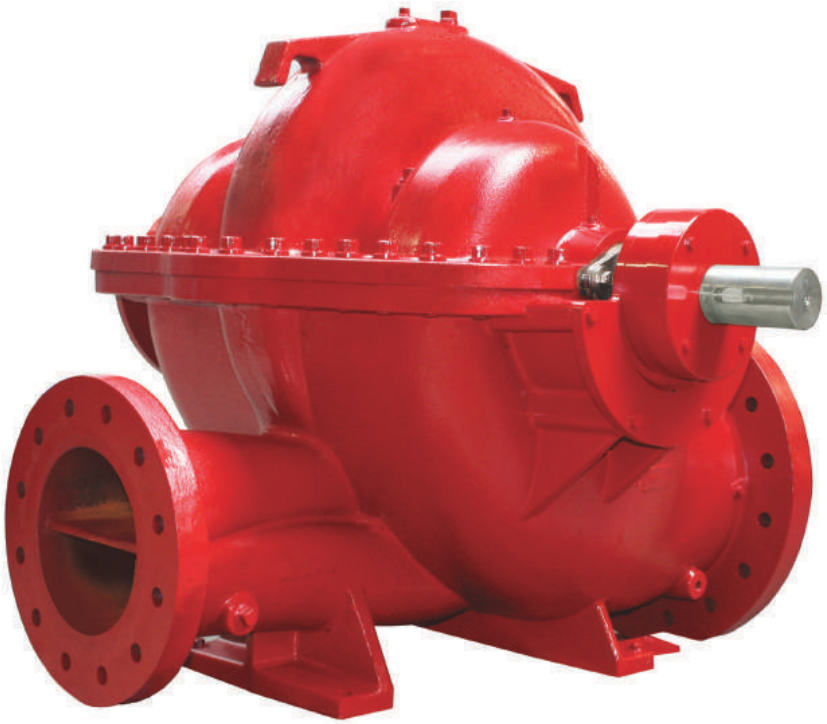
50HZ/60HZ



MENA

MECHANICAL INDUSTRIES CO.

FIRE PUMP

NFPA

UL® LISTED

MENA MECHANICAL INDUSTRIES CO.		
		Vendor Doc. No. **TS-150/9 - ES2528**
Contractor Name: **WATER WAVE**		Contractor Ref. No
Project Name:		Contractor Job No.

Fire Pump Set
Technical Submittal

Capacity
150 GPM @ 9 BAR

0	*SUBMITTED FOR APPROVAL*	*KY*	*KY*		*25/06/2025*
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

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-STS	System Technical Specifications	
	05	GD-PA	PREVIOUS APPROVALS	
DIESEL DRIVEN PUMP	05	DDP-PSC-150	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-150	Electric motor driven pump specifications	
	09	EDP-EMS- 30/2	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-80	Diesel Fuel Tank Drawing	

0	*SUBMITTED FOR APPROVAL*	*KY*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

SUB VENDOR LIST

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

SUB VENDOR LIST

EQUIPMENT	BRAND	MAKE	DESCRIPTION
END SUCTION FIRE PUMP	MENA	MENA MECHANICAL INDUSTRIES, UAE	RANGE: 50 - 1000 US GPM upto 230 PSI
DIESEL DRIVER	Kirloskar Enriching Lives	KIRLOSKAR UL LISTED & FM APPROVED	RANGE: 62 - 330 HP from 1760 - 3000 RPM
FIRE PUMP MOTOR	TECHTOP marathon Motors A Regal Brand REGAL	TECHTOP UL LISTED MARATHON UL LISTED	RANGE: 11kW - 350kW Type: ODP & TEFC, NEMA2 RANGE: 15HP- 400HP Type: ODP & TEFC, NEMA2
FIRE PUMP CONTROLLERS	TORNATECH Fire Pump Controller	TORNATECH, INC UL LISTED & FM APPROVED	RANGE: 11kW to 350KW Type: Diesel, Electric, Jockey
AIR RELIEF VALVE	CAL-VAL OR FWIC Valves	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 ENGINEERING	GERAND, USA FM APPROVED	RANGE: 2-1/2 Inch to 8 Inch UP TO 300 PSI

MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name	Contractor Job No.

SYSTEM TECHNICAL SUBMITTAL

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

MENA
MECHANICAL INDUSTRIES CO.

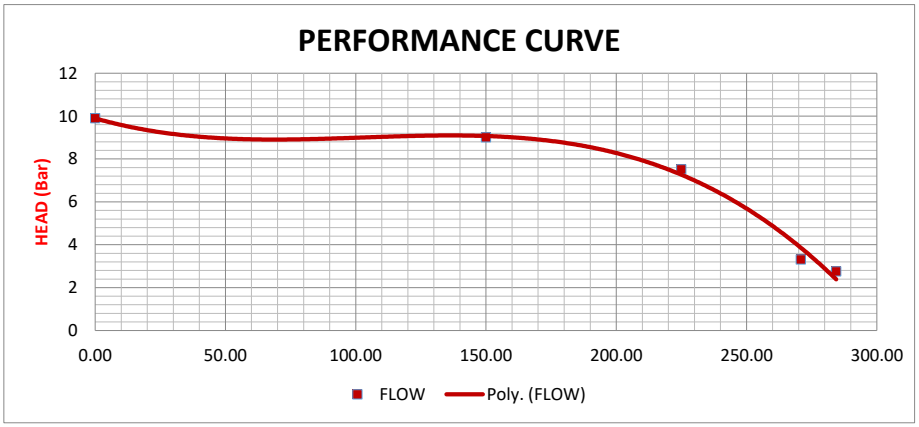
UL LISTED

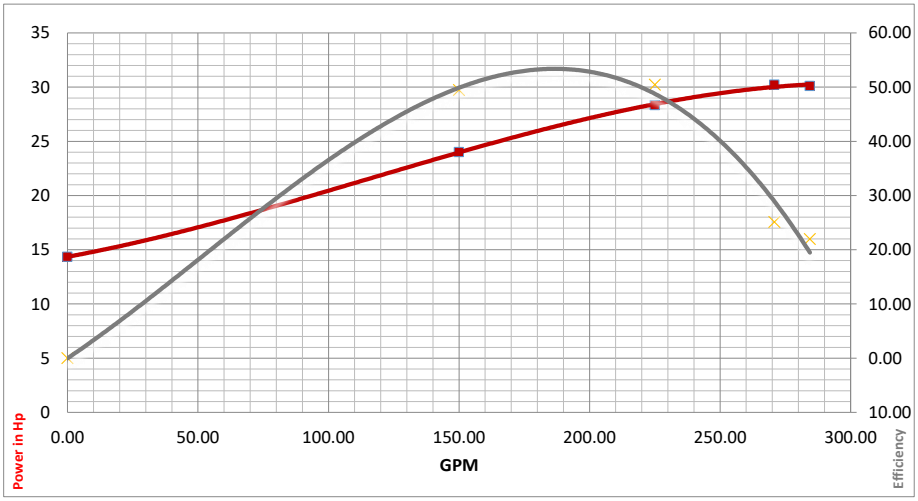
PUMP PERFORMANCE CURVE

Pump	
Model	VES 40-250
Type	END SUCTION-50 HZ
Specific Speed	2900
FL-Dimension	2 1/2 x1 1/2
Power Rating	
Engine HP	

Search Criteria			
Flow In GPM	150	Head In (Bar)	9.03
Fluid			
Fluid	Water		
Atm Pressure	101 Mpa		
Impeller Details			
Impeller Dia(mm)	Ref Test Report		

Data Point	
Flow (GPM)	150
Head (Bar)	9.03
Eff	49.47
BHP@150%	28.75
Design Curve	
Shutoff head	9.90
Flow @150%	225
H(Bar)@150%	7.51
Power-150%	28.340
RPM	2,900
Driver Rating	
Motor (HP)	NA
Engine(HP)	55





Performance Evaluation

Flow In GPM	Pressure in M(Bar)	Power In HP	Eifficiency
0.00	9.90	14.350	0.00
150.00	9.01	24.000	49.47
225.00	7.51	28.340	50.45
270.83	3.31	30.230	25.13
284.40	2.75	30.110	21.97

*Manufacturer Reserves Right to Revise the specs and contains without prior notice

Diesel Fire Pump

Item Description		Proposed
Diesel Pump:		
Make	:	MENA (MENA Mechanical Industries) UL Listed
Model	:	VES 40-250
Type	:	End Suction Fire Pump
Rated Flow	:	150 USGPM
Rated Head	:	9 BAR
Rated Speed	:	2900 RPM
Casing	:	Ductile Iron
Impeller	:	Bronze
Material Shaft	:	ASTM 420
Brand	:	MENA
Pump Approval	:	UL Listed
Diesel Engine:		
Make	:	KIRLOSKAR
Model / Hp	:	KFP4R-UF05 / 55HP
Cooling Method	:	Heat Exchanger
Speed	:	3000 RPM
Engine Approval	:	UL Listed & FM Approved
Diesel Pump Controller		
Make	:	"Tornatech"
Model	:	GPD-12-220
Operation	:	Combined Automatic , Manual Start
Enclosure	:	NEMA 2
Mounting	:	FLOOR / WALL
Method of Start	:	Standard
Operation Interface	:	Standard
Power Supply	:	220V AC, 12V DC
Controller Approval	:	UL Listed & FM Approved, Built to NFPA 20 Standards

UL LISTED FM APPROVED

MENA
MECHANICAL INDUSTRIES CO.

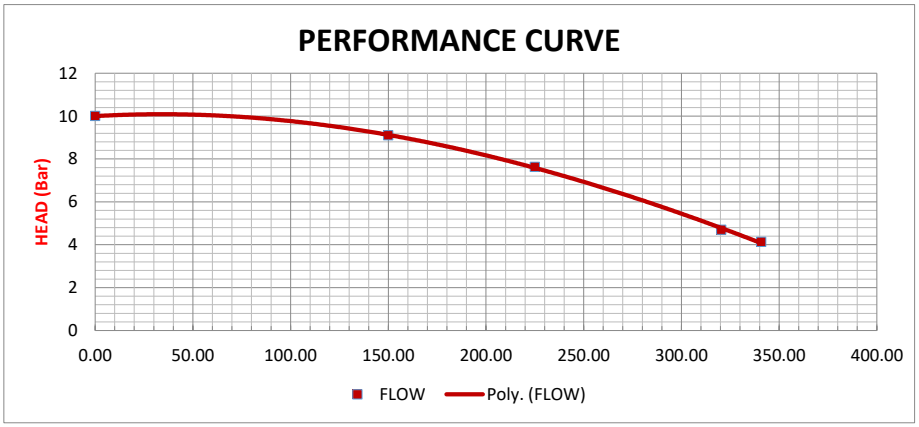
UL LISTED

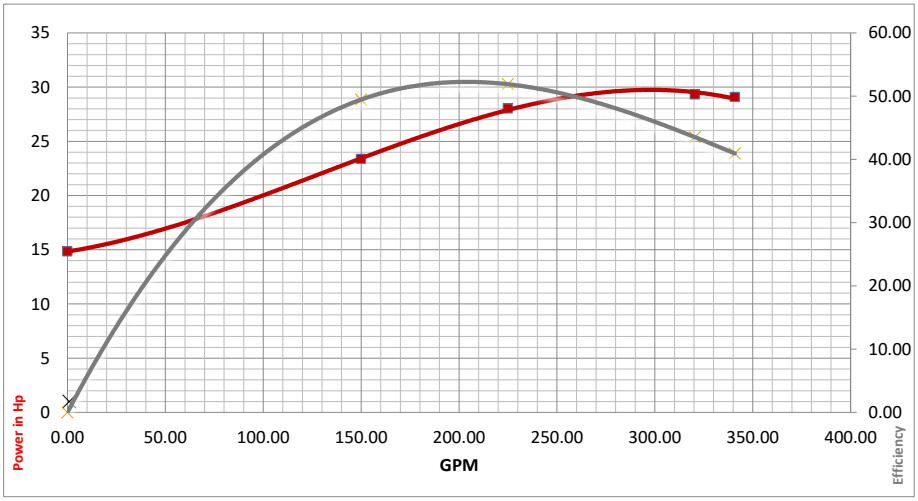
PUMP PERFORMANCE CURVE

Pump	
Model	VES 40-250
Type	END SUCTION-60 HZ
Specific Speed	3500
FL-Dimension	2 1/2 x1 1/2
Motor Rating	
Motor HP	

Search Criteria			
Flow In GPM	150	Head In (Bar)	9
Fluid			
Fluid	Water		
Atm Pressure	101 Mpa		
Impeller Details			
Impeller Dia(mm)	Ref Test Report		

Data Point	
Flow (GPM)	150
Head In (Bar)	9
Eff	49.46
MAX HP(EOC)	30.44
RPM	3500
Design Curve	
Shutoff head	10.00
Flow @150%	225
H(Bar)@150%	7.63
Power-150%	28.020
Driver Rating	
Motor (HP)	30
Engine(HP)	NA





Performance Evaluation

Flow In GPM	Pressure in M(Bar)	Power In Hp	Eifficiency
0.00	10.00	14.840	0.00
150.00	9.10	23.370	49.46
225.00	7.63	28.020	51.89
320.41	4.70	29.310	43.53
340.85	4.13	29.09	40.94

*Manufacturer Reserves Right to Revise the specs and contains without prior notice

Electric Fire Pump

Item Description		Proposed
Electric Pump:		
Make	:	MENA (MENA Mechanical Industries) UL Listed
Model	:	VES 40-250
Type	:	End Suction Fire Pump
Rated Flow	:	150 USGPM
Rated Head	:	9 BAR
Rated Speed	:	3500 RPM
Casing	:	Ductile Iron
Impeller Material	:	Bronze
Shaft	:	ASTM 420
Brand	:	MENA
Pump Approval	:	UL Listed
Electric Motor:		
Make	:	TECHTOP
Protection	:	Class F
Type	:	ODP
Performance Rating	:	30 HP, 3Ph, 60Hz , 380V, 2 POLES
Speed	:	3500 RPM
Motor Approval	:	UL Listed
Electric Pump Controller		
Make	:	"Tornatech"
Model	:	GPA-380\30\3\60
Operation	:	Combined Automatic , Manual Start & Remote Start
Enclosure	:	NEMA 2
Mounting	:	FLOOR / WALL
Method of Start	:	DOL
Operation Interface	:	Standard
Power Supply	:	3Ph, 380V, 60Hz
Controller Approval	:	UL Listed & FM Approved, Built to NFPA 20 Standards

UL LISTED FM APPROVED

Jokey Fire Pump

Item Description		Proposed
Electric Pump:		
Make	:	PACIFIC OR MENA
Model	:	RV
Type	:	Vertical Multistage
Rated Flow	:	15 USGPM
Rated Head	:	10 BAR
Rated Speed	:	3500 RPM, 60 Hz
Motor:		
Type	:	TEFC Motor
Power Supply	:	3 Ph, 380V, 60 hz
Rated power	:	5 Hp
Speed	:	3500RPM
Jockey Pump Controller		
Make	:	"Tornatech"
Model	:	JP3-380\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

MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

UL/FM CERTIFICATES

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
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

Deborah Jennings-Conner, VP Regulatory Services

UL LLC

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

Deborah Jennings-Conner, VP Regulatory Services

UL LLC

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

UL Product iQ™

QYLU.EX15277 - INTERNAL-COMBUSTION ENGINES FOR DRIVING STATIONARY FIRE PUMPS

Internal-combustion Engines for Driving Stationary Fire Pumps

See General Information for Internal-combustion Engines for Driving Stationary Fire Pumps

KIRLOSKAR OIL ENGINES LTD
Plot D/1,Five Star MIDC, Kagal
Hatkangale Industrial Area
Vill : Talandage
Kolhapur, MH 416202 INDIA

EX15277

DIESEL ENGINES RATED FOR USE WITHIN SPEED RANGES

Model	No. of Cylinders	Minimum Rated Speed (rpm)	Minimum Rated HP	Maximum Rated Speed (rpm)	Maximum Rated HP
KFP4R-UF05	4	2800	57	3000	55
KFP4R-UF08	4	2800	77	3000	76
KFP4R-UF16R1	4	2800	105	3000	152
KFP4R-UF16R2	4	2800	146	3000	116
KFP6R-UF26R1	6	2800	251	3000	247
KFP6R-UF26R2	6	2800	164	3000	217

DIESEL ENGINES RATED AT SPECIFIC SPEEDS

Model	No. of Cylinders	Rated HP	Rated Speed (rpm)
KFP4R-UF07	4	62	1760
	4	70	2100
	4	74	2200
	4	74	2350
	4	77	2600
KFP4R-UF15	4	108	1760
	4	111	2100
	4	117	2200
	4	143	2350
	4	151	2600

KFP6R-UF25	6	169	1760
	6	191	2100
	6	196	2200
	6	203	2350
	6	225	2600
KFP6S-UF35	6	288	1760
	6	336	2100
	6	332	2200
	6	330	2350

Last Updated on 2018-09-14

FM APPROVED

Certificate of Compliance

This certificate is issued for the following:

Diesel Engine Fire Pump Drivers
(see listing attached)

Prepared for:

Kirloskar Oil Engines Ltd.
Laxmanrao Kirloskar Road
Khadki Pune, 411 003
India

Manufactured at:

Kirloskar Oil Engines Ltd.
Plot D/1, Five Star MIDC, Kagal Hatkangale Industrial Area
Khadki Village of Talandge, Kolhapur
Maharashtra, 416202 India

FM Approvals Class: 1333 (February 2018)

Approval Identification: 3058182

Approval Granted: October 5, 2018

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.

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

FM Approvals®
Member of the FM Global Group

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FM APPROVED

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Certificate of Compliance

Model	Rated Power, hp	Rated Power, kW	Rated Speed, r/min
KFP4R-UF05	57	42	2800
KFP4R-UF05	56	41.7	2900
KFP4R-UF05	55	41	3000
KFP4R-FM05D1	43	32	2900
KFP4R-UF08	77	57	2800
KFP4R-UF08	77	57	2900
KFP4R-UF08	76	56	3000
KFP4R-UF16R1	105	78	2800
KFP4R-UF16R1	128	95	2900
KFP4R-UF16R1	152	113	3000
KFP4R-UF16R2	146	108	2800
KFP4R-UF16R2	131	97	2900
KFP4R-UF16R2	116	86	3000
KFP6R-UF26R1	251	187	2800
KFP6R-UF26R1	249	185	2900
KFP6R-UF26R1	247	184	3000
KFP6R-UF26R2	164	122	2800
KFP6R-UF26R2	191	142	2900
KFP6R-UF26R2	217	161	3000
KFP4R-UF07	77	57	2600
KFP4R-UF07	74	55	2350
KFP4R-UF07	74	55	2200
KFP4R-UF07	70	52	2100
KFP4R-UF07	62	46	1760
KFP4R-UF15	151	112	2600
KFP4R-UF15	143	106	2350
KFP4R-UF15	117	87	2200
KFP4R-UF15	111	83	2100
KFP4R-UF15	108	80	1760
KFP6R-UF25	225	168	2600
KFP6R-UF25	203	151	2350
KFP6R-UF25	196	146	2200
KFP6R-UF25	191	142	2100
KFP6R-UF25	169	126	1760
KFP6S-UF35	330	246	2350
KFP6S-UF35	332	247	2200
KFP6S-UF35	336	250	2100
KFP6S-UF35	288	215	1760

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

Additional Information: See the UL Online Certifications Directory at https://iq.ulprospector.com for additional information.

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

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

Look for the UL Certification Mark on the product.

