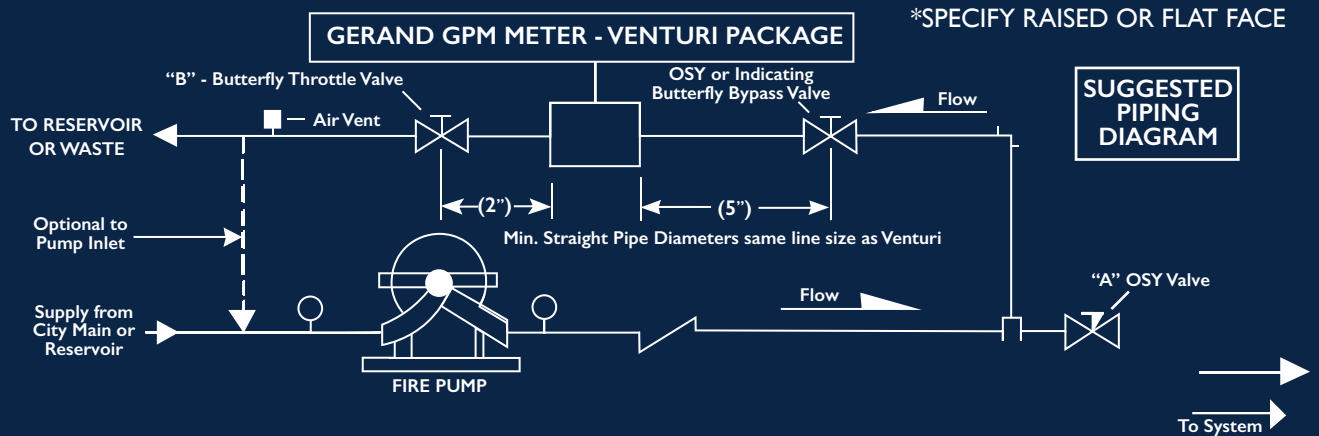
GROOVED



FLANGED




OPERATING INSTRUCTIONS



1. Close system OSY valve "A"
2. Open by-pass valve and "B" butterfly throttle valve
3. Purge meter, located on venturi, as follows:
 - a) Open station shut-off valves on venturi & vent valves attached to meter. When a steady stream of water passes through hose, meter is purged of air.
 - b) Close the vent valves after purging.

4. Start the fire pump, and read meter in GPM.
5. Refer to pump GPM requirement and adjust throttle valve to meet the requirement.
6. After the test, open valve "A" and close the by-pass and "B" valves.



	Vendor Ref. No.	
	Vendor Doc. No.	
	Contractor Ref. No.	
Project Name:	Contractor Job No.	

Pressure Gauge

<i>0</i>	<i>SUBMITTED FOR APPROVAL</i>				
Rev	Description	Prepared	Checked	Approved	Date

Bourdon Tube Pressure Gauges Standard Series Type 111.10SP

WIKA Datasheet 111.10SP

Applications

- Fire sprinkler systems
- Suitable for all media that will not obstruct the pressure system or attack copper alloy parts

Product Features

- UL-listed (UL-393), United States and Canada
- Factory Mutual (FM) approved
- Reliable and economical

Specifications

Design

EN 837-1 & ASME B40.100

Sizes

4" (100 mm)

Accuracy class

± 3/2/3% of span (ASME B40.100 Grade B)

Ranges

0/80 psi (5,5 bar), retard to 250 psi (17 bar), air

0/300 psi (20 bar), water

0/400 psi (28 bar), water

0/600 psi (40 bar), water

Working pressure

Steady: 3/4 of full scale value

Fluctuating: 2/3 of full scale value

Short time: full scale value

Operating temperature

Ambient: -40°F to 140°F (-40°C to 60°C)

Media: 140°F (+60°C) maximum

Temperature error

Additional error when temperature changes from reference temperature of 68°F (20°C) ±0.4% of span for every 18°F (10°K) rising or falling.