Bruce Mahrenholz, Director North American Certification Program

UL LLC

CERTIFICATE OF COMPLIANCE

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

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

Models/Product

Model Number,F-TXC143T1U2B,F-TXC143T1U2B,F-TXC143T1U2B,F-TXC143T1U2B,F-TXC143T1.5U2B,F-TXC143T1.5U2B,F-TXC143T1.5U2B,F-TXC143T1.5U2B,F-TXC145T2U2B,F-TXC145T2U2B,F-TXC145T2U2B,F-TXC145T2U2B,F-TXC182T3U2B,F-TXC182T3U2B,F-TXC182T3U2B,F-TXC182T3U2B,F-TXC184T5U2B,F-TXC184T5U2B,F-TXC184T5U2B,F-TXC184T5U2B,F-TXC213T7.5U2B,F-TXC213T7.5U2B,F-TXC213T7.5U2B,F-TXC213T7.5U2B,F-TXC215T10U2B,F-TXC215T10U2B,F-TXC215T10U2B,F-TXC215T10U2B,F-TXC254T15U2B,F-TXC254T15U2B,F-TXC254T15U2B,F-TXC254T15U2B,F-TXC256T20U2B,F-TXC256T20U2B,F-TXC256T20U2B,F-TXC256T20U2B,F-TXC284TS25U2B,F-TXC284TS25U2B,F-TXC284TS25U2B,F-TXC284TS25U2B,F-TXC286TS30U2B,F-TXC286TS30U2B,F-TXC286TS30U2B,F-TXC286TS30U2B,F-TXC324TS40U2B,F-TXC324TS40U2B,F-TXC324TS40U2B,F-TXC324TS40U2B,F-TXC326TS50U2B,F-TXC326TS50U2B,F-TXC326TS50U2B,F-TXC326TS50U2B,F-TXC364TS60U2B,F-TXC364TS60U2B,F-TXC364TS60U2B,F-TXC364TS60U2B,F-TXC365TS75U2B,F-TXC365TS75U2B,F-TXC365TS75U2B,F-TXC365TS75U2B,F-TXC405TS100U2B,F-TXC405TS100U2B,F-TXC405TS100U2B,F-TXC405TS100U2B,F-TXC444TS125U2B,F-TXC444TS125U2B,F-TXC444TS125U2B,F-TXC444TS125U2B,F-TXC445TS150U2B,F-TXC445TS150U2B,F-TXC445TS150U2B,F-TXC445TS150U2B,F-TXC447TS200U2B,F-TXC447TS200U2B,F-TXC447TS200U2B,F-TXC447TS200U2B,F-TXC449TS250U2B,F-TXC449TS250U2B,F-TXC449TS250U2B,F-TXC449TS250U2B,F-TXC449TS300U2B,F-TXC449TS300U2B,F-TXC449TS300U2B,F-TXC449TS300U2B,F-TXC586/7TS350U2B,F-TXC586/7TS350U2B,F-TXC586/7TS350U2B,F-TXC586/7TS350U2B,F-TXC586/7TS400U2B,F-TXC586/7TS400U2B,F-TXC586/7TS400U2B,F-TXC586/7TS400U2B,F-TXC586/7TS450U2B,F-TXC586/7TS450U2B,F-TXC586/7TS450U2B,F-TXC586/7TS450U2B,F-TXC143T1U4B,F-TXC143T1U4B,F-TXC143T1U4B,F-TXC143T1U4B,F-TXC145T1.5U4B,F-TXC145T1.5U4B,F-TXC145T1.5U4B,F-TXC145T1.5U4B,F-TXC145T2U4B,F-TXC145T2U4B,F-TXC145T2U4B,F-TXC145T2U4B,F-TXC182T3U4B,F-TXC182T3U4B,F-TXC182T3U4B,F-TXC182T3U4B,F-TXC184T5U4B,F-TXC184T5U4B,F-TXC184T5U4B,F-TXC184T5U4B,F-TXC213T7.5U4B,F-TXC213T7.5U4B,F-TXC213T7.5U4B,F-TXC213T7.5U4B,F-TXC215T10U4B,F-TXC215T10U4B,F-TXC215T10U4B,F-TXC215T10U4B,F-TXC254T15U4B,F-TXC254T15U4B,F-TXC254T15U4B,F-TXC254T15U4B,F-TXC256T20U4B,F-TXC256T20U4B,F-TXC256T20U4B,F-TXC256T20U4B,F-TXC284T25U4B,F-TXC284T25U4B,F-TXC284T25U4B,F-TXC284T25U4B,F-TXC286T30U4B,F-TXC286T30U4B,F-TXC286T30U4B,F-TXC286T30U4B,F-TXC324T40U4B,F-TXC324T40U4B,F-TXC324T40U4B,F-TXC324T40U4B,F-TXC326T50U4B,F-TXC326T50U4B,F-TXC326T50U4B,F-TXC326T50U4B,F-TXC364T60U4B,F-TXC364T60U4B,F-TXC364T60U4B,F-TXC364T60U4B,F-TXC365T75U4B,F-TXC365T75U4B,F-TXC365T75U4B,F-TXC365T75U4B,F-TXC405T100U4B,F-TXC405T100U4B,F-TXC405T100U4B,F-TXC405T100U4B,F-TXC444T125U4B,F-TXC444T125U4B,F-TXC444T125U4B,F-TXC444T125U4B,F-TXC445T150U4B,F-TXC445T150U4B,F-TXC445T150U4B,F-TXC445T150U4B,F-TXC447T200U4B,F-TXC447T200U4B,F-TXC447T200U4B,F-TXC447T200U4B,F-TXC449T250U4B,F-TXC449T250U4B,F-TXC449T250U4B,F-

Bruce Mahrenholz, Director North American Certification Program

UL LLC

CERTIFICATE OF COMPLIANCE

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TXC449T250U4B,F-TXC449TS300U4B,F-TXC449TS300U4B,F-TXC449TS300U4B,F-TXC449TS300U4B,F-TXC586/7T350U4B,F-TXC586/7T350U4B,F-TXC586/7T350U4B,F-TXC586/7T350U4B,F-TXC586/7T400U4B,F-TXC586/7T400U4B,F-TXC586/7T400U4B,F-TXC586/7T400U4B,F-TXC586/7T450U4B,F-TXC586/7T450U4B,F-TXC586/7T450U4B,F-TXC586/7T450U4B,F-TXC145T1U6B,F-TXC145T1U6B,F-TXC145T1U6B,F-TXC145T1U6B,F-TXC182T1.5U6B,F-TXC182T1.5U6B,F-TXC182T1.5U6B,F-TXC182T1.5U6B,F-TXC184T2U6B,F-TXC184T2U6B,F-TXC184T2U6B,F-TXC184T2U6B,F-TXC213T3U6B,F-TXC213T3U6B,F-TXC213T3U6B,F-TXC213T3U6B,F-TXC215T5U6B,F-TXC215T5U6B,F-TXC215T5U6B,F-TXC215T5U6B,F-TXC254T7.5U6B,F-TXC254T7.5U6B,F-TXC254T7.5U6B,F-TXC254T7.5U6B,F-TXC256T10U6B,F-TXC256T10U6B,F-TXC256T10U6B,F-TXC256T10U6B,F-TXC284T15U6B,F-TXC284T15U6B,F-TXC284T15U6B,F-TXC284T15U6B,F-TXC286T20U6B,F-TXC286T20U6B,F-TXC286T20U6B,F-TXC286T20U6B,F-TXC324T25U6B,F-TXC324T25U6B,F-TXC324T25U6B,F-TXC324T25U6B,F-TXC326T30U6B,F-TXC326T30U6B,F-TXC326T30U6B,F-TXC326T30U6B,F-TXC364T40U6B,F-TXC364T40U6B,F-TXC364T40U6B,F-TXC364T40U6B,F-TXC365T50U6B,F-TXC365T50U6B,F-TXC365T50U6B,F-TXC365T50U6B,F-TXC404T60U6B,F-TXC404T60U6B,F-TXC404T60U6B,F-TXC404T60U6B,F-TXC405T75U6B,F-TXC405T75U6B,F-TXC405T75U6B,F-TXC405T75U6B,F-TXC444T100U6B,F-TXC444T100U6B,F-TXC444T100U6B,F-TXC444T100U6B,F-TXC445T125U6B,F-TXC445T125U6B,F-TXC445T125U6B,F-TXC445T125U6B,F-TXC447T150U6B,F-TXC447T150U6B,F-TXC447T150U6B,F-TXC447T150U6B,F-TXC449T200U6B,F-TXC449T200U6B,F-TXC449T200U6B,F-TXC449T200U6B,F-TXC586/7T250U6B,F-TXC586/7T250U6B,F-TXC586/7T250U6B,F-TXC586/7T250U6B,F-TXC586/7T300U6B,F-TXC586/7T300U6B,F-TXC586/7T300U6B,F-TXC586/7T300U6B,F-TXC586/7T350U6B,F-TXC586/7T350U6B,F-TXC586/7T350U6B,F-TXC586/7T350U6B,F-TXC586/7T400U6B,F-TXC586/7T400U6B,F-TXC586/7T400U6B,F-TXC586/7T400U6B,

Bruce Mahrenholz, Director North American Certification Program

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F-TDC254T15U2B,F-TDC254T15U2B,F-TDC254T15U2B,F-TDC254T15U2B,F-TDC256T20U2B,F-TDC256T20U2B,F-TDC256T20U2B,F-TDC256T20U2B,F-TDC284TS25U2B,F-TDC284TS25U2B,F-TDC284TS25U2B,F-TDC284TS25U2B,F-TDC286TS30U2B,F-TDC286TS30U2B,F-TDC286TS30U2B,F-TDC286TS30U2B,F-TDC286TS40U2B,F-TDC286TS40U2B,F-TDC286TS40U2B,F-TDC286TS40U2B,F-TDC324TS40U2B,F-TDC324TS40U2B,F-TDC324TS40U2B,F-TDC324TS40U2B,F-TDC324TS50U2B,F-TDC324TS50U2B,F-TDC324TS50U2B,F-TDC324TS50U2B,F-TDC326TS50U2B,F-TDC326TS50U2B,F-TDC326TS50U2B,F-TDC326TS50U2B,F-TDC326TS60U2B,F-TDC326TS60U2B,F-TDC326TS60U2B,F-TDC326TS60U2B,F-TDC364TS60U2B,F-TDC364TS60U2B,F-TDC364TS60U2B,F-TDC364TS60U2B,F-TDC364TS75U2B,F-TDC364TS75U2B,F-TDC364TS75U2B,F-TDC364TS75U2B,F-TDC365TS75U2B,F-TDC365TS75U2B,F-TDC365TS75U2B,F-TDC365TS75U2B,F-TDC365TS100U2B,F-TDC365TS100U2B,F-TDC365TS100U2B,F-TDC365TS100U2B,F-TDC405TS100U2B,F-TDC405TS100U2B,F-TDC405TS100U2B,F-TDC405TS100U2B,F-TDC404TS125U2B,F-TDC404TS125U2B,F-TDC404TS125U2B,F-TDC404TS125U2B,F-TDC444TS125U2B,F-TDC444TS125U2B,F-TDC444TS125U2B,F-TDC444TS125U2B,F-TDC405TS150U2B,F-TDC405TS150U2B,F-TDC405TS150U2B,F-TDC405TS150U2B,F-TDC445TS150U2B,F-TDC445TS150U2B,F-TDC445TS150U2B,F-TDC445TS150U2B,F-TDC444TS200U2B,F-TDC444TS200U2B,F-TDC444TS200U2B,F-TDC444TS200U2B,F-TDC447TS200U2B,F-TDC447TS200U2B,F-TDC447TS200U2B,F-TDC447TS200U2B,F-TDC449TS250U2B,F-TDC449TS250U2B,F-TDC449TS250U2B,F-TDC449TS250U2B,F-TDC447TS300U2B,F-TDC447TS300U2B,F-TDC447TS300U2B,F-TDC447TS300U2B,F-TDC449TS300U2B,F-TDC449TS300U2B,F-TDC449TS300U2B,F-TDC449TS300U2B,F-TDC447TS350U2B,F-TDC447TS350U2B,F-TDC447TS350U2B,F-TDC447TS350U2B,F-TDC449TS350U2B,F-TDC449TS350U2B,F-TDC449TS350U2B,F-TDC449TS350U2B,F-TDC449TS400U2B,F-TDC449TS400U2B,F-TDC449TS400U2B,F-TDC449TS400U2B,F-TDC449TS450U2B,F-TDC449TS450U2B,F-TDC449TS450U2B,F-TDC449TS450U2B,F-TDC449TS500U2B,F-TDC449TS500U2B,F-TDC449TS500U2B,F-TDC254T15U4B,F-TDC254T15U4B,F-TDC254T15U4B,F-TDC254T15U4B,F-TDC256T20U4B,F-TDC256T20U4B,F-TDC256T20U4B,F-TDC256T20U4B,F-TDC284T25U4B,F-TDC284T25U4B,F-TDC284T25U4B,F-TDC284T25U4B,F-TDC286T30U4B,F-TDC286T30U4B,F-TDC286T30U4B,F-TDC286T30U4B,F-TDC324T40U4B,F-TDC324T40U4B,F-TDC324T40U4B,F-TDC324T40U4B,F-TDC326T50U4B,F-TDC326T50U4B,F-TDC326T50U4B,F-TDC326T50U4B,F-TDC364T60U4B,F-TDC364T60U4B,F-TDC364T60U4B,F-TDC364T60U4B,F-TDC365T75U4B,F-TDC365T75U4B,F-TDC365T75U4B,F-TDC365T75U4B,F-TDC405T100U4B,F-TDC405T100U4B,F-TDC405T100U4B,F-TDC405T100U4B,F-TDC405T125U4B,F-TDC405T125U4B,F-TDC405T125U4B,F-TDC405T125U4B,F-TDC444T125U4B,F-TDC444T125U4B,F-TDC444T125U4B,F-TDC444T125U4B,F-TDC444T150U4B,F-TDC444T150U4B,F-TDC444T150U4B,F-TDC444T150U4B,F-TDC445T150U4B,F-TDC445T150U4B,F-TDC445T150U4B,F-TDC445T150U4B,F-TDC445T200U4B,F-TDC445T200U4B,F-TDC445T200U4B,F-TDC445T200U4B,F-TDC447T200U4B,F-TDC447T200U4B,F-TDC447T200U4B,F-TDC447T200U4B,F-TDC447T250U4B,F-TDC447T250U4B,F-TDC447T250U4B,F-TDC447T250U4B,F-TDC449T250U4B,F-TDC449T250U4B,F-TDC449T250U4B,F-TDC449T250U4B,F-TDC449T300U4B,F-TDC449T300U4B,F-TDC449T300U4B,F-TDC449T300U4B,F-TDC449T350U4B,F-TDC449T350U4B,F-

Bruce Mahrenholz, Director North American Certification Program

UL LLC

CERTIFICATE OF COMPLIANCE

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Issue Date	2020-FEBRUARY-14

TDC449T350U4B,F-TDC449T350U4B,F-TDC449T400U4B,F-TDC449T400U4B,F-TDC449T400U4B,F-TDC449T400U4B,F-TDC449T450U4B,F-TDC449T450U4B,F-TDC449T450U4B,

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QYZS.EX3971
Pump Controllers, Fire

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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 Ascolectric 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 Ascolectric 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:

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 2nd 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 (Ascolectric):

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

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

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.

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

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@fmapprovals.com
Website: www.fmapprovals.com

Member of the FM Global Group

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.

ADDRESS/REGION: 7075 PLACE ROBERT-JONCAS, #132
SAINT LAURENT, QUEBEC
H4M 2Z2 CANADA

NAME OF THE BRAND(S): TORNATECH FZE
Warehouse CC-4 near R/A 08
P.O. Box 18435, Jebel Ali
Dubai, United Arab Emirates

MODEL/NO: GPx series
GPD series

CERTIFICATION MARK: FM APPROVED

LOGO ON THE PRODUCT: TORNA TECH

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@fmapprovals.com
PRODUCT APPLICATION GUIDELINE (END USE):	Installations shall comply with the manufacturer's instructions.

SIGNED BY:

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.

FM APPROVED

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.

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

FM Approvals®

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FM APPROVED

Certificate of Compliance

Pump Rating, gal/min (dm³/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

FM Approvals®

Member of the FM Global Group

FM APPROVED

Certificate of Compliance

Pump Rating, gal/min (dm³/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.

FM Approvals®

Member of the FM Global Group

MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

COMPANY PROFILE
&
TRADE LICENSE

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

MENA
MECHANICAL INDUSTRIES CO.

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.

MENA MECHANICAL INDUSTRIES CO.

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:
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• 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.

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.

VENDORS

END SUCTION & SPLIT CASE PUMPS
VERTICAL TURBINE FIRE PUMP
MENA MECHANICAL INDUSTRIES- UAE

DIESEL DRIVER
KIRLOSKAR, INDIA
UL LISTED & FM APPROVED

DIESEL DRIVER
NM FIRE, CHINA
UL LISTED & FM APPROVED

DIESEL DRIVER
GREAVES COTTON
UL LISTED & FM APPROVED

DIESEL DRIVER
TAIDONG, CHINA
UL LISTED LISTED

DIESEL DRIVER
CLARKE, UK /USA
UL LISTED & FM APPROVED

FIRE PUMP MOTOR
WEG, BRAZIL
UL LISTED APPROVED

FIRE PUMP MOTOR
MARATHON, USA
UL LISTED

FIRE PUMP CONTROLLERS
TORNATECH, CANADA UL LISTED & FM APPROVED

PRESSURE RELIEF VALVE
SINGER VALVE, CANADA UL LISTED & FM APPROVED

FIRE PUMP MOTOR
TECHTOP, INC
UL LISTED APPROVED

FLOWMETER
GERAND, USA FM APPROVED

AMERILLO GEARS - USA

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.

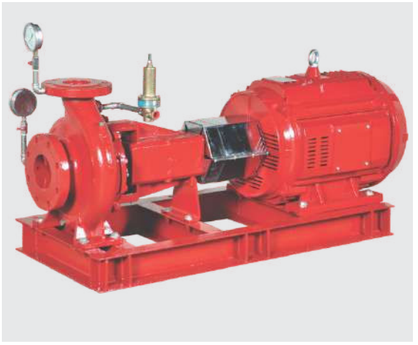
Our value and service meets our customer expectations because we build and maintain a good relationship with them to ensure long-term satisfaction.

PRODUCTS RANGE

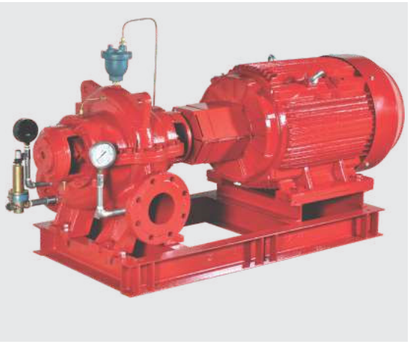
MENA MECHANICAL INDUSTRIES CO.

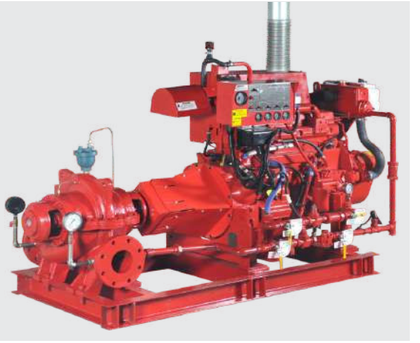
Vertical Turbine Fire Pumps

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

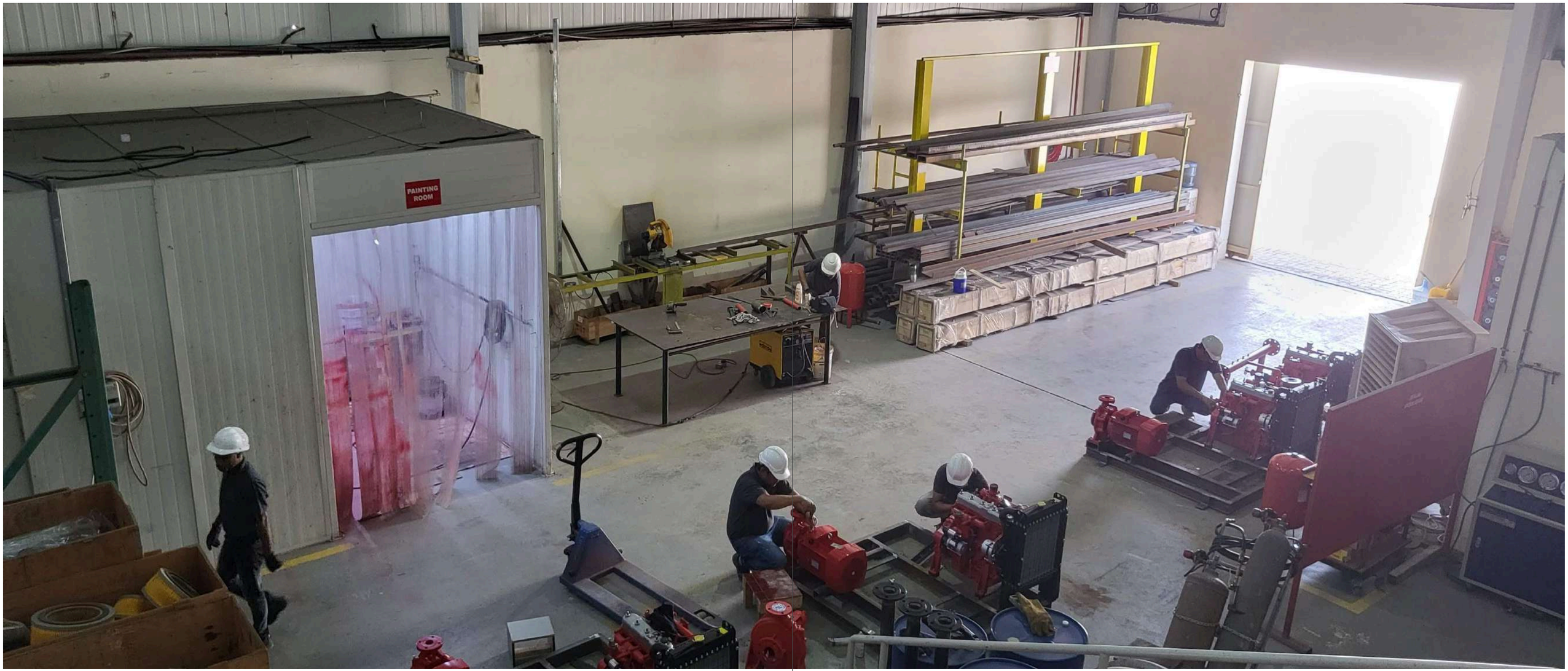
MENA MECHANICAL INDUSTRIES CO.

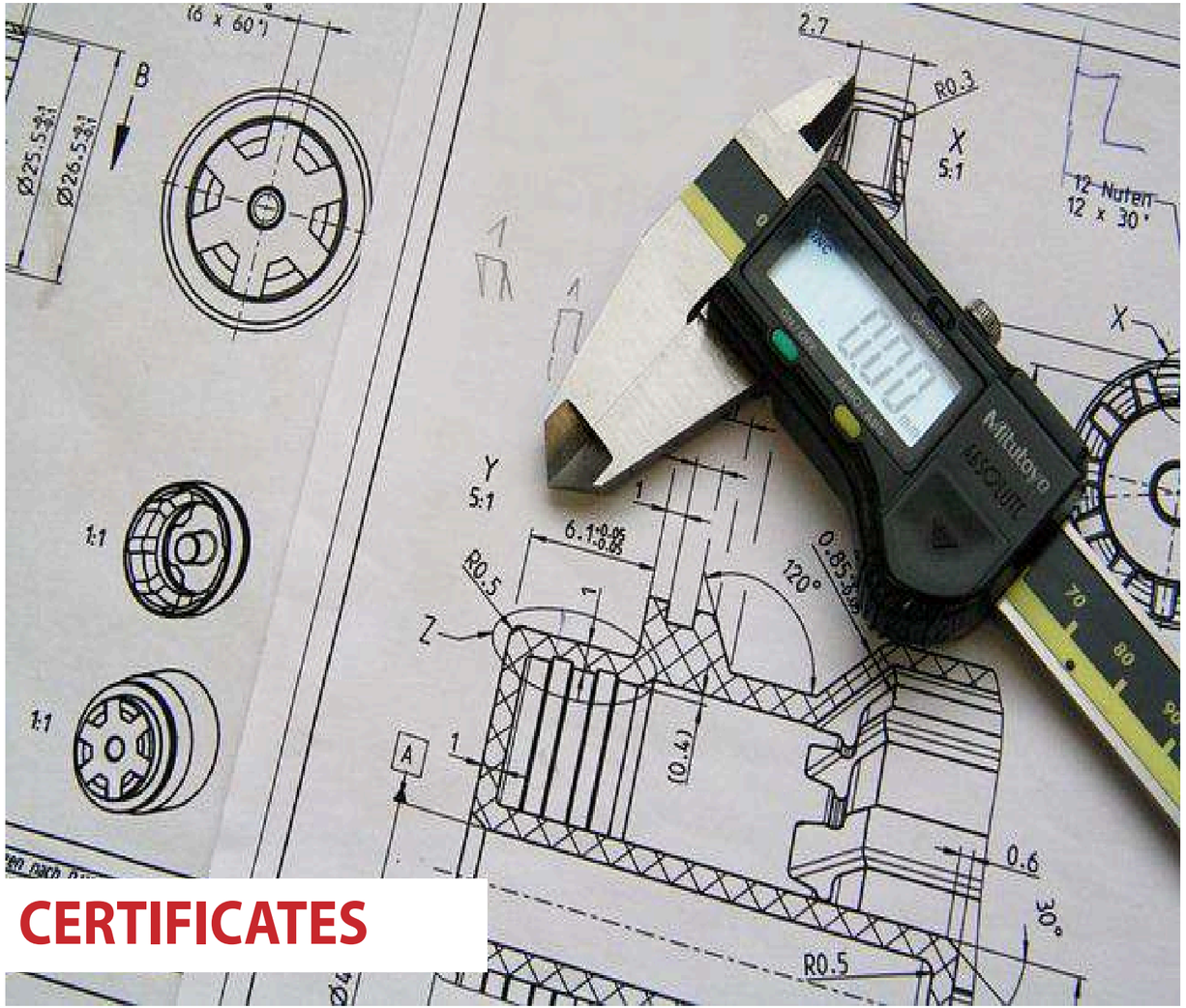
PRODUCTION CAPABALITIES









PAINTING
ROOM



CERTIFICATES

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-Gower

Deborah Jennings-Gower, VP Regulatory Services

UL LLC

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

MENA
MECHANICAL INDUSTRIES CO.

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

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

Page 1 of 8

UL Product iQ®

UL Solutions

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" , , MENA MECHANICAL INDUSTRIES CO

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

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 Sahra Building Contracting Company LLC	Sharjah Engineering Consultant	G+1 Commercial Building	Sharjah	300	9
6	Mr. Hassan Arab Darwish	Remal Al Sahra Building Contracting Company LLC	Sharjah Engineering Consultant	G+3 Commercial Builidng	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 Sahra 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 Architechture Engineering Consultant	Commercal Building G+4 TYP	Dubai	750	10

MENA MECHANICAL INDUSTRIES CO.

CONSULTANTS

OUR CLIENTS

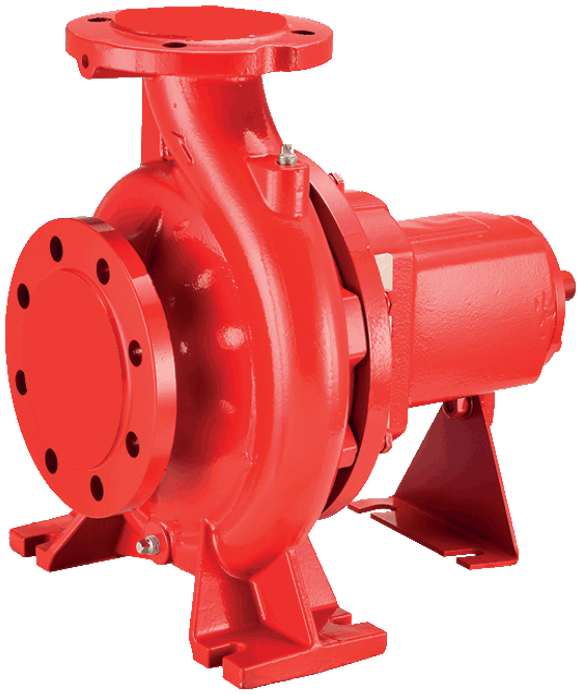
MENA MECHANICAL INDUSTRIES CO.

MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

DIESEL ENGINE DRIVEN PUMP
SPECIFICATIONS

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

END SUCTION FIRE PUMP



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

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

Pump Naming

VES 80-250

- Nominal impeller diameter (mm)
- Discharge fange DN (mm)
- Pump type

VESD150-80-250

- Nominal impeller diameter (mm)
- Discharge fange DN (mm)
- Pump Type

Product Standard

UL 448, NFPA

Product Approvals

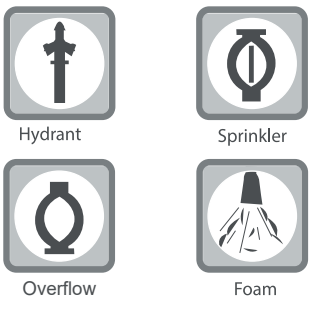
UL LISTED

Flange Standards

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

Driver Options

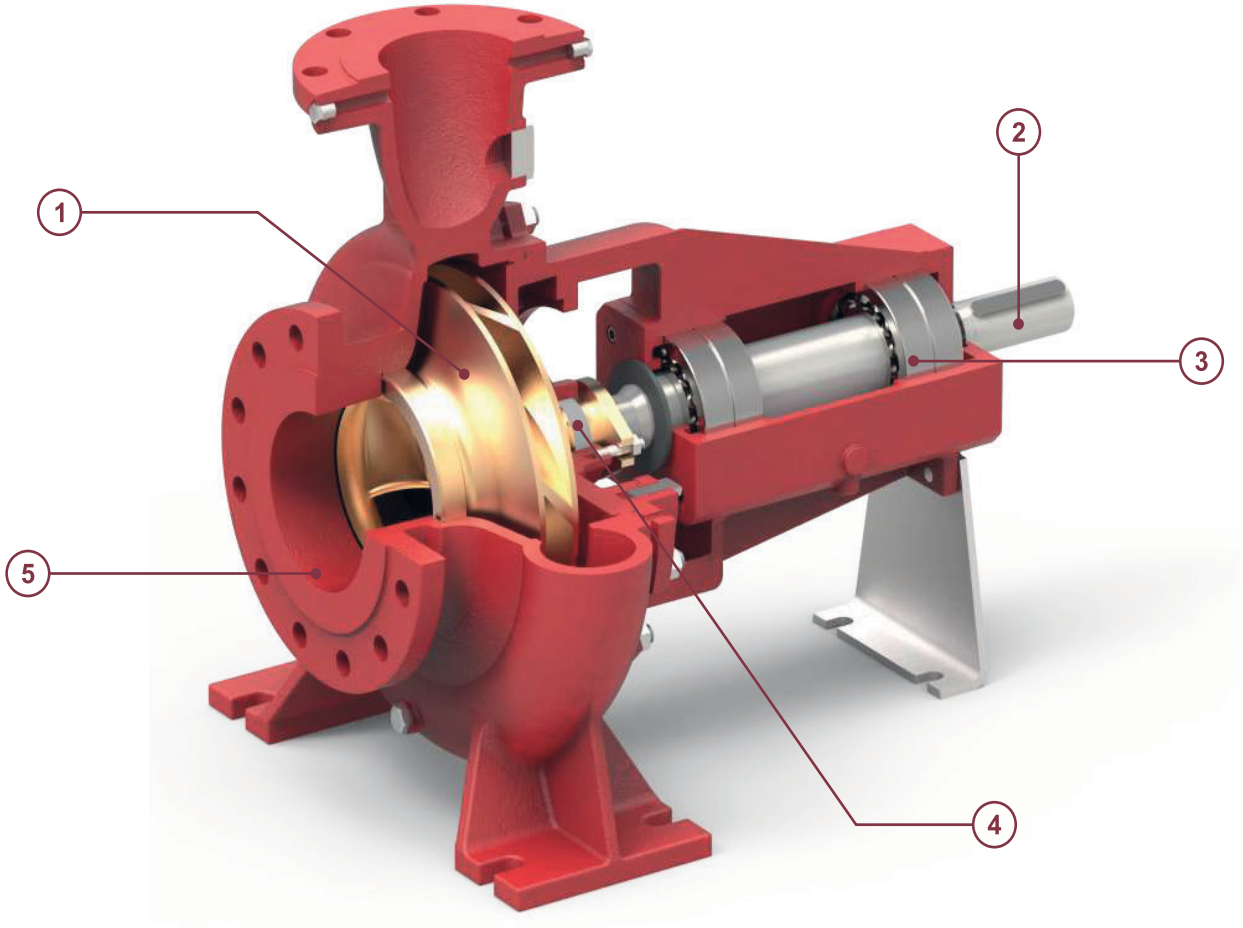
Application Areas



Risk Class

END SUCTION FIRE PUMP

General Pump Features



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

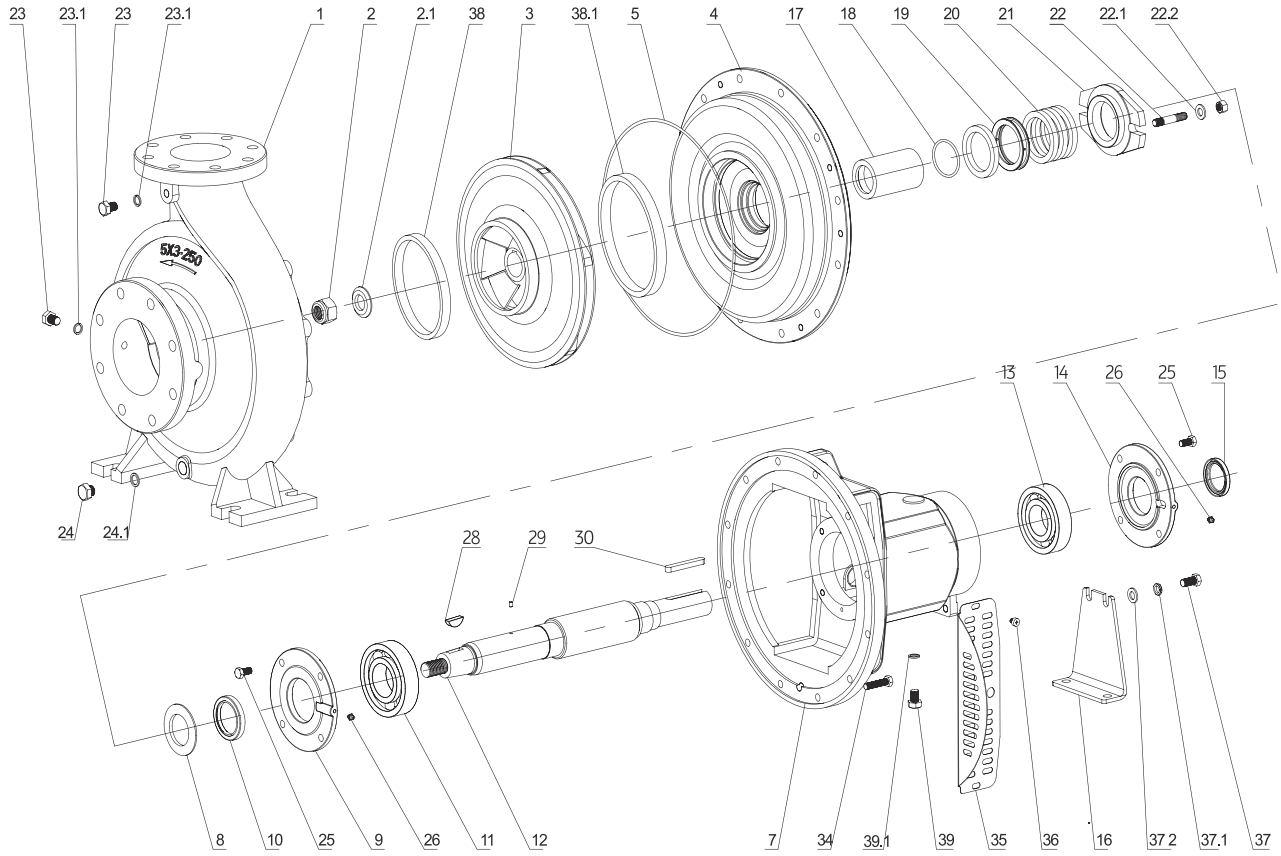
- Asbestos - free, soft packed stuffing boxes.

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

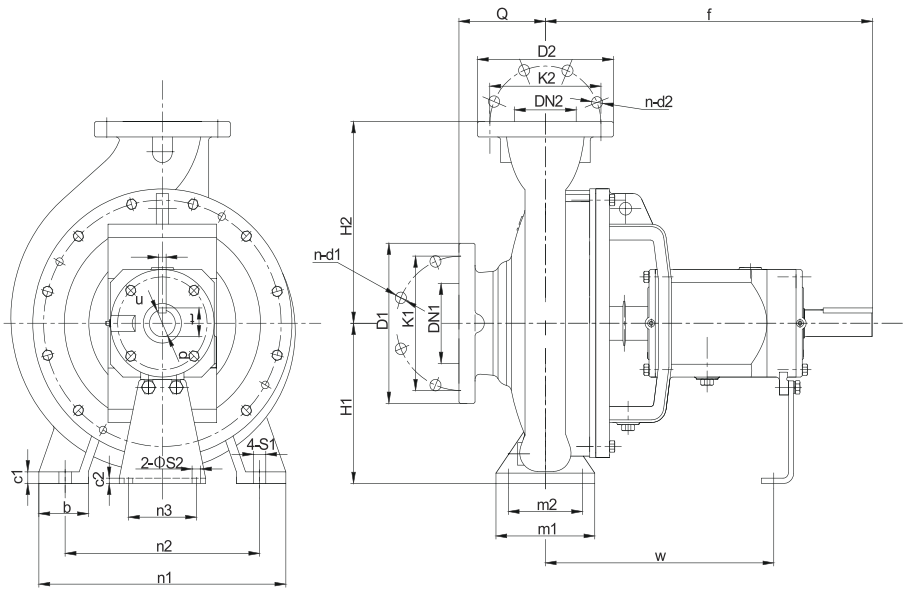


Code	Part Name
1	Casing
2	Impeller Nut
2.1	Lock washer for impeller
3	Impeller
4	Gland Cover
5	O-ring
7	Bearing Housing
8	Rubber Slinger
9	NDE Bearing Cover
10	NDE Oil Seal
11	NDE Bearing
12	Shaft
13	DE Bearing
14	DE Bearing Cover
15	DE Oil Seal

Code	Part Name
16	Support Foot
17	Packing Sleeve
18	O-ring
19	Gland Packing
20	Packing Seal Cage
21	Gland Cover
22	Stud Bolt
22.1	Flat Washer
22.2	Screw Nut
23	Plug
23.1	Plug Spacer
24	Plug
24.1	Plug Spacer
25	Screw Bolt

Code	Part Name
26	Oil Cup M6
28	key
29	pin
30	key
34	Screw Bolt
35	Protective cover
36	Bolt
37	Screw Bolt
37.1	Elastic Washer
37.2	Flat Washer
38	Front-Wearring
38.1	Back-Wearring
39	Plug
39.1	Plug Spacer

VES SERIES INSTALLATION DIMENSION



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.

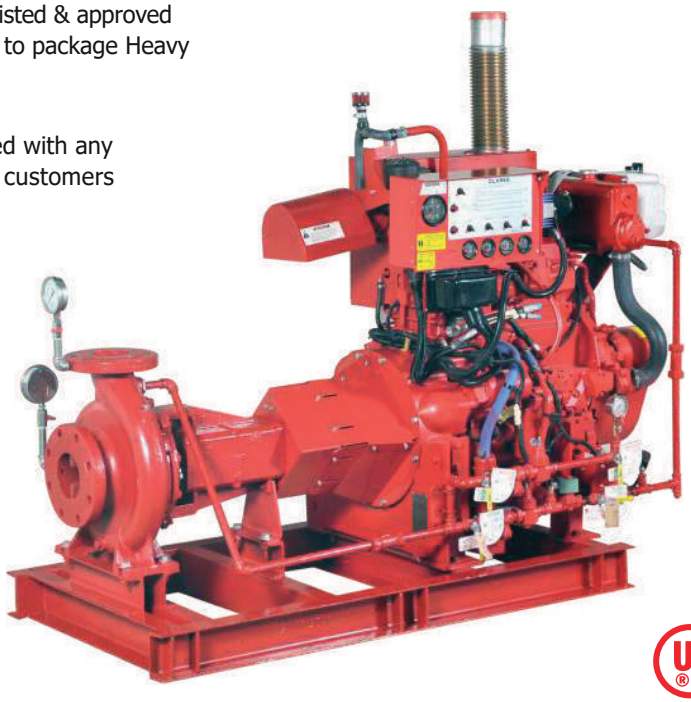
MENA ofers listed Centrifugal Fire Pump Skids that meet every fre protection need.

- 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 Retroft.
- High standard of Quality in material Construction fnish and Workmanship.

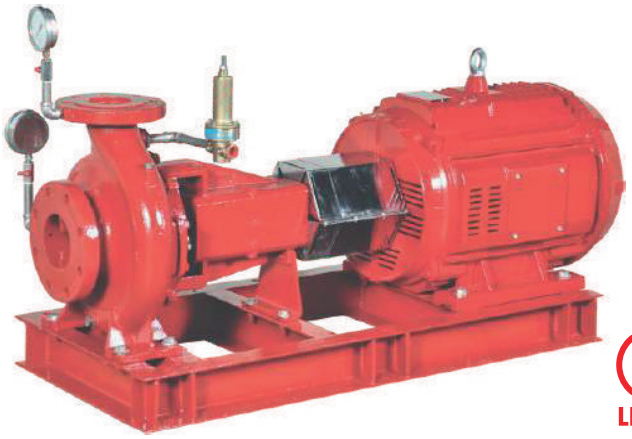
DIESEL DRIVEN SKIDS

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 specifc brand as per customers requirement.



UL LISTED



MOTOR DRIVEN SKIDS

MENA maintains its standard with using WEG which is High Efciency 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 specifc brand as per client requirement.

UL LISTED

APPROVED UL LISTING RANGE

Rated Capacity, US GPM	Size, In.	Model	Pressure Rating, psi	Approx Speed RPM	Maximum Working Pressure Psi
50	2.5×1.5	VES 40-250	101 - 142	2900	200
50	2.5×1.5	VES 40-250	144 - 207	3500	290
100	2.5×1.5	VES 40-250	97 - 140	2900	200
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
150	2.5×1.5	VES 40-250	87 - 131	2900	200
150	2.5×1.5	VES 40-250	133 - 196	3500	290
150	3×2	VES 50-250	104 - 147	2980	225
150	3×2	VES 50-250	144 - 202	3500	290
200	3×2	VES 50-250	101 - 145	2980	225
200	3×2	VES 50-250	140 - 200	3500	290
250	3×2	VES 50-250	97 - 140	2980	225
250	3×2	VES 50-250	136 - 196	3500	290
250	4×2.5	VES 65-250	91 - 143	2900	225
250	4×2.5	VES 65-250	131 - 207	3500	290
300	4×2.5	VES 65-250	89 - 142	2900	225
300	4×2.5	VES 65-250	130 - 206	3500	290
400	4×2.5	VES 65-250	82 - 137	2900	225
400	4×2.5	VES 65-250	125 - 203	3500	290
400	5×3	VES 80-200	89 - 141	3500	225
400	5×3	VES 80-250	88 - 140	2900	225
400	5×3	VES 80-250	128 - 207	3500	290
450	5×3	VES 80-200	86 - 139	3500	225
450	5×3	VES 80-250	86 - 140	2900	225
450	5×3	VES 80-250	127 - 206	3500	290
450	5×3	VES 80-315	131 - 207	2900	290
450	5×4	VES 100-200	88 - 143	3500	225
450	5×4	VES 100-250	83 - 135	2900	290
450	5×4	VES 100-250	123 – 198	3500	290
450	5×4	VES 100-315	133 - 210	2900	290
450	5×4	VES 100-315	140 - 222	2980	290
500	5×3	VES 80-200	83 - 136	3500	225
500	5×3	VES 80-250	84 - 139	2900	225
500	5×3	VES 80-250	125 - 205	3500	290
500	5×3	VES 80-315	127 - 204	2900	290
500	5×4	VES 100-200	88 - 141	3500	225
500	5×4	VES 100-250	83 - 134	2900	290
500	5×4	VES 100-250	122 - 198	3500	290
500	5×4	VES 100-315	132 - 209	2900	290
500	5×4	VES 100-315	139 - 221	2980	290
500	6×4	VESD 150-100-200	116 - 142	3500	225
500	6×4	VESD 150-100-315	119 - 192	2900	250
750	5×4	VES 100-200	82 - 138	3500	225
750	5×4	VES 100-250	74 - 128	2900	290
750	5×4	VES 100-250	115 - 191	3500	290
750	5×4	VES 100-315	125 - 202	2900	290
750	5×4	VES 100-315	133 - 214	2980	290
750	6×4	VESD 150-100-200	112 - 137	3500	225
750	6×4	VESD 150-100-315	113 - 186	2900	250
1000	6×4	VESD 150-100-200	99 - 128	3500	225
1000	6×4	VESD 150-100-315	101 - 173	2900	250

UL® LISTED

MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

DIESEL ENGINE SPECIFICATIONS

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

Diesel Engines for Fire Pumps

FM APPROVED · UL LISTED · NFPA 20 Requirements · CE

Never Compromise on Safety.

kirloskar
Oil Engines

A rich tradition of engineering excellence

The Kirloskar Legacy stands for a tradition of excellence for more than a century now. A personification of patronizing values and visionary goals, the name 'Kirloskar' is engraved on numerous nation-building milestones. Today, the Kirloskar Group, with a turnover exceeding USD 1.6 billion, stands as an enormous industrial conglomerate.

Incorporated in 1946, Kirloskar Oil Engines Limited (KOEL) is the flagship company of the Kirloskar group. We have four state-of-the-art manufacturing units in India that offer world-class service.

The company has a sizable presence in international markets, with offices in the USA, UAE., South Africa, Kenya and representatives in Indonesia, Vietnam and Nigeria. KOEL also has a strong distribution network throughout the Middle East and Africa.

Today KOEL is an acknowledged leader in the manufacturing of diesel engines, agricultural pumpsets, power tillers and generating sets. The company currently ranks among the leading manufacturers of diesel engines, which are manufactured and sold under Kirloskar Brand. Kirloskar engines cover a power envelop span ranging from 4 hp to 1250 hp in air-cooled and liquid cooled versions.

KOEL manufactures over 225,000 engines annually, which are used in over 100 different applications. These applications are found in sectors such as agriculture, power generation, construction, material handling, earth-moving, mining, offshore, fluid handling and agro-industrial market segments that include defence and marine applications. KOEL exports to over 60 countries worldwide.

Kirloskar Engines for Fire Pumps

Reliability of the fire protection systems is a major concern for insurance companies and end users. A prime contributor to the reliability of fire pumps is a dependable driver.

With over sixty years of experience in engine designing and manufacturing, Kirloskar Oil Engines Ltd. has the capability to offer dependable diesel engines for critical applications.

The company's work with OEMs, contractors, consultants and end users over the years, has given it a comprehensive understanding of the need for cost effective and reliable diesel engines for fire pump packages.

Kirloskar KFP series engines have been designed to meet the stringent requirements of Factory Mutual (FM), Underwriters Laboratories (UL) as well as NFPA 20 standards.

KFP series engines are currently available in 19 different ratings approved by FM and listed by UL. These stringent approval criteria cover performance and functional requirements, examination of manufacturing facility, quarterly audits of quality assurance procedures and a follow up programme to verify approved products' conformance.