Bourdon Tube Pressure Gauge Type 111.10SP

Bourdon tube

Material: copper alloy
C-shape

Pressure connection

Material: copper alloy
1/4" NPT lower mount (LM)

Movement

Copper alloy

Dial

White aluminum with stop pin; black and red lettering

Pointer

Black aluminum

Case

Black polycarbonate

Window

Snap-in clear polycarbonate

Approvals

UL listed (UL-393)

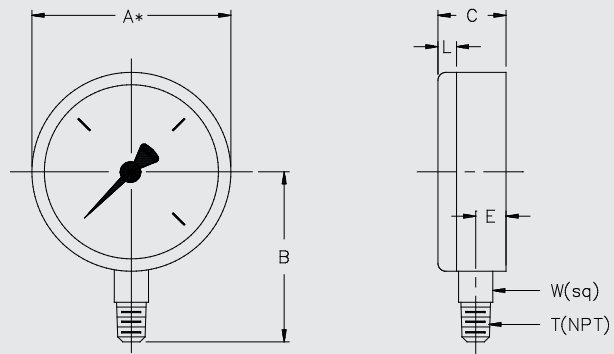
Factory Mutual

Optional Extras

(not all options are UL or FM approved)

- Brass restrictor
- Black-painted steel case
- Custom dial layout
- Other dual scales in combination with psi are available:
bar, kPa, MPa, kg/cm²

Dimensions



Size		A	B	C	E	L	T	W	Weight
4"	mm	100	71	30	11.5	3.75		14	
	in	4.0	2.79	1.18	0.45	0.15	1/4"	0.55	0.35 lb.

Ordering information

Pressure gauge model / Nominal size / Scale range / Size of connection / Optional extras required
 Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing.
 Modifications may take place and materials specified may be replaced by others without prior notice.



WIKAI Instrument Corporation
 1000 Wiegand Boulevard
 Lawrenceville, GA 30043-5868
 Tel: 888-WIKA-USA • 770-513-8200
 Fax: 770-338-5118
 E-Mail: info@wika.com
www.wika.com

Bourdon tube pressure gauge Model 111.11, welding gauge to ISO 5171

WIKA data sheet PM 01.03



for further approvals
see page 2

Applications

- For equipment and plants for welding, cutting and allied processes

Special features

- Design per ISO 5171
- Pressure relief in case back
- Reliable and cost-effective



Bourdon tube pressure gauge model 111.11

Description

Design

ISO 5171

Nominal size in mm

40, 50, 63

Accuracy class

2.5

Scale ranges

Welding engineering standard ranges for oxygen and acetylene to ISO 5171, as well as 0 ... 1 to 0 ... 400 bar to EN 837-1

Pressure limitation

Steady: 3/4 x full scale value

Fluctuating: 2/3 x full scale value

Short time: Full scale value

Permissible temperature

Ambient: -20 ... +60 °C

Medium: +60 °C maximum

Temperature effect

When the temperature of the measuring system deviates from the reference temperature (+20 °C): max. $\pm 0.4 \%$ /10 K of the span

Standard version

Process connection

Copper alloy, lower mount (LM), with restrictor
 NS 40: G 1/8 B (male), 14 mm flats
 NS 50,63: G 1/4 B (male), 14 mm flats

Pressure element

Copper alloy (with acetylene, max. 70 % copper content),
 C-type or helical type

Movement

Copper alloy

Dial

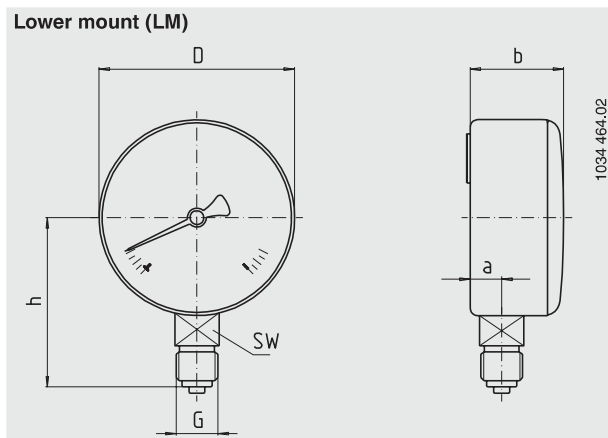
Plastic, white, with pointer stop pin
 Black lettering

Pointer

Plastic, black

Dimensions in mm

Standard version



NS	Dimensions in mm						Weight in kg
	a	b	D	G	h ±1	SW	
40	9.5	26	39	G 1/8 B	36	14	0.09
50	9.5	28	49	G 1/4 B	45	14	0.11
63	9.5	28	62	G 1/4 B	53.5	14	0.15

Process connection per EN 837-1 / 7.3

Ordering information

Model / Nominal size / Scale range / Connection size / Options

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 The specifications given in this document represent the state of engineering at the time of publishing.
 We reserve the right to make modifications to the specifications and materials.