Salient features of KFP series

- Heat exchanger for engine coolant
- Liquid cooled charge air cooler for after-cooled engine models
- FM approved cooling loop with raw water solenoid, flow switch and manual valves in main & emergency lines as per NFPA20 requirements
- Engine mounted instrument panel duly isolated from vibration
- Junction box integral with instrument panel for AC wiring
- Interconnection to main controller
- Engine coolant heater
- Starter Contactors (DC)
- Splitter for splitting the charging current coming from alternator to dual battery
- Heat shield on exhaust manifold, turbo charger & CAC pipes
- Fire resistant flexible supply & return lines in fuel connections
- UL listed drive shafts

Optional Accessories offered with Kirloskar KFP range for Fire Pump OEMs

- Drive Shaft Assembly: Listed or Non-Listed along with Drive Shaft Guard
- Fabricated Base Frames customized to suite various Engine-Pump combinations for Drop-in assembly of pumps
- Engine Base frames for VT pump installations
- Torsional Couplings with free service of TV analysis report
- Battery kits
- Weather Proof / Sound Attenuated Enclosures
- Standard Tool Kit
- Engine Maintenance Kits

FM Approved & UL Listed Ratings

Engine Model	FM Approved & UL Listed Ratings							
	1760 RPM	2100 RPM	2200 RPM	2350 RPM	2600 RPM	2800 RPM	2900 RPM	3000 RPM
	HP	HP	HP	HP	HP	HP	HP	HP
KFP4R-FM05D1 Naturally Aspired							43*	
KFP4R-UF05 Naturally Aspired						57	56	55
KFP4R-UF07 Naturally Aspired	62	70	74	74	77			
KFP4R-UF08 Naturally Aspired						77	77	76
KFP4R-UF15 Turbocharged After Cooled	108	111	117	143	151			
KFP4R-UF16R1 Turbocharged After Cooled						105	128	152
KFP4R-UF16R2 Turbocharged After Cooled						146	131	116
KFP4K-UF17R1 Turbocharged After Cooled						186#	182#	178#
KFP6R-UF25 Turbocharged After Cooled	169	191	196	203	225			
KFP6R-UF26R1 Turbocharged After Cooled						251	249	247
KFP6R-UF26R2 Turbocharged						164	191	217
KFP6K-UF27R1 Turbocharged After Cooled							305#	300#
KFP6S-UF35 Turbocharged After Cooled	288	336	332	330				

* - FM only rating

Values are rounded off from the decimals to the nearest whole value. The Final offered Listed Ratings may vary slightly

Above mentioned Engine Ratings are as per NFPA 20 & FM approved guidelines and are applicable for stationary emergency standby fire pump service alone Engines are rated at Standard site conditions with Temperature of 25°C, Altitude of 91 m (300 ft) above sea level and humidity of 60%

Engines are subjected to deration when operating at other site conditions. Please contact Kirloskar Oil Engines Ltd. for duration guidelines.

Brief specifications

Models	KFP4R-UF05	KFP4R-UF 07/08	KFP4R-UF 15/16	KFP4K-UF17R1	KFP6R-UF 25/26	KFP6K-UF27R1	KFP6S-UF 35
Engine Description	Vertical, Liquid Cooled, Compression Ignition, Four Stroke, Naturally Aspirated		Vertical, Liquid Cooled, Compression Ignition, Four Stroke / Turbo After Cooled Diesel Engines				
Bore x Stroke (mm)	96 x 112	105 x 120		105 x 125			118 x 135
Displacement (cc)	3242	4160		4320	6480		8800
Compression Ratio	18:01	18:01		17.6:1			17.5:1
Direction of Rotation	Counter-Clockwise (Looking from Flywheel End)						
Speed-Max Operating (rpm)	3000						2350
Dimensions (mm) L x W x H	1248x878x1120	1840x1140x1580	1840x1140x1580	1346x865x1192	2130x1330x1630	1625x922x1219	2270x1580x1890
Weight (kg)	500	580	630	700	880	950	1160

FM APPROVED

UL LISTED

NFPA 20 Requirements

CE

Global Presence

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kirloskar Oil Engines

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IBG.U.164 Rev4

Enriching Lives

Engine Data Sheet

Kirloskar Oil Engines Limited
Laxmanrao Kirloskar Road
Khadki, Pune - 411003 (India)

Basic Engine Model:
KFP4R-UF05

Reference Number : EDS - UF05 - 00

Revision Date : 11.01.2018
Rev. Number : 00

General Engine Data

Engine Manufacturer	KOEL
Ignition Type	Compression (Diesel)
Number of Cylinders	4
Bore and Stroke - in(mm)	3.78 x 4.4 (96 x 112)
Displacement - in^3 (L)	197 (3.2)
Compression Ratio	17.5 : 1
Valve per cylinder - Intake	1
Exhaust	1
Combustion System	Direct Injection
Engine Type	In-Line, 4 Stroke Cycle
Aspiration	Naturally Aspirated
Firing Order	1-3-4-2
Charge Air Cooling Type	Not Applicable
Rotation(Viewed from Flywheel end) - Clockwise	Not Available
Counter-Clockwise	Standard
Engine Crankcase Vent System	Open
Installation Drawing	T4.2427.00.0.00

Power Rating - Approved	**2800**	**2900**	**3000**
Engine Nameplate Power - HP(kW)	57(42)	56(41.7)	55(41)

Cooling system	**2800**	**2900**	**3000**
Engine Coolant Heat - Btu/sec(kW)	38(40)	39(41)	40(42)
Engine Radiated Heat - Btu/sec(kW)	8(8)	8(8)	8(8)
Heat Exchanger minimum Flow			
60^0F (16^0C) Raw Water - gal/min (LPM)	7.4(28)		
100^0F (38^0C) Raw Water - gal/min (LPM)	9.2(35)		
Heat Exchanger Maximum Cooling Water			
Inlet Pressure - lb/in^2 (bar)	60 (4.13)		
Flow - gal/min (LPM)	11.9(45)		
Thermostat, Start to Open - ^{0}F (^{0}C)	165.2(74)		
Fully Opened - ^{0}F (^{0}C)	183.2(84)		
Engine Coolant capacity - L	8.0		
Engine Coolant High Temp. Switch - ^{0}F (^{0}C)	203(95)		
Engine Coolant Low Temp. Switch - ^{0}F (^{0}C)	95(35)		
Raw water High Temp. Switch - ^{0}F (^{0}C)	149(65)		

Continued……

Electric System - DC

System Voltage (Nominal)……..	12 V
Battery Capacity for Ambient above 32^0F (0^0C)	
Voltage (Nominal)…….	12 V
Current Capacity - Amp/hr……	150
Qty. per Battery Bank……..	1
CCA at 0^0F (-18^0C)……..	640
Reserve Capacity - Minutes……..	260
Battery Cable Minimum Size - $mm^{2.}$……	35
Charging Alternator Output - Amp…….	35
Starter Cranking Amps - at 60^0F (15^0C)……..	250 - 350

Exhaust System

	2800	2900	3000
Exhaust Flow - ft^3/min (m^3/min)……..	439.1(12.4)	452(12.8)	461.3(13.1)
Exhaust Temperature - ^{0}F (^{0}C)…….	1225(663)	1229(665)	1238(670)
Max. Allowable Back Pressure - in H_2O(kPa)……	16(4)		
Exhaust pipe Dia. In (mm) for further exhaust piping(Min.)……	4 (100)		

Fuel System

	2800	2900	3000
Fuel Consumption - gal/hr (L/hr)……	3.64(13.8)	3.7(14)	3.75(14.2)
Fuel Return - gal/hr (L/hr)……	34.96(132.2)	35.4(134)	35.85(135.8)
Total Supply Fuel Flow - gal/hr (L/hr)…….	38.6(146)	39.1(148)	39.6(150)
Fuel Pressure - lb/in^2 (kPa)…….	36.25(250)		
Fuel Supply Line Size(Min.) - in(mm) ……	0.5(12.7)		
Fuel Return Line Size(Min.) - in(mm)……	0.375(9.5)		
Max. Allowable Fuel Pump Suction With Clean Filter - in H_2O (m H_2O)……	31 (0.8)		
Max. Allowable Fuel Head Above Fuel Pump Supply or Return - m (ft)…….	5 (16.4)		
Fuel Filter Size - Micron…….	3 - 5 micron		

Heater System

Jacket Water Heater……..	Standard
Wattage (Nominal)……..	1500
Voltage - AC, 1P…….	240

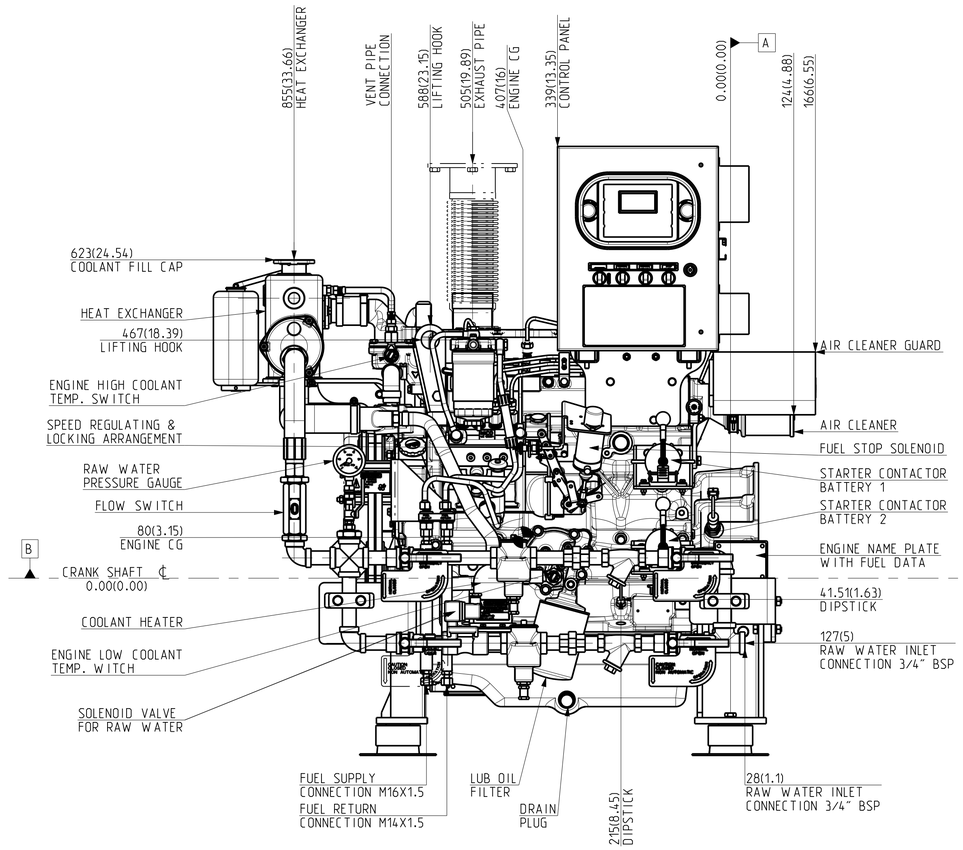
Continued……

Air Intake System	**2800**	**2900**	**3000**
Air Cleaner Type…….	Dry type, Indoor service only		
Air Intake Restriction Maximum Limit			
Dirty Air Cleaner - in H_2O (kPa)……..	7.1(1.8) for 2800 to 3000 rpm		
Clean Air Cleaner - in H_2O (kPa)……	4(1.0)		
Engine Air Flow - ft^3/min (m^3/min)……	134.2(3.8)	137.9(3.9)	140(4)
Air Temperature(At Engine Inlet) - ^0F (^0C)..……..	113(45) Max. Allowable		

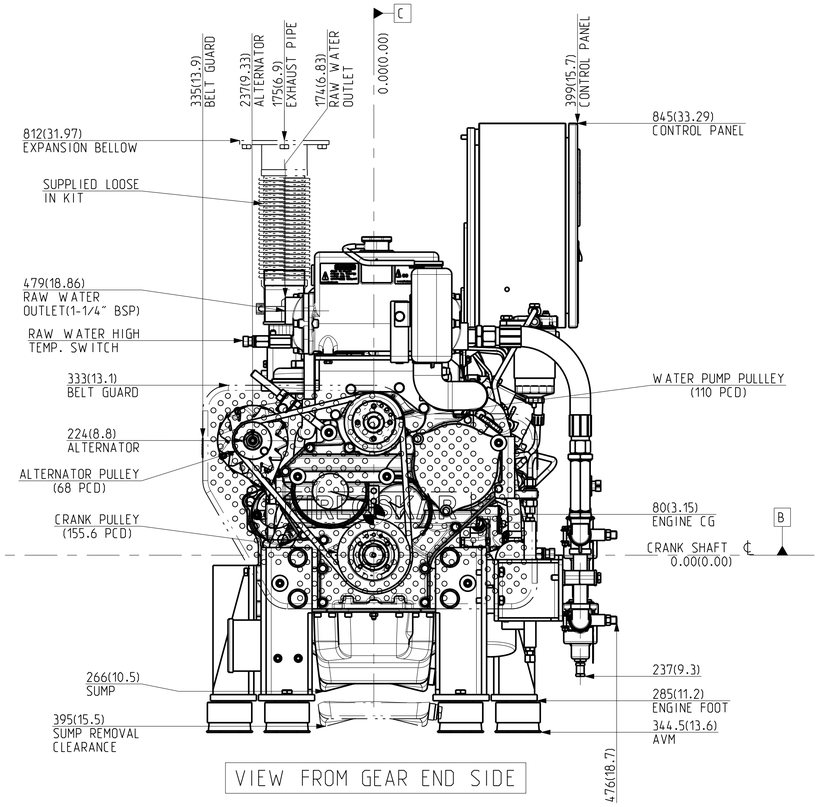
Lubrication System	
Oil Pressure(Normal) - lb/in^2 (kPa)…….	36.26 to 79.77 (250 to 550)
Oil Temperature(In Pan) - ^0F (^0C) (max.)……..	248 (120)
Oil Pan Capacity, High - L……	10
Low - L…….	8.0
Total Oil Capacity with filter - L……..	11.5

Performance	**2800**	**2900**	**3000**
BMEP - lb/in^2 (kPa)……..	81.5(562)	77.3(533)	73.4(506)
Piston Speed - ft/min (m/min)……..	2058(627)	2132(650)	2205(672)
Mechanical Noise - dB(A) at 1m……	102 approx.		
Power Curve……	Performance curve No. : EPC - UF05 - 00		

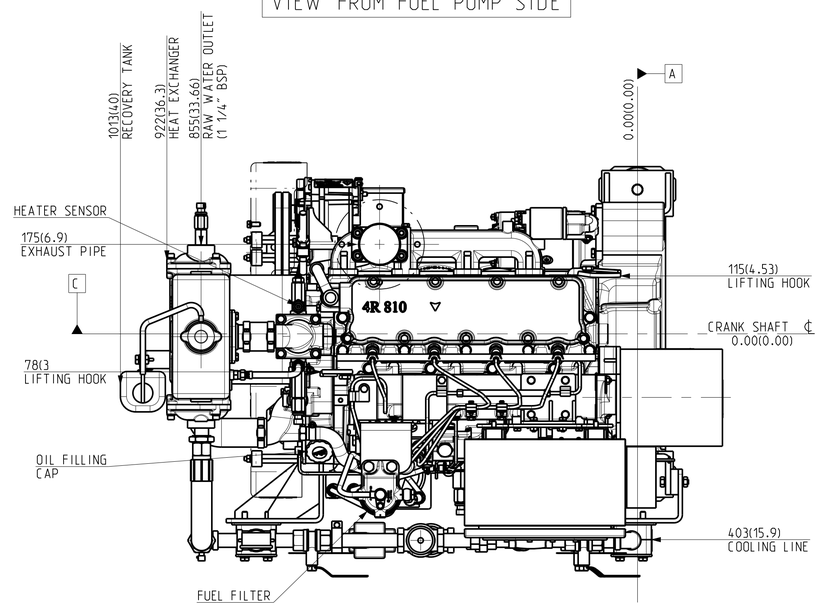
Note : The unit 'gal/hr or gal/min' mentioned in above data sheet is US gallon.



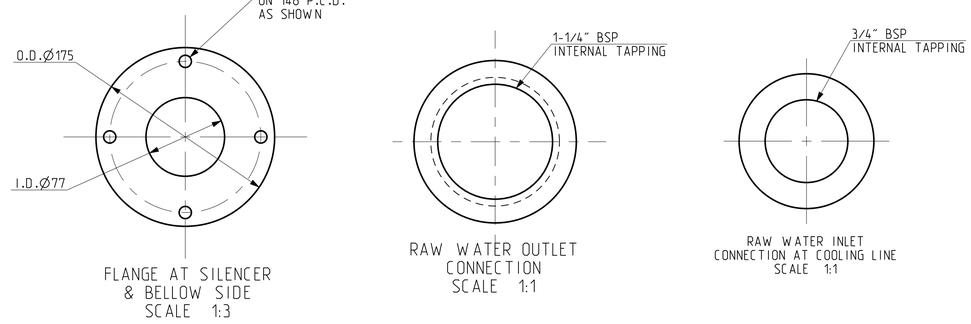
VIEW FROM FUEL PUMP SIDE



VIEW FROM GEAR END SIDE



VIEW FROM TOP SIDE



FLANGE AT SILENCER & BELLOW SIDE
SCALE 1:3

RAW WATER OUTLET CONNECTION
SCALE 1:1

RAW WATER INLET CONNECTION AT COOLING LINE
SCALE 1:1

ATTENTION

*REFER "TECHNICAL BULLETIN" PART NO. 4H.1901.01.0.00. PROVIDED ALONG WITH THE ENGINE FOR AVM INSTALLATION GUIDELINES FOR BASE ALONG WITH ENGINE.

CAUTION

*ALL PLUMBING MUST BE SUPPORTED AND/OR ISOLATED SO THAT NO WEIGHT OR STRESS IS APPLIED TO ANY ENGINE COMPONENT.
*BASE MUST BE FULLY GROUTED AND SECURE WITH SUITABLE ANCHOR BOLTS.

NOTES:
*ALL DIMENSIONS SHOWN ARE IN MM AND IN BRACKET ARE IN INCHES.

DATUMS:
A MOUNTING FACE OF FLYWHEEL
B ENGINE CRANK SHAFT HORIZONTAL CENTRE LINE
C ENGINE CRANK SHAFT VERTICAL CENTRE LINE
CENTER OF GRAVITY OF ENGINE

IF IN DOUBT ASK	PRINTS OF PREVIOUS REVISION NO. SHOULD BE SCRAPPED

FORMAT No.R&E/FORM/056/01 (REFER DOP No. R&E 4.4/03)

No.	REVISION	ZONE	MODIFIED BY	REF. No. DATE
01	ENGINE FOUNDATION LAYOUT MODIFIED		SSG	20760 21/09/2018
00	NEW RELEASE			14.0409 28/04/2017

UNLESS OTHERWISE SPECIFIED
- ALL DIMENSIONS ARE IN mm.
- SURFACE ROUGHNESS AS PER CO. STD.NO.10501.
- UNMENTIONED TOLERANCES AS PER CO.STD.NO.11001/M.
- REMOVE ALL SHARP BURRS AND SHARP EDGES.
- DRAWING NOT TO BE SCALED.

UNMENTIONED

RADII	--
CHAMFER	--
UNDERCUT	--

CAD DRG. FILE:-	PLM
MATERIAL :-	--
HEAT TREATMENT :-	--
WEIGHT (Kg) :-	--
DRN	SSG(MODELCAM)
CHD.	C.K.Pathan
APPD.	B.P.Deshmukh
DATE	13/04/2017

CASTING/FORGING DRG. NO.: --

TYPE KFP4R-UF05/KFP4R-FM05D1

TITLE: ENGINE INSTALLATION

DRAWING FOR KFP4R-UF05 SERIES ENGINES.

SCALE 1:6

SHT. NO 1 OF 2

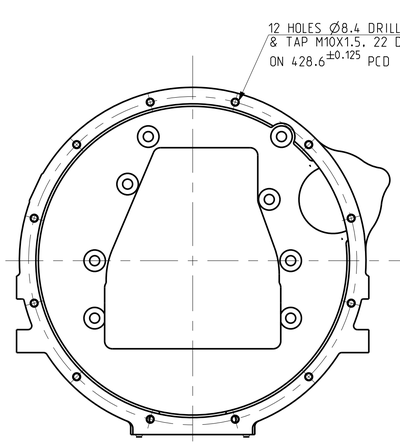
KIRLOSKAR OIL ENGINES LTD.. PUNE 411 003 (INDIA)

DRAWING NO. T4.2427.00.0.00

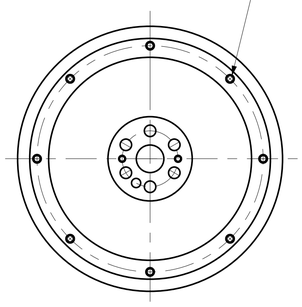
REV. NO. 01

LIFECYCLE STATE:- Released

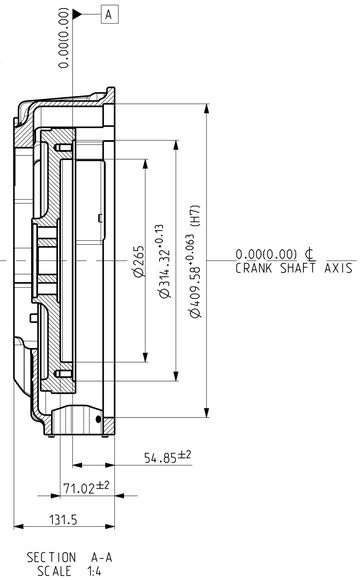
SIZE A1



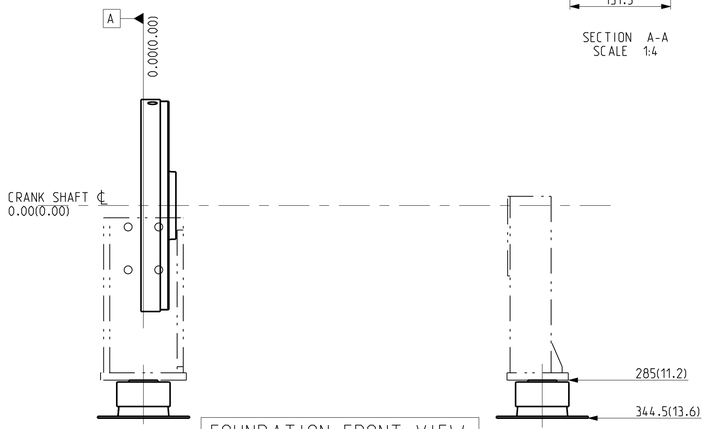
FLYWHEEL HOUSING



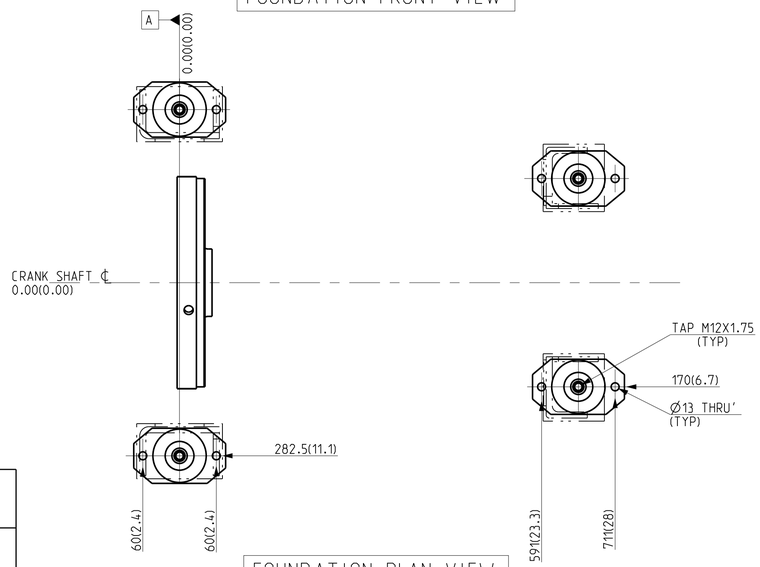
FLYWHEEL END DETAIL



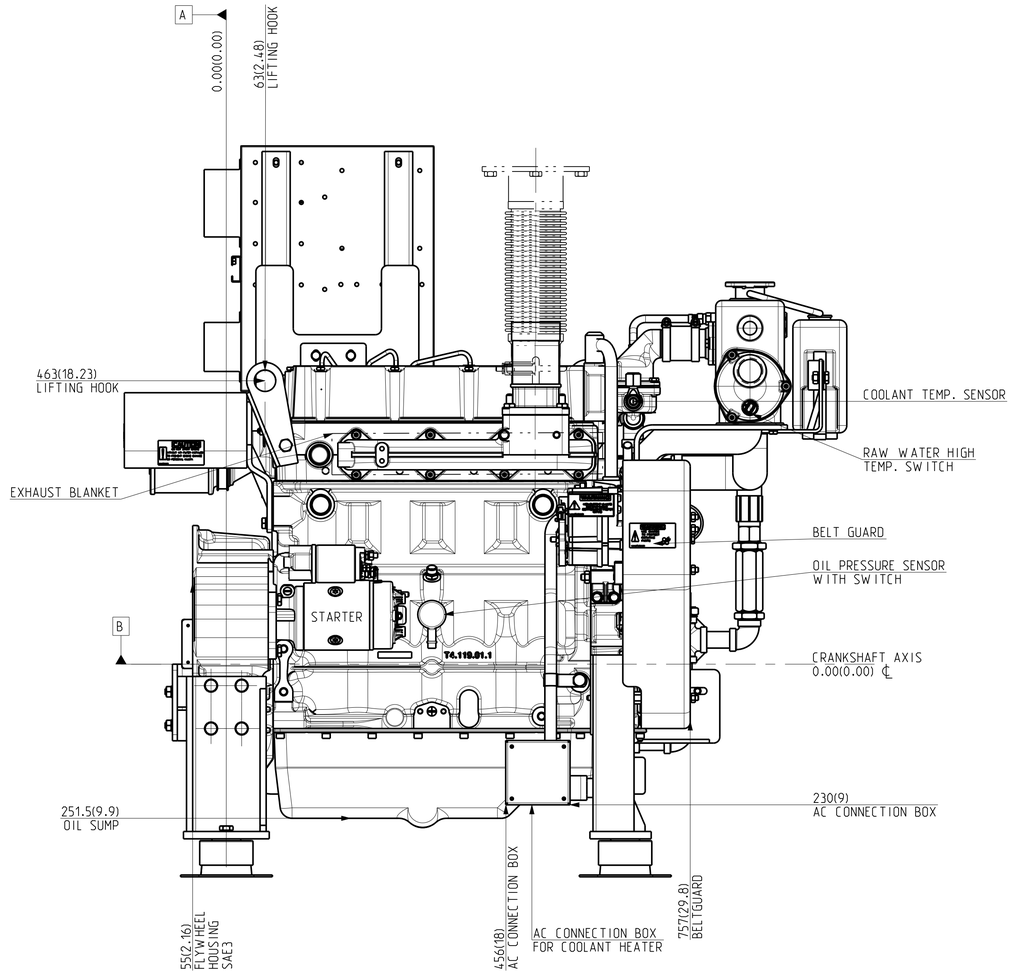
SECTION A-A
SCALE 1:4



FOUNDATION FRONT VIEW



FOUNDATION PLAN VIEW



VIEW FROM EXHAUST SIDE

ATTENTION

*REFER "TECHNICAL BULLETIN" PART NO. 4H.1901.01.0.00. PROVIDED ALONG WITH THE ENGINE FOR AVM INSTALLATION GUIDELINES FOR BASE ALONG WITH ENGINE.

CAUTION

*ALL PLUMBING MUST BE SUPPORTED AND/OR ISOLATED SO THAT NO WEIGHT OR STRESS IS APPLIED TO ANY ENGINE COMPONENT.
*BASE MUST BE FULLY GROUTED AND SECURE WITH SUITABLE ANCHOR BOLTS.

NOTES:
*ALL DIMENSIONS SHOWN ARE IN MM AND IN BRACKET ARE IN INCHES.

IF IN DOUBT ASK	PRINTS OF PREVIOUS REVISION NO. SHOULD BE SCRAPPED

FORMAT No.R&E/FORM/056/01 (REFER DOP No. R&E 4.4/03)

No.	REVISION	ZONE	MODIFIED BY	REF. No. DATE
01	ENGINE FOUNDATION LAYOUT MODIFIED	SSG		20760 21/09/2018
00	NEW RELEASE			T-04109 28/04/2017

UNLESS OTHERWISE SPECIFIED
- ALL DIMENSIONS ARE IN mm.
- SURFACE ROUGHNESS AS PER CO. STD.NO.10501.
- UNMENTIONED TOLERANCES AS PER CO.STD.NO.11001/M.
- REMOVE ALL SHARP BURRS AND SHARP EDGES.
- DRAWING NOT TO BE SCALED.

UNMENTIONED

RADII	--
CHAMFER	--
UNDERCUT	--

CAD DRG. FILE:-	PLM
MATERIAL :-	--
HEAT TREATMENT :-	--
WEIGHT (Kg) :-	--
CASTING/FORGING DRG. NO.	--
DRN	SSG(MODELCAM)
CHD.	C.H.Jadhav
APPD.	B.P.Deshmukh
DATE	13/04/2017

TYPE KFP4R-UF05/KFP4R-FM05D1

TITLE: ENGINE INSTALLATION
DRAWING FOR KFP4R-UF05 SERIES ENGINES.

SCALE 1:5 | SHT. NO 2 OF 2

KIRLOSKAR OIL ENGINES LTD.,
PUNE 411 003 (INDIA)

DRAWING NO. T4.2427.00.0.00 | REV. NO. 01

LIFECYCLE STATE:- Released

SIZE A1

MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

DIESEL DRIVEN PUMP CONTROLLER SPECS

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

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.

c UL us FM APPROVED N.Y.C. APPROVED CE

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	• Battery 1 & Battery 2 voltage • Battery 1 & Battery 2 charging amperage • Charging mode	
Pressure Reading	• Continuous system pressure display • Cut-in and cut-out pressure setting	
Pressure and Event Recorder	• 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	• 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	• Engine run • Main switch AUTO • Main switch in OFF • Main switch in HAND • Periodic test • Cranking Cycle • AC Power available • Pump room temperature (ºF or ºC)
Visual & Audible Alarms	Visual only • 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 Visual and Audible • 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	DPDT-8A-250V.AC • Engine run • Common controller trouble • Charger #1 & Charger #2 failure • Pressure transducer fault • Common engine trouble • High engine temperature • Battery #1 & battery #2 failure • Overspeed • Fail to start • DC failure • Fail when running • Fuel injection malfunction** • Loss of continuity (starter) #1 and/or #2 • Low oil pressure • ECM selector switch in alternate position*** • PLD low suction pressure • Common pump room trouble (field re-assignable)* • Low fuel level • Low pump room temperature • AC Failure • High fuel level • High pump room temperature • Fuel tank leak • 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	• 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	• Embedded microcomputer with software PLC logic • 7.0” color touch screen (HMI technology) • Upgradable software • Multi-language		
Operation	**Selector Switch**	• Hand-Off-Auto • Behind lockable and breakable cover	
	Automatic Start	• Start on pressure drop • Remote start signal from automatic device	
	Manual Start	• Crank 1 and Crank 2 start pushbuttons • Run test pushbutton	

	Crank Cycle	• 6 consecutive cycle attempts
		  • 3 X 15s crank from battery 1 or 2 alternatively
		  • 15s rest in between each crank attempt	

	Stopping	• Manual with Stop pushbutton • Automatic after expiration of minimum run timer ****	
	Timers	**Field Adjustable & Visual Countdown**	• Minimum run timer ****(off delay) • Sequential start timer (on delay) • Periodic test timer
	Actuation	**Visual Indication**	• Pressure • Non-pressure
	Mode		• Automatic • Non-automatic
Communication Protocol Capability	• 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:

☐ _____

☐ _____

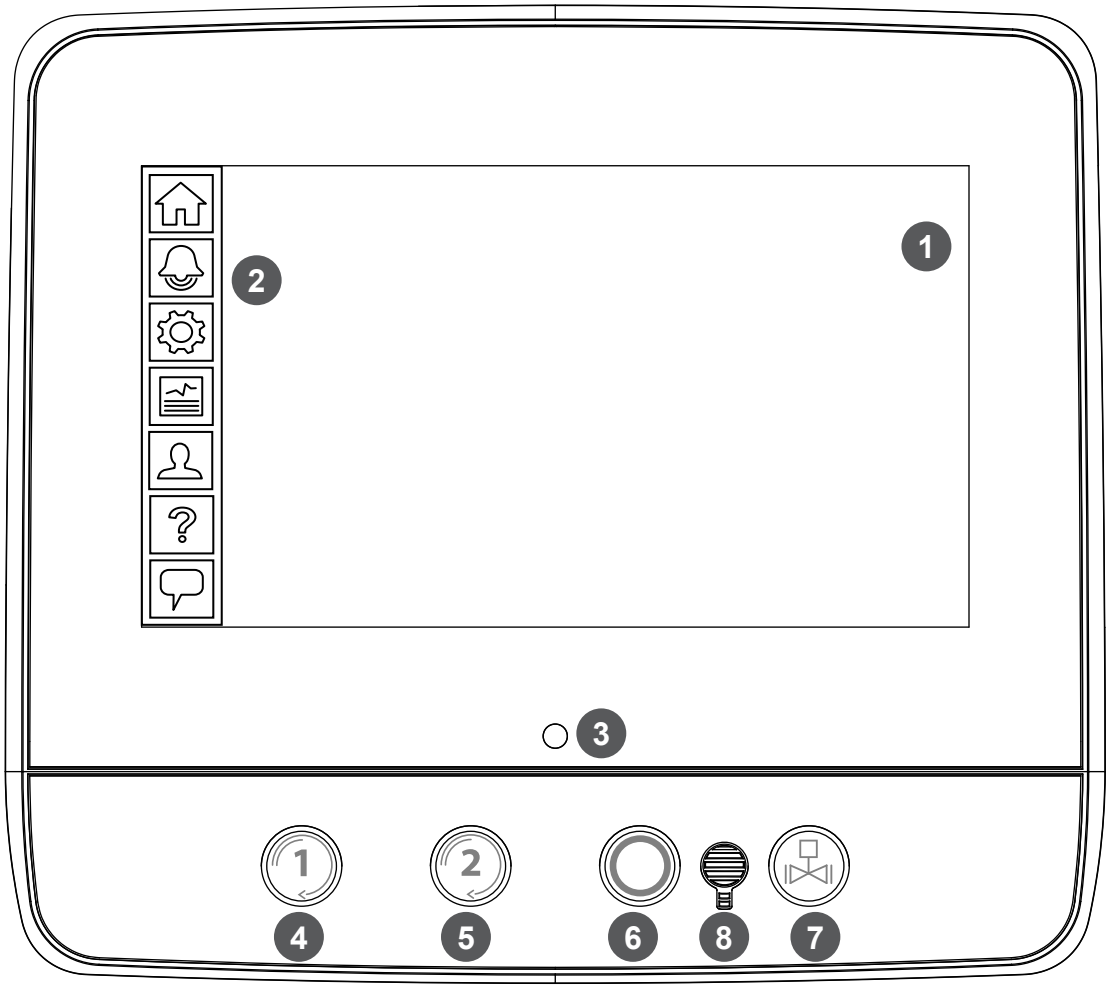
☐ _____

☐ _____

☐ _____

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
2 - Onscreen menu
- HOME page
- ALARM page
- CONFIGURATION page
- HISTORY page
- SERVICE page
- MANUAL page
- LANGUAGES page

3 - Power LED (3 colors)
4 - CRANK 1 button
5 - CRANK 2 button
6 - STOP button
7 - RUN TEST button
8 - Alarm buzzer

TORNATECH

	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

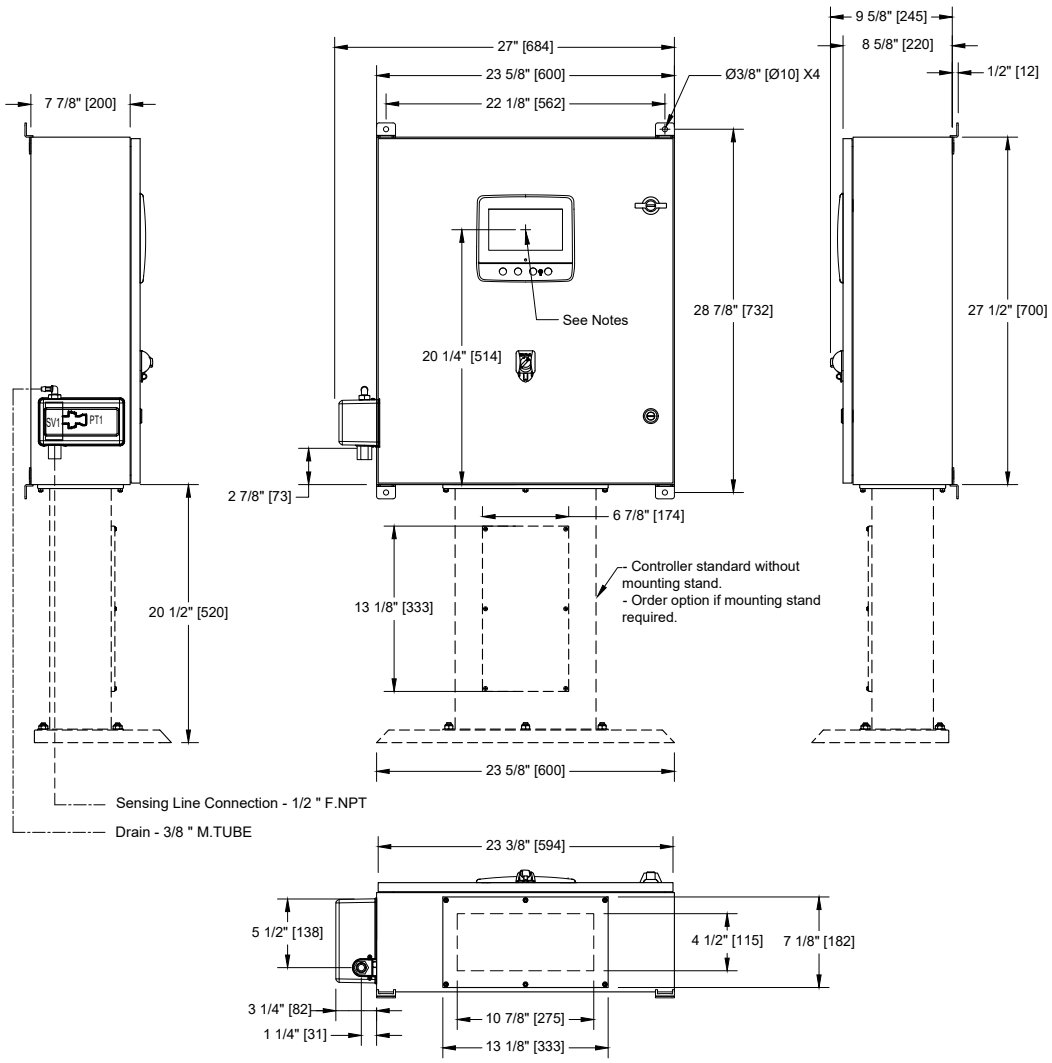
NYC Dpt of Building Approved

THIRD ANGLE PROJECTION

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.

TORNATECH

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

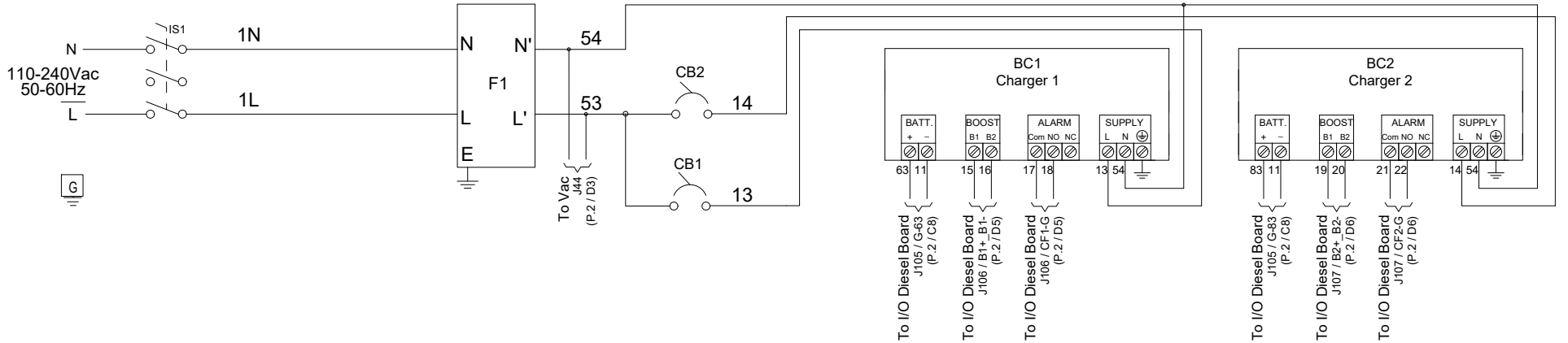
DIESEL ENGINE FIRE PUMP CONTROLLER
12VDC OR 24VDC NEGATIVE GROUND

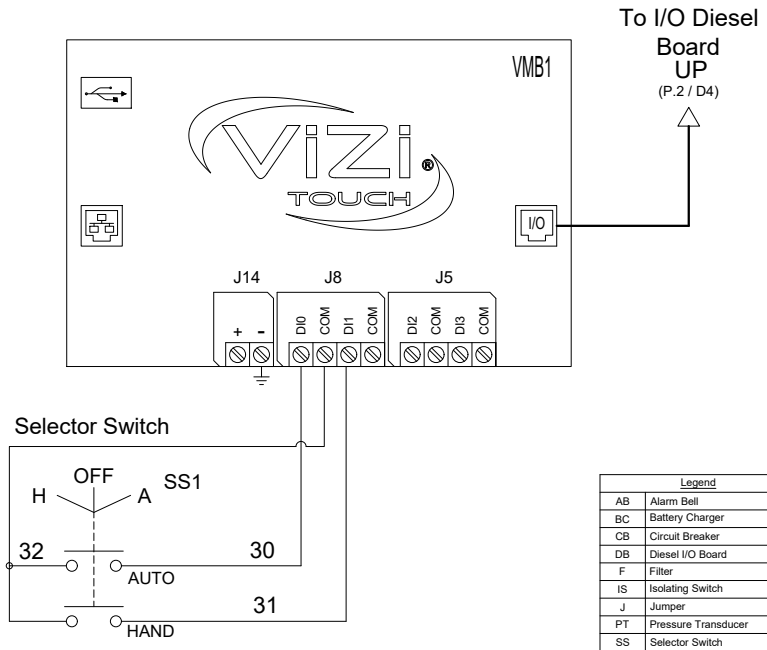
MODEL: GPD

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

NYC Dpt of Building Approved

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

TORNATECH

	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

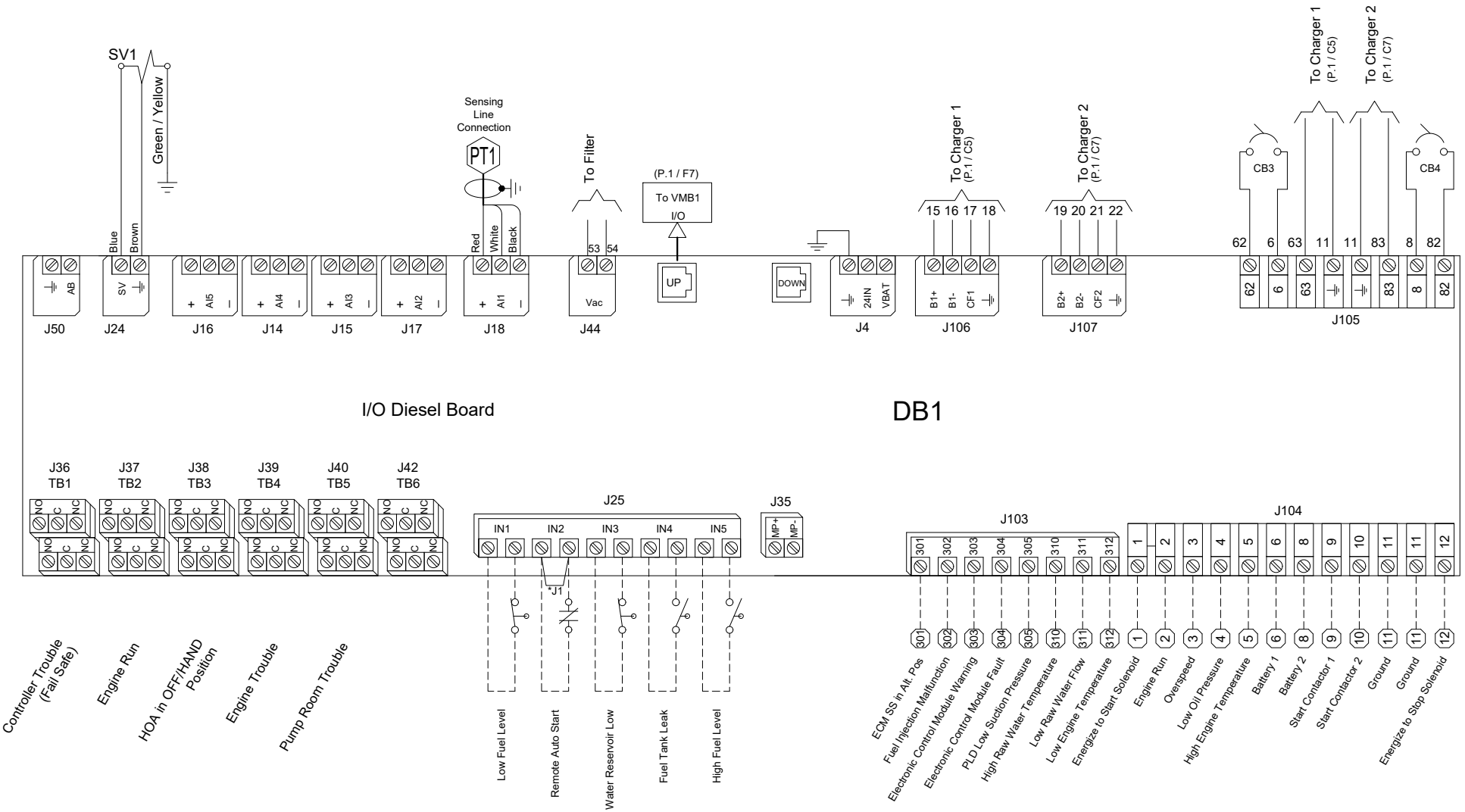
BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