Case

Steel, brass-coloured,
 with pressure relief in case back

Window

Polycarbonate, snap-fitted in case

Options

- Other process connection
- Sealings (model 910.17, see data sheet AC 09.08)
- Case brass or stainless steel
- Slip-on bezel
- Back mount (BM)
- Acetylene pressure gauge for pressure regulators for manifold systems per ISO 7291 (BAM tested)

CE conformity

Pressure equipment directive

97/23/EC, PS > 200 bar, module A, pressure accessory

Approvals

- GOST, metrology/measurement technology, Russia
- GOST-R, import certificate, Russia
- CRN, safety (e.g. electr. safety, overpressure, ...), Canada

Certificates ¹⁾

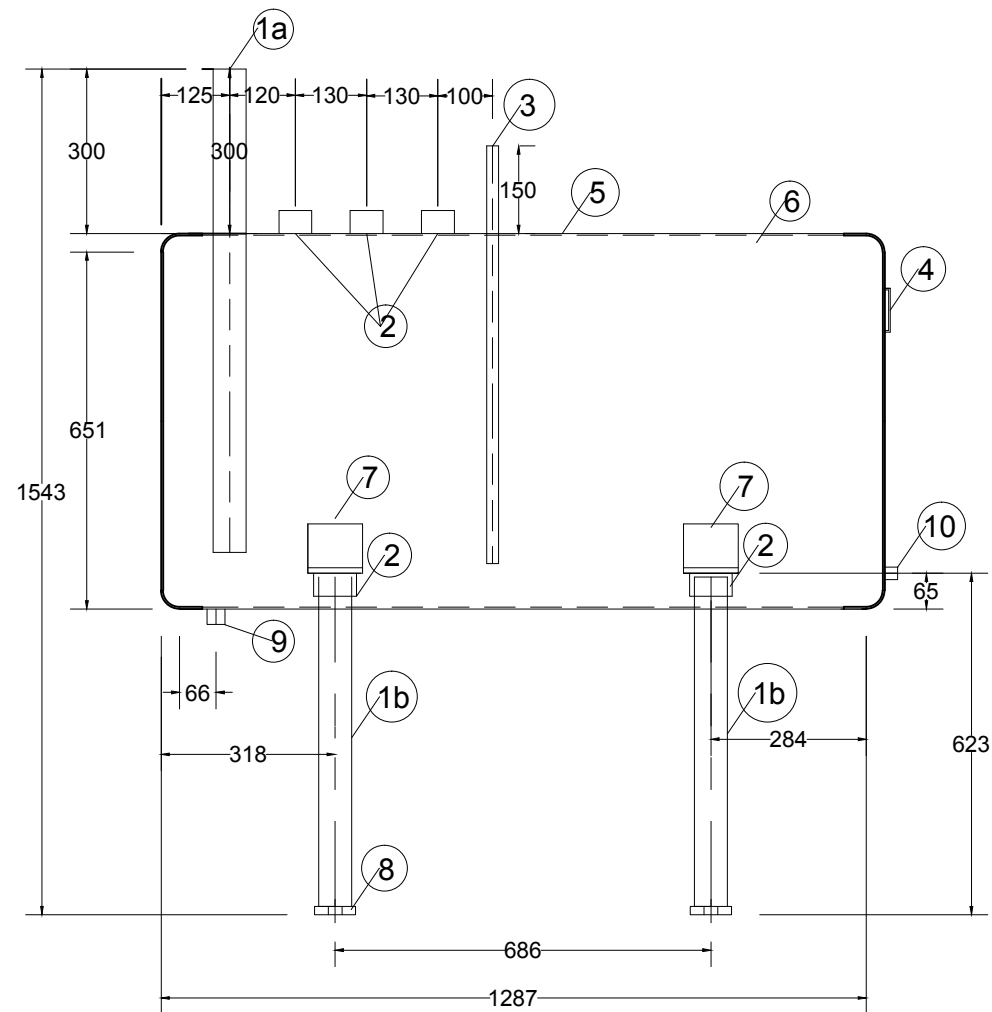
- 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, material proof, indication accuracy)
- 3.1 inspection certificate per EN 10204 (e.g. indication accuracy)