NYC Dpt of Building Approved

DRAWING NUMBER GPD-WS800/E

DWG REV. 0

SHEET 2 OF 2



* Remove this jumper to use this feature

	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

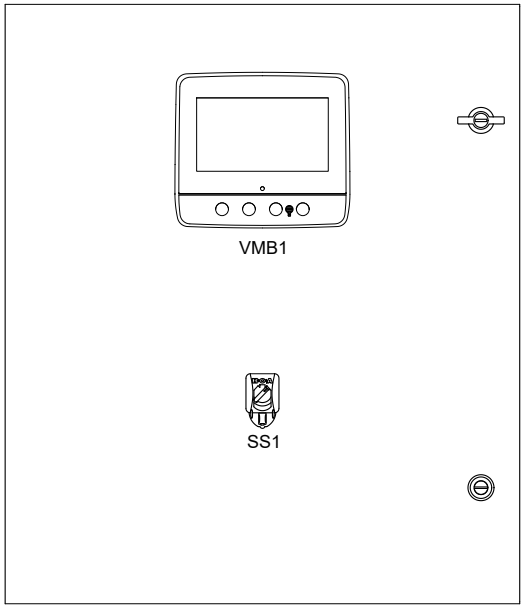
BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

NYC Dpt of Building Approved

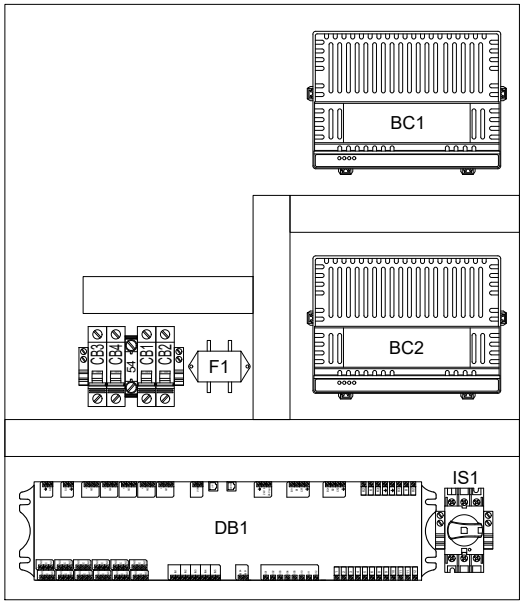
THIRD ANGLE PROJECTION

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

TORNATECH

	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

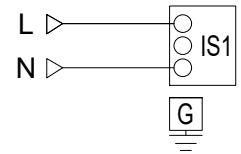
NYC Dpt of Building Approved

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

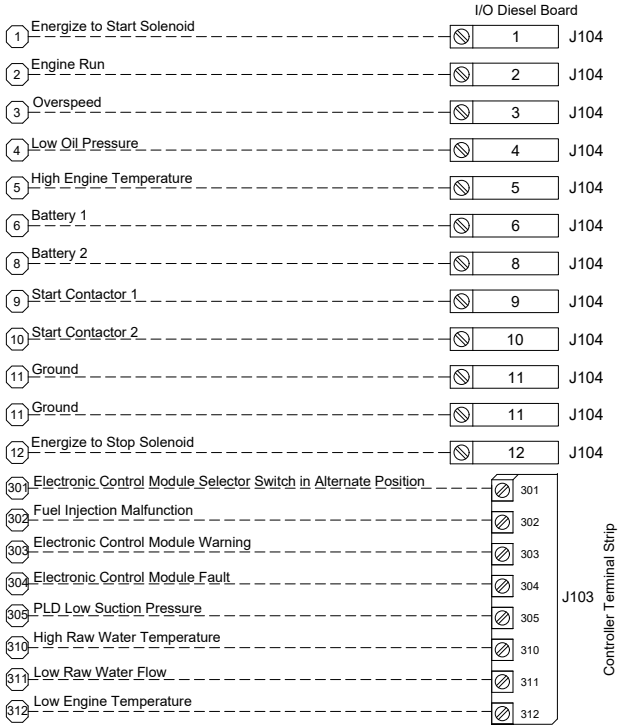
All wiring between the controller and diesel engine shall be stranded (NFPA20)

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.

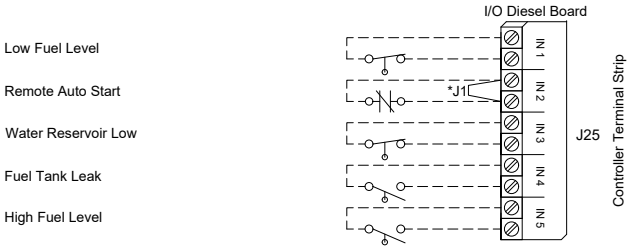
Wiring between controller and engine (terminals 6, 8, 11 [rated at 30A]) must be stranded and sized according to distance.

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)



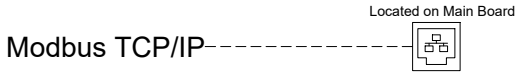
Field Connections

Terminals Wire Size:
24 - 12 AWG
0.5 Nm



Network Connections

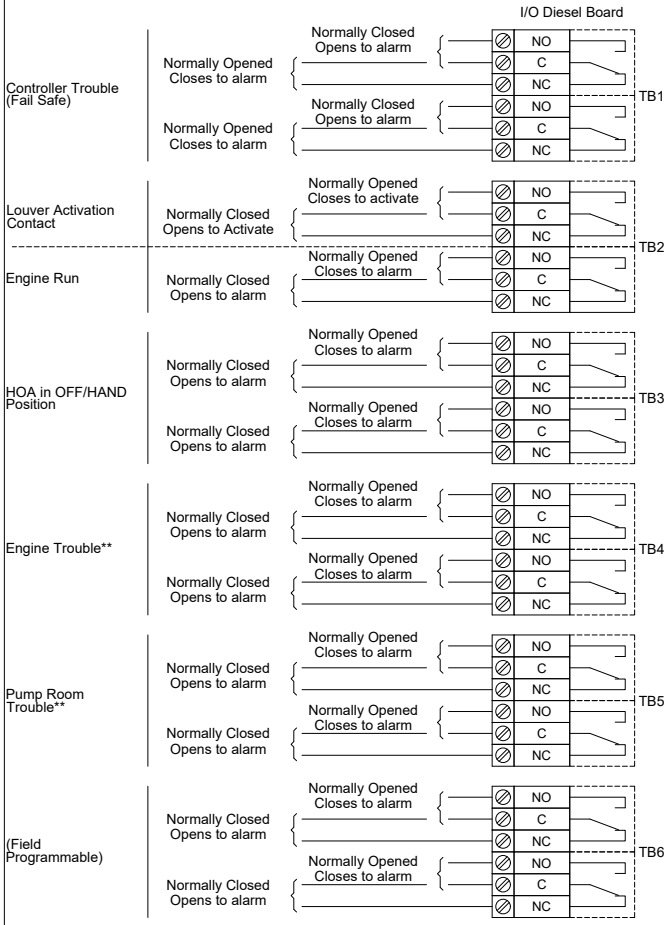
Terminals Wire Size:
Shielded Female Connector RJ45



* Remove this jumper to use this feature

Alarm Contacts

Terminals Wire Size:
24 - 12 AWG
0.5 Nm



** Re-assignable

TORNATECH

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

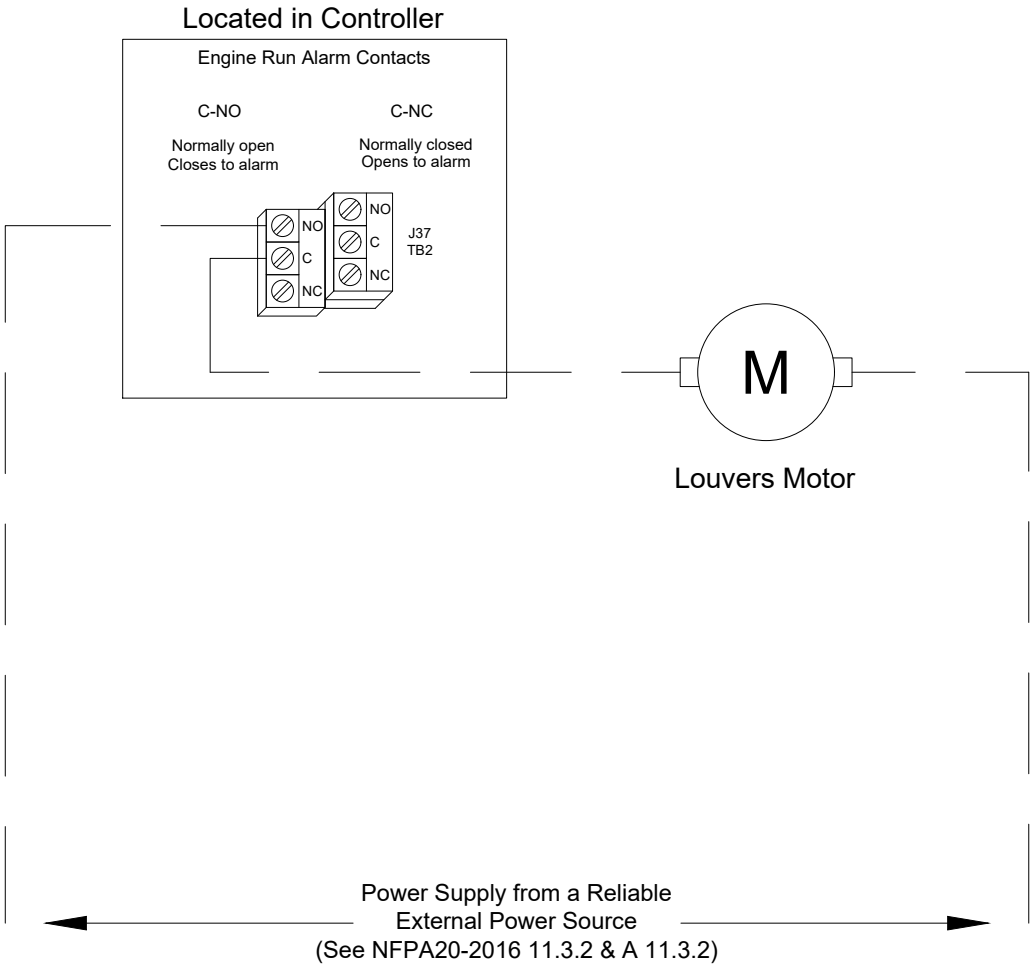
DIESEL ENGINE FIRE PUMP CONTROLLER
12VDC OR 24VDC NEGATIVE GROUND

MODEL: GPD

BUILT TO THE LATEST EDITION OF THE NFPA20 & NFPA70

NYC Dpt of Building Approved

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

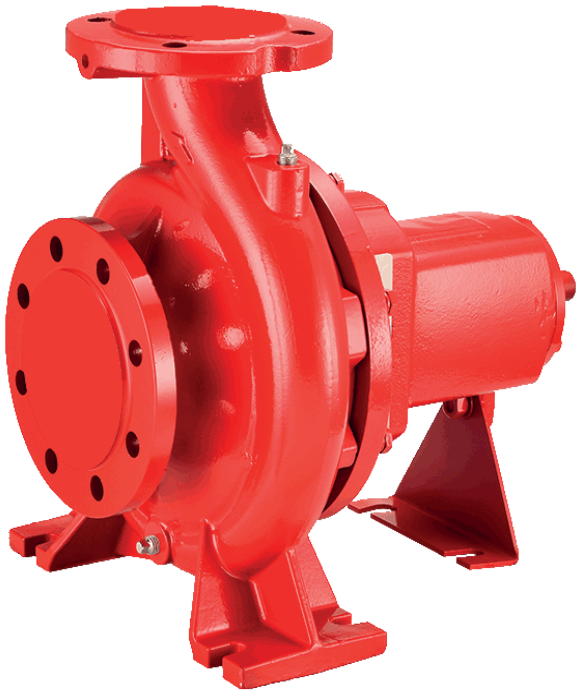


MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

ELECTRIC MOTOR DRIVEN PUMP SPECIFICATIONS

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

END SUCTION FIRE PUMP



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

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

Pump Naming

VES 80-250

- Nominal impeller diameter (mm)
- Discharge fange DN (mm)
- Pump type

VESD150-80-250

- Nominal impeller diameter (mm)
- Discharge fange DN (mm)
- Pump Type

Product Standard

UL 448, NFPA

Product Approvals

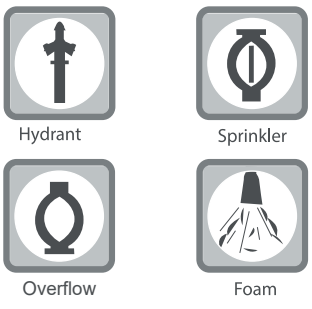
UL LISTED

Flange Standards

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

Driver Options

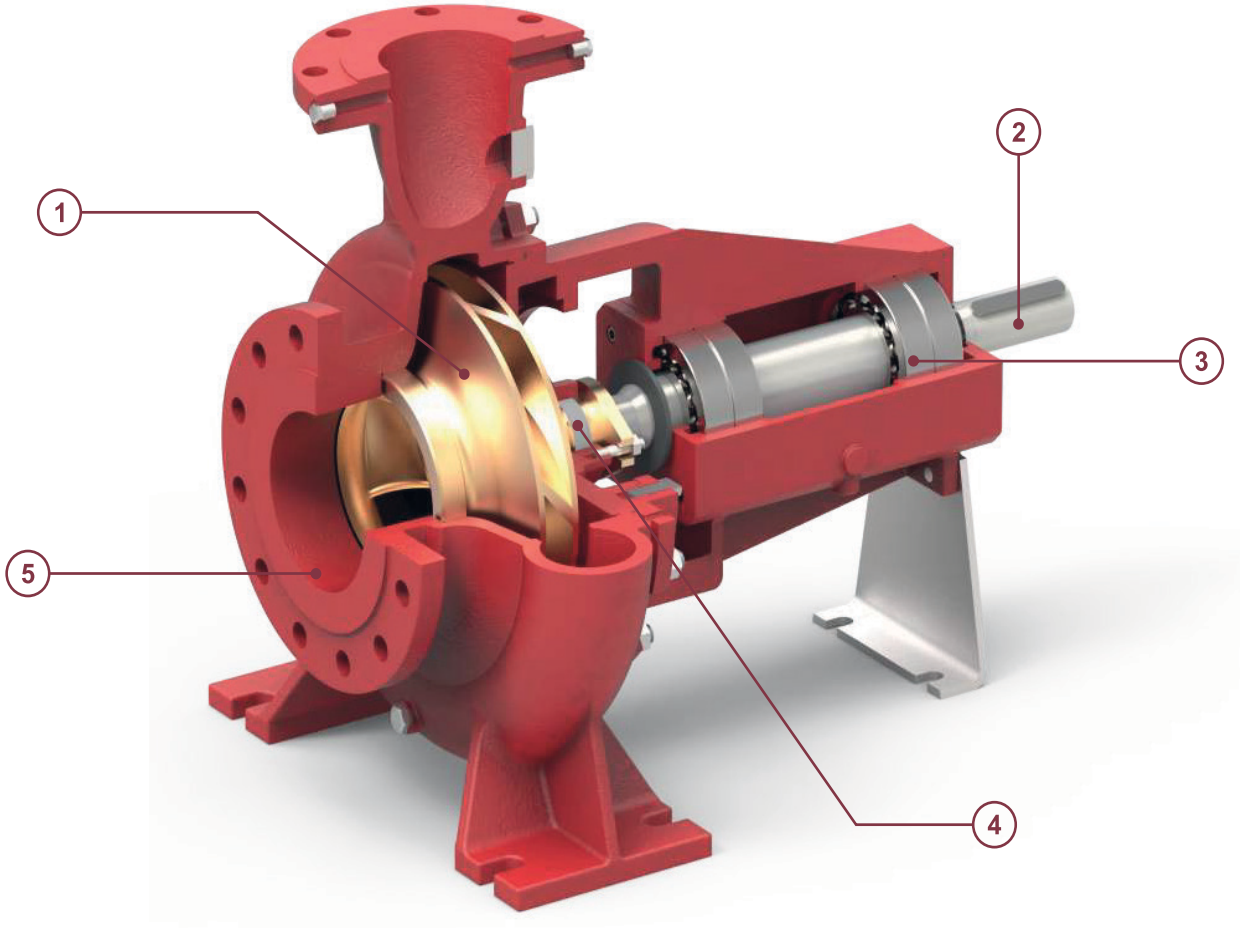
Application Areas



Risk Class

END SUCTION FIRE PUMP

General Pump Features



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

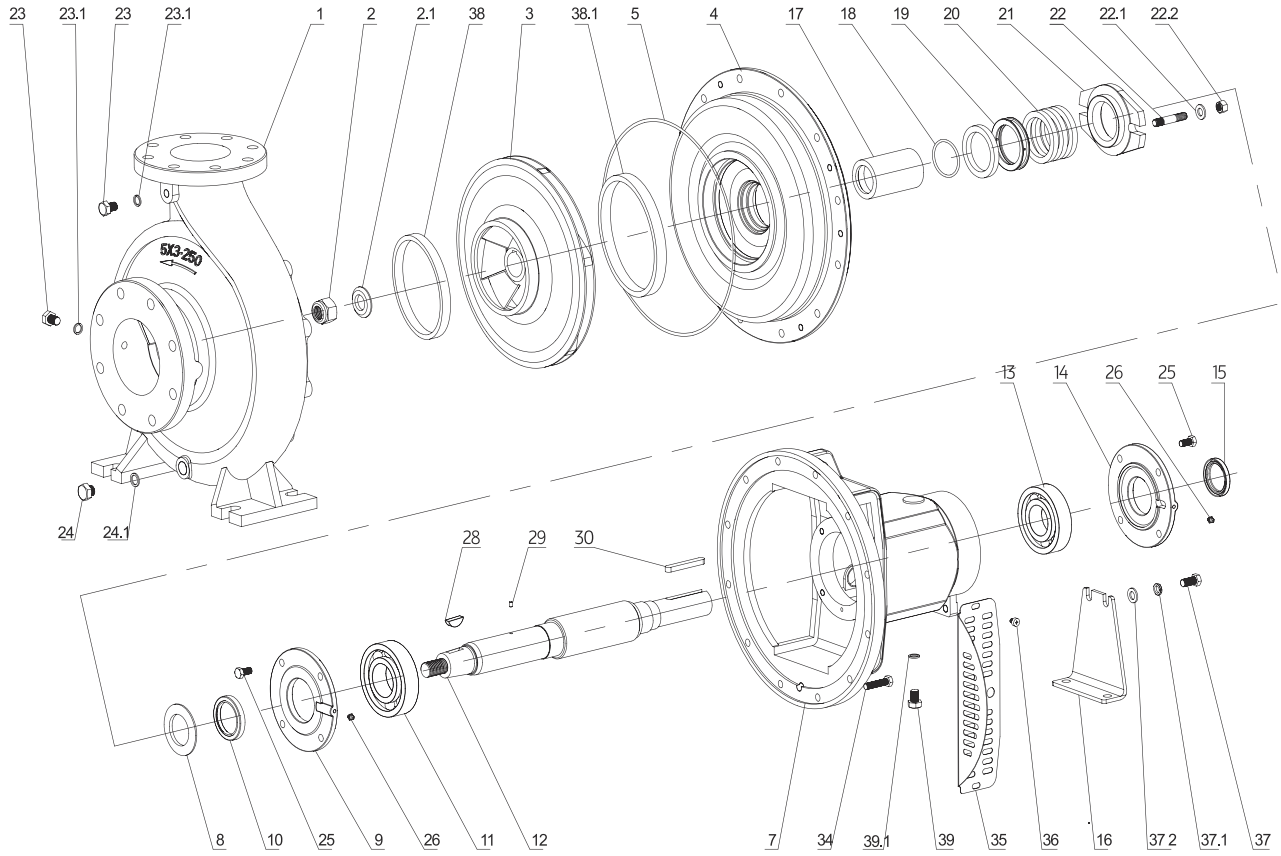
- Asbestos - free, soft packed stuffing boxes.

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

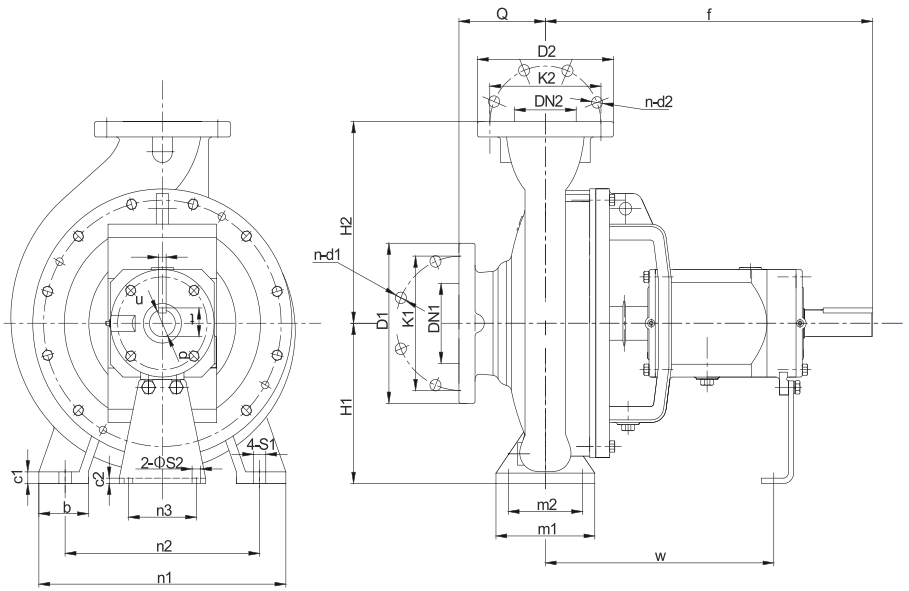


Code	Part Name
1	Casing
2	Impeller Nut
2.1	Lock washer for impeller
3	Impeller
4	Gland Cover
5	O-ring
7	Bearing Housing
8	Rubber Slinger
9	NDE Bearing Cover
10	NDE Oil Seal
11	NDE Bearing
12	Shaft
13	DE Bearing
14	DE Bearing Cover
15	DE Oil Seal

Code	Part Name
16	Support Foot
17	Packing Sleeve
18	O-ring
19	Gland Packing
20	Packing Seal Cage
21	Gland Cover
22	Stud Bolt
22.1	Flat Washer
22.2	Screw Nut
23	Plug
23.1	Plug Spacer
24	Plug
24.1	Plug Spacer
25	Screw Bolt

Code	Part Name
26	Oil Cup M6
28	key
29	pin
30	key
34	Screw Bolt
35	Protective cover
36	Bolt
37	Screw Bolt
37.1	Elastic Washer
37.2	Flat Washer
38	Front-Wearring
38.1	Back-Wearring
39	Plug
39.1	Plug Spacer

VES SERIES INSTALLATION DIMENSION



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.

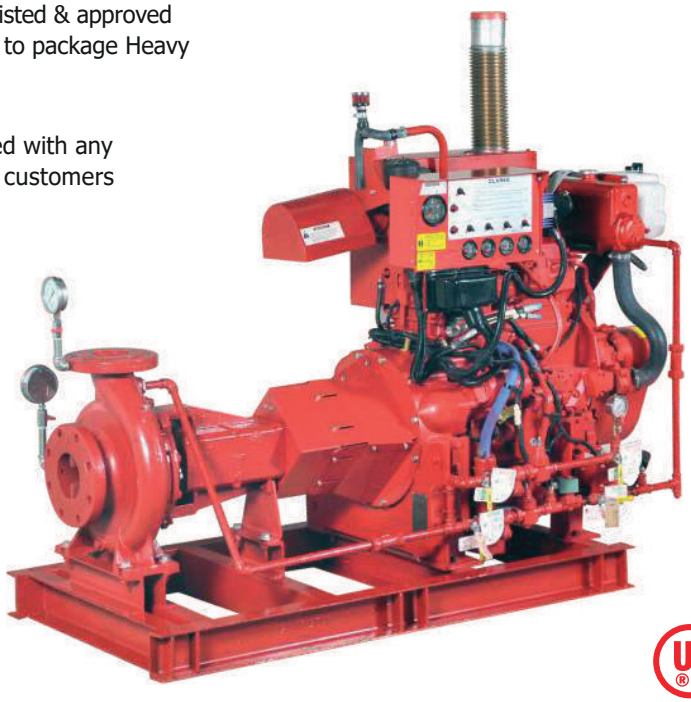
MENA ofers listed Centrifugal Fire Pump Skids that meet every fre protection need.

- 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 Retroft.
- High standard of Quality in material Construction fnish and Workmanship.

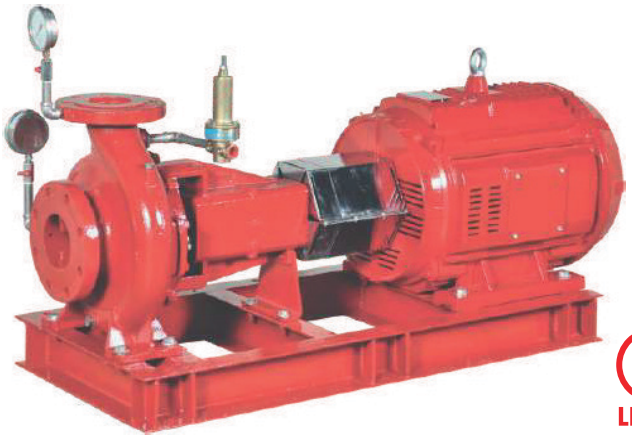
DIESEL DRIVEN SKIDS

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 specifc brand as per customers requirement.



UL LISTED



MOTOR DRIVEN SKIDS

MENA maintains its standard with using WEG which is High Efciency 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 specifc brand as per client requirement.

UL LISTED

APPROVED UL LISTING RANGE

Rated Capacity, US GPM	Size, In.	Model	Pressure Rating, psi	Approx Speed RPM	Maximum Working Pressure Psi
50	2.5×1.5	VES 40-250	101 - 142	2900	200
50	2.5×1.5	VES 40-250	144 - 207	3500	290
100	2.5×1.5	VES 40-250	97 - 140	2900	200
100	2.5×1.5	VES 40-250	140 - 203	3500	290
150	2.5×1.5	VES 40-250	87 - 131	2900	200
150	2.5×1.5	VES 40-250	133 - 196	3500	290
150	3×2	VES 50-250	104 - 147	2980	225
150	3×2	VES 50-250	144 - 202	3500	290
200	3×2	VES 50-250	101 - 145	2980	225
200	3×2	VES 50-250	140 - 200	3500	290
250	3×2	VES 50-250	97 - 140	2980	225
250	3×2	VES 50-250	136 - 196	3500	290
250	4×2.5	VES 65-250	91 - 143	2900	225
250	4×2.5	VES 65-250	131 - 207	3500	290
300	4×2.5	VES 65-250	89 - 142	2900	225
300	4×2.5	VES 65-250	130 - 206	3500	290
400	4×2.5	VES 65-250	82 - 137	2900	225
400	4×2.5	VES 65-250	125 - 203	3500	290
400	5×3	VES 80-200	89 - 141	3500	225
400	5×3	VES 80-250	88 - 140	2900	225
400	5×3	VES 80-250	128 - 207	3500	290
450	5×3	VES 80-200	86 - 139	3500	225
450	5×3	VES 80-250	86 - 140	2900	225
450	5×3	VES 80-250	127 - 206	3500	290
450	5×3	VES 80-315	131 - 207	2900	290
450	5×4	VES 100-200	88 - 143	3500	225
450	5×4	VES 100-250	83 - 135	2900	290
450	5×4	VES 100-250	123 – 198	3500	290
450	5×4	VES 100-315	133 - 210	2900	290
450	5×4	VES 100-315	140 - 222	2980	290
500	5×3	VES 80-200	83 - 136	3500	225
500	5×3	VES 80-250	84 - 139	2900	225
500	5×3	VES 80-250	125 - 205	3500	290
500	5×3	VES 80-315	127 - 204	2900	290
500	5×4	VES 100-200	88 - 141	3500	225
500	5×4	VES 100-250	83 - 134	2900	290
500	5×4	VES 100-250	122 - 198	3500	290
500	5×4	VES 100-315	132 - 209	2900	290
500	5×4	VES 100-315	139 - 221	2980	290
500	6×4	VESD 150-100-200	116 - 142	3500	225
500	6×4	VESD 150-100-315	119 - 192	2900	250
750	5×4	VES 100-200	82 - 138	3500	225
750	5×4	VES 100-250	74 - 128	2900	290
750	5×4	VES 100-250	115 - 191	3500	290
750	5×4	VES 100-315	125 - 202	2900	290
750	5×4	VES 100-315	133 - 214	2980	290
750	6×4	VESD 150-100-200	112 - 137	3500	225
750	6×4	VESD 150-100-315	113 - 186	2900	250
1000	6×4	VESD 150-100-200	99 - 128	3500	225
1000	6×4	VESD 150-100-315	101 - 173	2900	250

UL® LISTED

MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

ELECTRIC PUMP
ELECTRIC MOTOR SPECS

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

TECHTOP®

MOTOR

New! Fire Pump Motor Ready

SHANGHAI TOP MOTOR CO.,LTD.

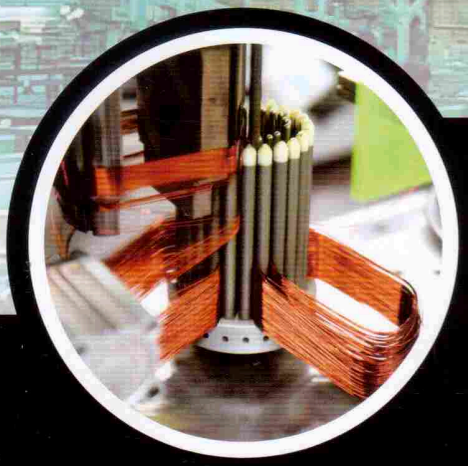
SHANGHAI HALOTOP IMPORT & EXPORT CO., LTD.
GLOBAL POWER ENGINEERING CO. LTD.

E323353 CC096A the standard in safety

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

QUALITY MANAGEMENT SYSTEM
CERTIFICATE

Certificate No.: 00110Q22322R0M/3100

We hereby certify that
Shanghai Top Motor Co., Ltd.

No.303, Kangliu Road, Kangqiao Town, Pudong New District, Shanghai, China

by reason of its
Quality Management System
has been awarded this certificate for compliance with the standard
ISO9001: 2008
GB/T 19001-2008

The Quality Management System Applies in the following area:
Design, Production and Service of 0.04-50kw of Three-phase Asynchronous Motors, Single-phase Asynchronous Motors

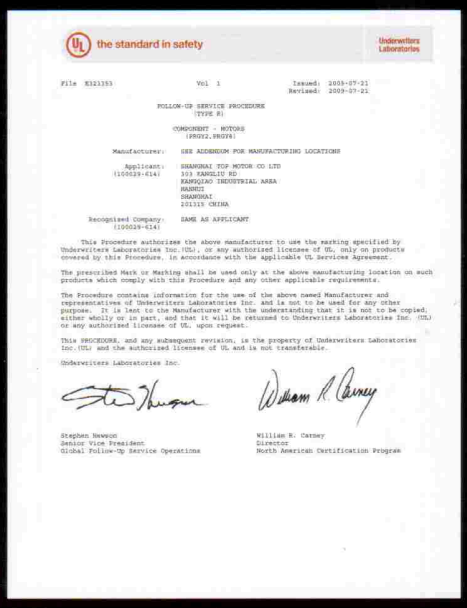
Certified since: Dec. 29, 2003 Valid from: Mar. 08, 2010 Valid until: Mar. 07, 2013

Signed by: Wang Kejiao

CHINA QUALITY CERTIFICATION CENTRE

Q 0004274

ISO9001



the standard in safety — Underwriters Laboratories

File E321353 Vol 1 Issued: 2003-07-21
Revised: 2009-07-21

FOLLOW-UP SERVICE PROCEDURE
(TYPE 8)

COMPONENT - MOTORS
(PRGY2.PRGY8)

Manufacturer: SEE ADDENDUM FOR MANUFACTURING LOCATIONS

Applicant: SHANGHAI TOP MOTOR CO LTD
(100029-614) 303 KANGLIU RD
KANGQIAO INDUSTRIAL AREA
HAINEI
SHANGHAI
201315 CHINA

Recognized Company: SAME AS APPLICANT
(100029-614)

This Procedure authorizes the above manufacturer to use the marking specified by Underwriters Laboratories Inc.(UL), or any authorized licensee of UL, only on products covered by this Procedure, in accordance with the applicable UL Services Agreement.

The prescribed Mark or Marking shall be used only at the above manufacturing location on such products which comply with this Procedure and any other applicable requirements.

The Procedure contains information for the use of the above named Manufacturer and representatives of Underwriters Laboratories Inc. and is not to be used for any other purpose. It is lent to the Manufacturer with the understanding that it is not to be copied, either wholly or in part, and that it will be returned to Underwriters Laboratories Inc. (UL) or any authorized licensee of UL, upon request.

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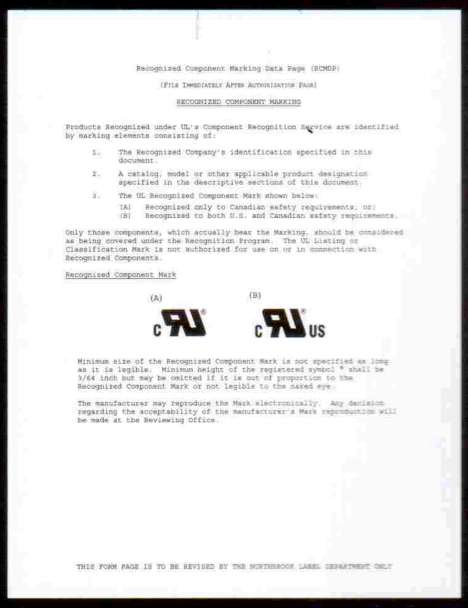
Underwriters Laboratories Inc.

Stephen Newson
Senior Vice President
Global Follow-Up Service Operations

William R. Carney
Director
North American Certification Program



Recognized Component Marking Data Page (RCMDP)

(File Immediately After Authorization Page)

RECOGNIZED COMPONENT MARKING

Products Recognized under UL's Component Recognition Service are identified by marking elements consisting of:

1. The Recognized Company's identification specified in this document.
2. A catalog, model or other applicable product designation specified in the descriptive sections of this document.
3. The UL Recognized Component Mark shown below:
   (A) Recognized only to Canadian safety requirements, or;
   (B) Recognized to both U.S. and Canadian safety requirements.

Only those components, which actually bear the Marking, should be considered as being covered under the Recognition Program. The UL Listing or Classification Mark is not authorized for use on or in connection with Recognized Components.

Recognized Component Mark

(A) (B)

Minimum size of the Recognized Component Mark is not specified as long as it is legible. Minimum height of the registered symbol ® shall be 1/64 inch but may be omitted if it is out of proportion to the Recognized Component Mark or not legible to the naked eye.

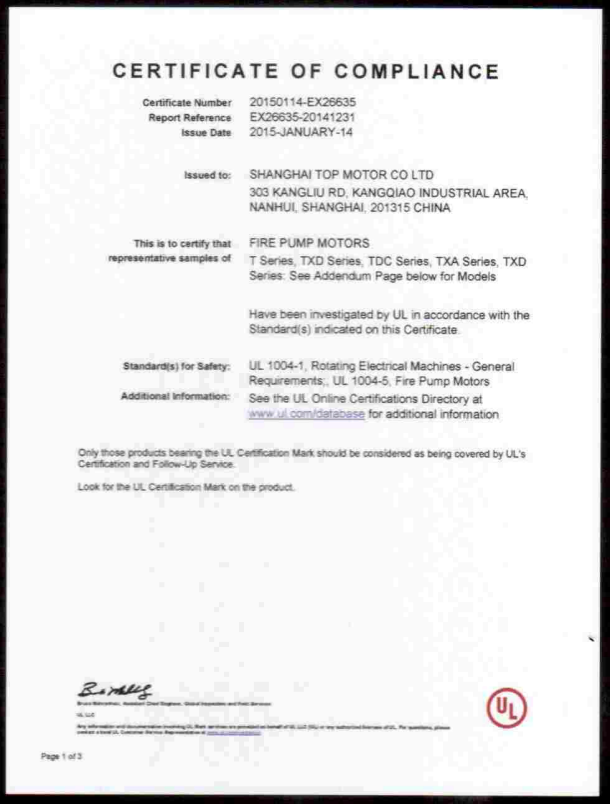
The manufacturer may reproduce the Mark electronically. Any decision regarding the acceptability of the manufacturer's Mark reproduction will be made at the Reviewing Office.

THIS FORM PAGE IS TO BE REVISED BY THE NORTHBROOK LABEL DEPARTMENT ONLY

UL

ECHTOP®

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.

Page 1 of 3

UL

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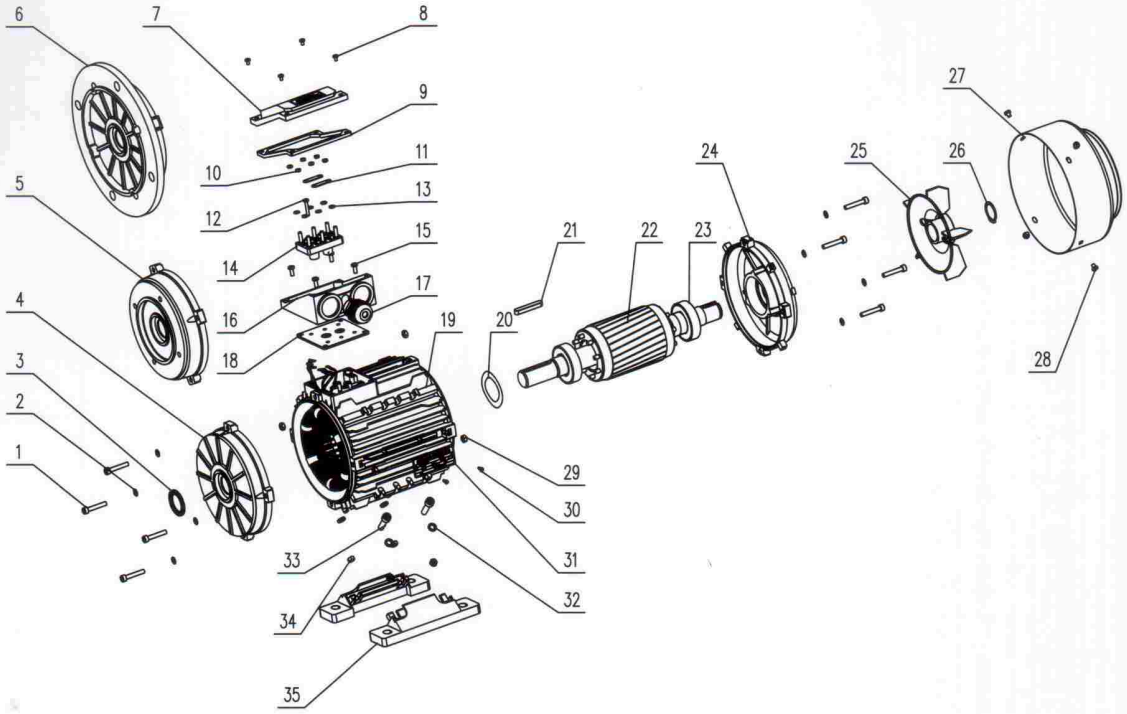
Motor Spare Part List "Exploded Drawing"



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

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℃
2	T 802-2	380-415V	1.1	1.5	50	25.7	175	250	120	F	2846	50℃
3	T 803-2	380-415V	1.5	2.0	50	32.3	170	240	120	F	2852	50℃
4	T 90S-2	380-415V	1.5	2.0	50	32.3	170	240	120	F	2852	50℃
5	T 90L1-2	380-415V	2.2	3.0	50	40.9	160	230	110	F	2845	50℃
6	T 90L2-2	380-415V	3	4.0	50	49.4	155	220	105	F	2851	50℃
7	T 100L-2	380-415V	3	4.0	50	49.4	155	220	105	F	2851	50℃
8	T 100L2-2	380-415V	4	5.5	50	61.8	145	215	105	F	2910	50℃
9	T 112M-2	380-415V	4	5.5	50	61.8	145	215	105	F	2910	50℃
10	T 112L-2	380-415V	5.5	7.5	50	79.8	140	200	100	F	2905	50℃
11	T 132S1-2	380-415V	5.5	7.5	50	79.8	140	200	100	F	2905	50℃
12	T 132S2-2	380-415V	7.5	10.0	50	101.7	135	200	100	F	2910	50℃
13	T 132M1-2	380-415V	9.2	12.0	50	118.8	130	200	100	F	2910	50℃
14	T 132M2-2	380-415V	11	15.0	50	146.3	130	200	100	F	2920	50℃
15	T 160M1-2	380-415V	11	15.0	50	146.3	130	200	100	F	2920	50℃
16	T 160M2-2	380-415V	15	20.0	50	184.3	130	200	100	F	2918	50℃
17	T 160L-2	380-415V	18.5	25.0	50	230.9	130	200	100	F	2922	50℃
18	T 180M-2	380-415V	22	30.0	50	274.6	130	200	100	F	2930	50℃
19	T 200L1-2	380-415V	30	40.0	50	367.7	125	200	100	F	2925	50℃
20	T 200L2-2	380-415V	37	50.0	50	457.9	120	200	100	F	2930	50℃
21	T 225M-2	380-415V	45	60.0	50	549.1	120	200	100	F	2930	50℃
22	T 250M-2	380-415V	55	75.0	50	685.9	105	200	95	F	2940	50℃
23	T 280S-2	380-415V	75	100.0	50	916.8	105	200	95	F	2940	50℃
24	T 280M-2	380-415V	90	125.0	50	1146.7	100	200	90	F	2940	50℃
25	T 315S-2	380-415V	110	150.0	50	1369.0	100	200	90	F	2940	50℃
26	T 315M-2	380-415V	132	175.0	50	1599.8	100	200	90	F	2940	50℃
27	T 315L1 -2	380-415V	160	215.0	50	1900.0	90	175	65	F	2945	50℃
28	T 315L2 -2	380-415V	200	270.0	50	2636.3	70	175	65	F	2945	50℃
29	T 355M-2	380-415V	250	330.0	50	3125.5	70	175	65	F	2945	50℃
30	T 355L-2	380-415V	315	420.0	50	4075.5	70	175	65	F	2945	50℃
31	T 802-4	380-415V	0.75	1.0	50	19.0	275	300	190	F	1420	50℃
32	T 803-4	380-415V	1.1	1.5	50	25.7	250	280	175	F	1425	50℃
33	T 90S-4	380-415V	1.1	1.5	50	25.7	250	280	175	F	1425	50℃
34	T 90L-4	380-415V	1.5	2.0	50	32.3	235	270	165	F	1420	50℃
35	T 90L2-4	380-415V	2.2	3.0	50	40.9	215	250	150	F	1430	50℃
36	T 100L1-4	380-415V	2.2	3.0	50	40.9	215	250	150	F	1430	50℃
37	T 100L2-4	380-415V	3	4.0	50	49.4	200	230	140	F	1430	50℃
38	T 100L3-4	380-415V	4	5.5	50	61.8	180	225	130	F	1435	50℃
39	T 112M-4	380-415V	4	5.5	50	61.8	180	225	130	F	1435	50℃
40	T 112L-4	380-415V	5.5	7.5	50	79.8	175	215	120	F	1430	50℃
41	T 132S-4	380-415V	5.5	7.5	50	79.8	175	215	120	F	1430	50℃
42	T 132M-4	380-415V	7.5	10.0	50	101.7	165	200	115	F	1430	50℃
43	T 132L1-4	380-415V	9.2	12.0	50	118.8	160	200	115	F	1430	50℃
44	T 132L2-4	380-415V	11	15.0	50	146.3	160	200	110	F	1440	50℃
45	T 160M-4	380-415V	11	15.0	50	146.3	160	200	110	F	1440	50℃
46	T 160L-4	380-415V	15	20.0	50	184.3	150	200	105	F	1445	50℃
47	T 180M-4	380-415V	18.5	25.0	50	230.9	150	200	105	F	1445	50℃
48	T 180L-4	380-415V	22	30.0	50	274.6	150	200	105	F	1460	50℃
49	T 200L-4	380-415V	30	40.0	50	367.7	140	200	100	F	1460	50℃
50	T 225S-4	380-415V	37	50.0	50	457.9	140	200	100	F	1470	50℃