1) Option

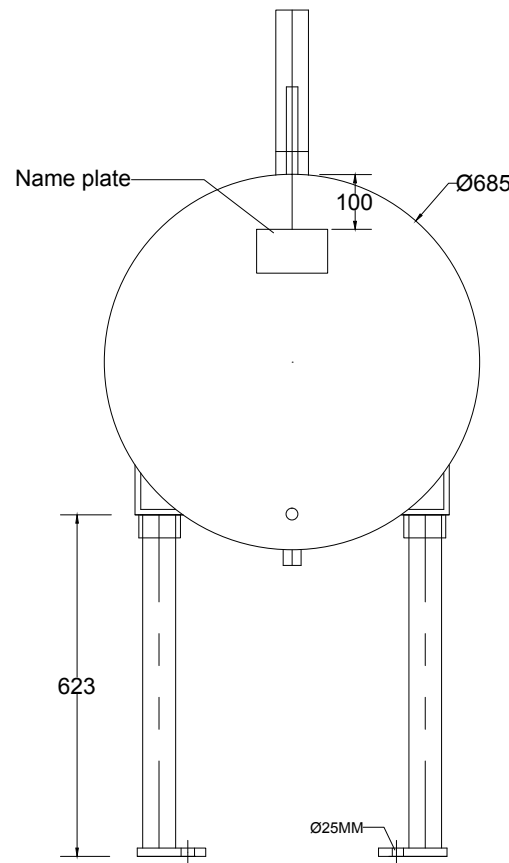
Approvals and certificates, see website



WIKAL Alexander Wiegand SE & Co. KG
 Alexander-Wiegand-Straße 30
 63911 Klingenberg/Germany
 Tel. +49 9372 132-0
 Fax +49 9372 132-406
 info@wika.de
 www.wika.de



tank front view



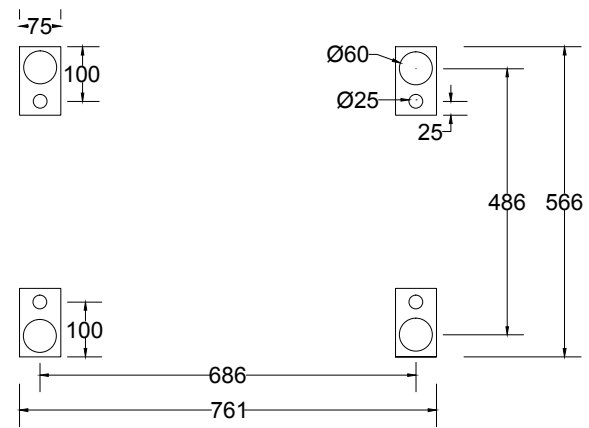
tank side view

SL NO	DESCRIPTION	LENGTH	QTY
1A	2" PIPE	882MM	1 NO
1B	2" PIPE	600 MM	4 NOS
2	2" COUPLING	-	7 NOS
3	1/2" PIPE	762MM	1 NO
4	NAME PLATE	150X100X3MM	1 NO
5	MS SHEET 3MM	2154X1171X3MM	1 NO
6	END PLATE 3MM	DIA 682MM	2 NOS
7	ANGLE 90X90X9MM	100MM	4 NOS
8	BASE PLATE	125X75X16MM	4 NOS
9	COUPLING 1"	-	1 NO
10	COUPLING 1/2"	-	1 NO

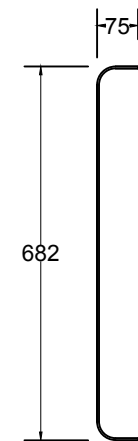
PAINTING SPECIFICATION
RAL -3002 RED COLOUR

NOTES:
 1. ALL DIMENSION ARE IN MILLIMETERS AND ALL LEVELS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
 2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELATED DRAWINGS.
 3. ANY DISCREPANCY IN THE DRAWING SHALL BE BRING INTO NOTICE OF THE ENGINEER PRIOR TO THE EXECUTION OF WORK.
 4. DO NOT COMMENCE THE WORK UNLESS THE DRAWING IS ISSUED FOR CONSTRUCTION.
 5. PROJECT ENGINEERS SHALL CHECK ALL DIMENSIONS, SIZE ETC. BEFORE COMMENCING ANY WORK AT SITE.

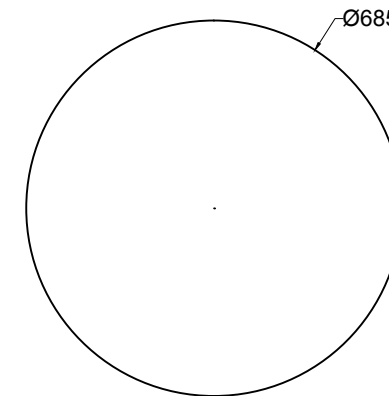
120USG tank 3 coupling



LEG FIXING TOP VIEW



side view



front view

Dish end plate 3.7mm thk
 PLATE CUTTING SIZE-750 MM

PROJECT:-			
CLIENT:-			
MAIN CONTRACTOR:-			
DWG. TITLE:- 120 US GLN TANK			
DRAWN	YH	DATE	29/01/2017
CHECKED	YH	PROJECT NO.	
DESIGNED		SCALE	1:1
APPROVED		REVISION	00
DWG. NO.	BR-FT-120-01		