T 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℃
52	T 250M-4	380-415V	55	75.0	50	685.9	140	200	100	F	1480	50℃
53	T 280S-4	380-415V	75	100.0	50	916.8	125	200	100	F	1480	50℃
54	T 280M-4	380-415V	90	125.0	50	1146.7	110	200	100	F	1480	50℃
55	T 315S-4	380-415V	110	150.0	50	1369.0	110	200	100	F	1480	50℃
56	T 315M-4	380-415V	132	175.0	50	1599.8	100	200	90	F	1480	50℃
57	T 315L1-4	380-415V	160	215.0	50	1900.0	90	175	75	F	1480	50℃
58	T 315L2-4	380-415V	200	270.0	50	2636.3	80	175	75	F	1480	50℃
59	T 355M1-4	380-415V	220	300.0	50	2874.7	80	175	75	F	1480	50℃
60	T 355M2-4	380-415V	250	330.0	50	3125.5	80	175	75	F	1480	50℃
61	T 355L1-4	380-415V	280	375.0	50	3604.3	80	175	75	F	1480	50℃
62	T 355L2-4	380-415V	315	420.0	50	4075.5	80	175	75	F	1480	50℃
63	T 355L3-4	380-415V	355	475.0	50	4563.8	80	175	75	F	1480	50℃
64	T 803-6	380-415V	0.75	1.0	50	19.0	170	265	120	F	935	50℃
65	T 90S-6	380-415V	0.75	1.0	50	19.0	170	265	120	F	935	50℃
66	T 90L-6	380-415V	1.1	1.5	50	25.7	165	250	115	F	935	50℃
67	T 100L-6	380-415V	1.5	2.0	50	32.3	160	240	110	F	940	50℃
68	T 112M-6	380-415V	2.2	3.0	50	40.9	155	230	110	F	940	50℃
69	T 112M1-6	380-415V	3	4.0	50	49.4	150	220	105	F	940	50℃
70	T 112M2-6	380-415V	4	5.5	50	61.8	150	215	105	F	940	50℃
71	T 132S-6	380-415V	3	4.0	50	49.4	150	220	105	F	940	50℃
72	T 132M1-6	380-415V	4	5.5	50	61.8	150	215	105	F	945	50℃
73	T 132M2-6	380-415V	5.5	7.5	50	79.8	150	205	105	F	945	50℃
74	T 132M3-6	380-415V	7.5	10.0	50	101.7	150	200	105	F	945	50℃
75	T 160M-6	380-415V	7.5	10.0	50	101.7	150	200	105	F	955	50℃
76	T 160L-6	380-415V	11	15.0	50	146.3	140	200	100	F	960	50℃
77	T 180L-6	380-415V	15	20.0	50	184.3	135	200	100	F	960	50℃
78	T 200L1-6	380-415V	18.5	25.0	50	230.9	135	200	100	F	965	50℃
79	T 200L2-6	380-415V	22	30.0	50	274.6	135	200	100	F	965	50℃
80	T 225M-6	380-415V	30	40.0	50	367.7	135	200	100	F	975	50℃
81	T 250M-6	380-415V	37	50.0	50	457.9	135	200	100	F	975	50℃
82	T 280S-6	380-415V	45	60.0	50	549.1	135	200	100	F	980	50℃
83	T 280M-6	380-415V	55	75.0	50	685.9	135	200	100	F	980	50℃
84	T 315S-6	380-415V	75	100.0	50	916.8	125	200	100	F	980	50℃
85	T 315M-6	380-415V	90	125.0	50	1146.7	125	200	100	F	980	50℃
86	T 315L1-6	380-415V	110	150.0	50	1369.0	120	200	100	F	980	50℃
87	T 315L2-6	380-415V	132	175.0	50	1599.8	120	200	100	F	980	50℃
88	T 355M1-6	380-415V	160	215.0	50	1900.0	100	175	90	F	980	50℃
89	T 355M2-6	380-415V	200	270.0	50	2636.3	100	175	90	F	980	50℃
90	T 355L1-6	380-415V	220	300.0	50	2874.7	100	175	90	F	980	50℃
91	T 355L2-6	380-415V	250	330.0	50	3125.5	100	175	90	F	980	50℃

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℃
2	TDC256T20U2B	380-415V	20	50	177	130	200	100	1.15	F	2920	50℃
3	TDC284TS25U2B	380-415V	25	50	222	130	200	100	1.15	F	2930	50℃
4	TDC286TS30U2B	380-415V	30	50	264	130	200	100	1.15	F	2930	50℃
5	TDC324TS40U2B	380-415V	40	50	354	125	200	100	1.15	F	2930	50℃
6	TDC326TS50U2B	380-415V	50	50	441	120	200	100	1.15	F	2930	50℃
7	TDC364TS60U2B	380-415V	60	50	529	120	200	100	1.15	F	2930	50℃
8	TDC365TS75U2B	380-415V	75	50	661	105	200	95	1.15	F	2940	50℃
9	TDC405TS100U2B	380-415V	100	50	883	105	200	95	1.15	F	2940	50℃
10	TDC444TS125U2B	380-415V	125	50	1105	100	200	90	1.15	F	2940	50℃
11	TDC445TS150U2B	380-415V	150	50	1319	100	200	90	1.15	F	2940	50℃
12	TDC 254T15U4B	380-415V	15	50	141	160	200	110	1.15	F	1440	50℃
13	TDC 256T20U4B	380-415V	20	50	177	150	200	105	1.15	F	1445	50℃
14	TDC 284T25U4B	380-415V	25	50	222	150	200	105	1.15	F	1450	50℃
15	TDC 286T30U4B	380-415V	30	50	264	150	200	105	1.15	F	1460	50℃
16	TDC 324T40U4B	380-415V	40	50	354	140	200	100	1.15	F	1460	50℃
17	TDC 326T50U4B	380-415V	50	50	441	140	200	100	1.15	F	1470	50℃
18	TDC364T60U4B	380-415V	60	50	529	140	200	100	1.15	F	1480	50℃
19	TDC365T75U4B	380-415V	75	50	661	140	200	100	1.15	F	1480	50℃
20	TDC405T100U4B	380-415V	100	50	883	125	200	100	1.15	F	1480	50℃
21	TDC444T125U4B	380-415V	125	50	1105	110	200	100	1.15	F	1480	50℃
22	TDC445T150U4B	380-415V	150	50	1319	110	200	100	1.15	F	1480	50℃
23	TDC 254T7.5U6B	380-415V	7.5	50	77	150	200	105	1.15	F	955	50℃
24	TDC 256T10U6B	380-415V	10	50	98	150	200	105	1.15	F	960	50℃
25	TDC 284T15U6B	380-415V	15	50	141	140	200	100	1.15	F	960	50℃
26	TDC 286T20U6B	380-415V	20	50	177	135	200	100	1.15	F	965	50℃
27	TDC 324T25U6B	380-415V	25	50	222	135	200	100	1.15	F	965	50℃
28	TDC 326T30U6B	380-415V	30	50	264	135	200	100	1.15	F	975	50℃
29	TDC364T40U6B	380-415V	40	50	354	135	200	100	1.15	F	975	50℃
30	TDC365T50U6B	380-415V	50	50	441	135	200	100	1.15	F	980	50℃
31	TDC404T60U6B	380-415V	60	50	529	135	200	100	1.15	F	980	50℃
32	TDC405T75U6B	380-415V	75	50	661	135	200	100	1.15	F	980	50℃
33	TDC444T100U6B	380-415V	100	50	883	125	200	100	1.15	F	980	50℃
34	TDC445T125U6B	380-415V	125	50	1105	125	200	100	1.15	F	980	50℃

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℃
2	TDC256T20U2B	208~230/460V	20	60	145.0	130	200	100	1.15	F	3504	50℃
3	TDC284TS25U2B	208~230/460V	25	60	182.5	130	200	100	1.15	F	3516	50℃
4	TDC286TS30U2B	208~230/460V	30	60	217.5	130	200	100	1.15	F	3516	50℃
5	TDC324TS40U2B	208~230/460V	40	60	290.0	125	200	100	1.15	F	3516	50℃
6	TDC326TS50U2B	208~230/460V	50	60	362.5	120	200	100	1.15	F	3516	50℃
7	TDC364TS60U2B	208~230/460V	60	60	435.0	120	200	100	1.15	F	3516	50℃
8	TDC365TS75U2B	208~230/460V	75	60	542.5	105	200	95	1.15	F	3528	50℃
9	TDC405TS100U2B	208~230/460V	100	60	725.0	105	200	95	1.15	F	3528	50℃
10	TDC444TS125U2B	460V	125	60	907.5	100	200	90	1.15	F	3528	50℃
11	TDC445TS150U2B	460V	150	60	1085.0	100	200	90	1.15	F	3528	50℃
12	TDC 254T15U4B	208~230/460V	15	60	116.0	160	200	110	1.15	F	1728	50℃
13	TDC 256T20U4B	208~230/460V	20	60	145.0	150	200	105	1.15	F	1734	50℃
14	TDC 284T25U4B	208~230/460V	25	60	182.5	150	200	105	1.15	F	1740	50℃
15	TDC 286T30U4B	208~230/460V	30	60	217.5	150	200	105	1.15	F	1752	50℃
16	TDC 324T40U4B	208~230/460V	40	60	290.0	140	200	100	1.15	F	1752	50℃
17	TDC 326T50U4B	208~230/460V	50	60	362.5	140	200	100	1.15	F	1764	50℃
18	TDC364T60U4B	208~230/460V	60	60	435.0	140	200	100	1.15	F	1776	50℃
19	TDC365T75U4B	208~230/460V	75	60	542.5	140	200	100	1.15	F	1776	50℃
20	TDC405T100U4B	208~230/460V	100	60	725.0	125	200	100	1.15	F	1776	50℃
21	TDC444T125U4B	460V	125	60	907.5	110	200	100	1.15	F	1776	50℃
22	TDC445T150U4B	460V	150	60	1085.0	110	200	100	1.15	F	1776	50℃
23	TDC 254T7.5U6B	208~230/460V	7.5	60	63.5	150	200	105	1.15	F	1146	50℃
24	TDC 256T10U6B	208~230/460V	10	60	81.0	150	200	105	1.15	F	1152	50℃
25	TDC 284T15U6B	208~230/460V	15	60	116.0	140	200	100	1.15	F	1152	50℃
26	TDC 286T20U6B	208~230/460V	20	60	145.0	135	200	100	1.15	F	1158	50℃
27	TDC 324T25U6B	208~230/460V	25	60	182.5	135	200	100	1.15	F	1158	50℃
28	TDC 326T30U6B	208~230/460V	30	60	217.5	135	200	100	1.15	F	1170	50℃
29	TDC364T40U6B	208~230/460V	40	60	290.0	135	200	100	1.15	F	1170	50℃
30	TDC365T50U6B	208~230/460V	50	60	362.5	135	200	100	1.15	F	1176	50℃
31	TDC404T60U6B	208~230/460V	60	60	435.0	135	200	100	1.15	F	1176	50℃
32	TDC405T75U6B	208~230/460V	75	60	542.5	135	200	100	1.15	F	1176	50℃
33	TDC444T100U6B	208~230/460V	100	60	725.0	125	200	100	1.15	F	1176	50℃
34	TDC445T125U6B	460V	125	60	907.5	125	200	100	1.15	F	1176	50℃

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℃
2	TXC 143T1.5U2B	208~230/460V	1.5	60	20	175	250	120	1.15	F	3450	50℃
3	TXC 145T2U2B	208~230/460V	2	60	25	170	240	120	1.15	F	3450	50℃
4	TXC 182T3U2B	208~230/460V	3	60	32	160	230	110	1.15	F	3510	50℃
5	TXC 184T5U2B	208~230/460V	5	60	46	150	215	105	1.15	F	3510	50℃
6	TXC 213T7.5U2B	208~230/460V	7.5	60	63.5	140	200	100	1.15	F	3520	50℃
7	TXC 215T10U2B	208~230/460V	10	60	81	135	200	100	1.15	F	3520	50℃
8	TXC 254T15U2B	208~230/460V	15	60	116	130	200	100	1.15	F	3540	50℃
9	TXC 256T20U2B	208~230/460V	20	60	145	130	200	100	1.15	F	3540	50℃
10	TXC 284TS25U2B	208~230/460V	25	60	182.5	130	200	100	1.15	F	3550	50℃
11	TXC 286TS30U2B	208~230/460V	30	60	217.5	130	200	100	1.15	F	3550	50℃
12	TXC 324TS40U2B	208~230/460V	40	60	290	125	200	100	1.15	F	3560	50℃
13	TXC 326TS50U2B	208~230/460V	50	60	362.5	120	200	100	1.15	F	3560	50℃
14	TXC364TS60U2B	208~230/460V	60	60	435	120	200	100	1.15	F	3560	50℃
15	TXC365TS75U2B	208~230/460V	75	60	542.5	105	200	95	1.15	F	3560	50℃
16	TXC405TS100U2B	208~230/460V	100	60	725	105	200	95	1.15	F	3570	50℃
17	TXC444TS125U2B	460	125	60	907.5	100	200	90	1.15	F	3575	50℃
18	TXC445TS150U2B	460	150	60	1085	100	200	90	1.15	F	3575	50℃
19	TXC447TS200U2B	460	200	60	1450	100	200	90	1.15	F	3575	50℃
20	TXC449TS250U2B	460	250	60	1825	70	175	65	1.15	F	3575	50℃
21	TXC 143T1U4B	208~230/460V	1	60	15	275	300	190	1.15	F	1730	50℃
22	TXC 145T1.5U4B	208~230/460V	1.5	60	20	250	280	175	1.15	F	1730	50℃
23	TXC 145T2U4B	208~230/460V	2	60	25	235	270	165	1.15	F	1730	50℃
24	TXC 182T3U4B	208~230/460V	3	60	32	215	250	150	1.15	F	1735	50℃
25	TXC 184T5U4B	208~230/460V	5	60	46	185	225	130	1.15	F	1735	50℃
26	TXC 213T7.5U4B	208~230/460V	7.5	60	63.5	175	215	120	1.15	F	1740	50℃
27	TXC 215T10U4B	208~230/460V	10	60	81	165	200	115	1.15	F	1740	50℃
28	TXC 254T15U4B	208~230/460V	15	60	116	160	200	110	1.15	F	1750	50℃
29	TXC 256T20U4B	208~230/460V	20	60	145	150	200	105	1.15	F	1750	50℃
30	TXC 284T25U4B	208~230/460V	25	60	182.5	150	200	105	1.15	F	1760	50℃
31	TXC 286T30U4B	208~230/460V	30	60	217.5	150	200	105	1.15	F	1760	50℃
32	TXC 324T40U4B	208~230/460V	40	60	290	140	200	100	1.15	F	1770	50℃
33	TXC 326T50U4B	208~230/460V	50	60	362.5	140	200	100	1.15	F	1770	50℃
34	TXC364T60U4B	208~230/460V	60	60	435	140	200	100	1.15	F	1775	50℃
35	TXC365T75U4B	208~230/460V	75	60	542.5	140	200	100	1.15	F	1775	50℃
36	TXC405T100U4B	208~230/460V	100	60	725	125	200	100	1.15	F	1780	50℃
37	TXC444T125U4B	460	125	60	907.5	110	200	100	1.15	F	1780	50℃
38	TXC445T150U4B	460	150	60	1085	110	200	100	1.15	F	1780	50℃
39	TXC447T200U4B	460	200	60	1450	100	200	90	1.15	F	1780	50℃
40	TXC449T250U4B	460	250	60	1825	80	175	75	1.15	F	1780	50℃
41	TXC 145T1U6B	208~230/460V	1	60	15	170	265	120	1.15	F	1150	50℃
42	TXC 182T1.5U6B	208~230/460V	1.5	60	20	165	250	115	1.15	F	1150	50℃
43	TXC 184T2U6B	208~230/460V	2	60	25	160	240	110	1.15	F	1150	50℃
44	TXC 213T3U6B	208~230/460V	3	60	32	155	230	110	1.15	F	1150	50℃
45	TXC 215T5U6B	208~230/460V	5	60	46	150	215	105	1.15	F	1160	50℃
46	TXC 254T7.5U6B	208~230/460V	7.5	60	63.5	150	200	105	1.15	F	1160	50℃
47	TXC 256T10U6B	208~230/460V	10	60	81	150	200	105	1.15	F	1165	50℃
48	TXC 284T15U6B	208~230/460V	15	60	116	140	200	100	1.15	F	1165	50℃
49	TXC 286T20U6B	208~230/460V	20	60	145	135	200	100	1.15	F	1170	50℃
50	TXC 324T25U6B	208~230/460V	25	60	182.5	135	200	100	1.15	F	1170	50℃
51	TXC 326T30U6B	208~230/460V	30	60	217.5	135	200	100	1.15	F	1175	50℃
52	TXC364T40U6B	208~230/460V	40	60	290	135	200	100	1.15	F	1175	50℃
53	TXC365T50U6B	208~230/460V	50	60	362.5	135	200	100	1.15	F	1180	50℃
54	TXC404T60U6B	208~230/460V	60	60	435	135	200	100	1.15	F	1180	50℃
55	TXC405T75U6B	208~230/460V	75	60	542.5	135	200	100	1.15	F	1180	50℃
56	TXC444T100U6B	208~230/460V	100	60	725	125	200	100	1.15	F	1180	50℃
57	TXC445T125U6B	460	125	60	907.5	125	200	100	1.15	F	1180	50℃
58	TXC447T150U6B	460	150	60	1085	120	200	100	1.15	F	1180	50℃
59	TXC449T200U6B	460	200	60	1450	120	200	100	1.15	F	1180	50℃

TECHNICAL DATA

PRODUCT FEATURES			
Model	F-TDC286TS30U2B		
Standard	**NEMA MG-1**	Output rating	**30 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**

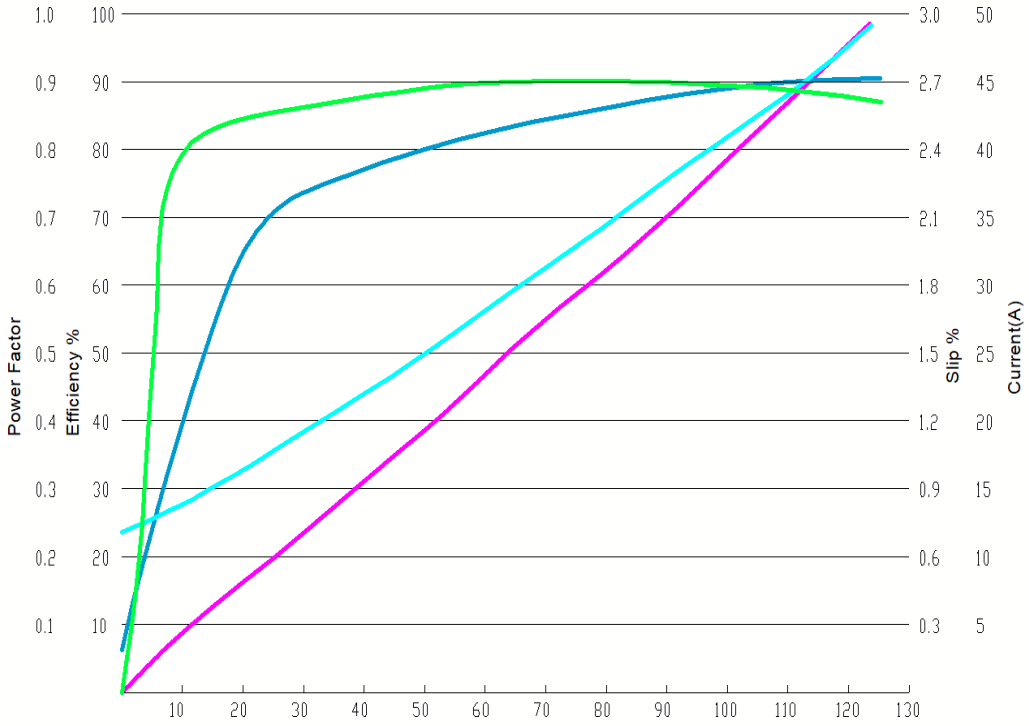
PRODUCT DETAILS			
Frame	**286TS**	Frequency	**60 Hz**
Output	**30 HP (22 kW)**	Number of Poles	**2**
Slip	**0.02333**	Rated speed	**3516 rpm**
Rated voltage	**380-400 V**	Temperature rise	**80 K**
Rated current	**42.2-40.1 A**	Duty Cycle	**Cont.(S1)**
L. R. Amperes	**260-247 A**	Starting Method	**Wye-Delta**
LRC	**6.16x(Code G)**	Ambient temperature	**50°C**
No load current	**12.5-11.5 A**	Altitude	**1000 m.a.s.l.**
Rated torque	**44.83 ft.lb**	Noise level	**86.0 dB(A)**
Locked rotor torque	**130%**	Approx. weight	**335 lb**
Breakdown torque	**200%**	Service factor	**1.15**
Locked rotor time	**30s (cold) 16s (hot)**	Design	**B**
Moment of inertia	**1.6 ft.lb^2**	Insulation Class	**F**
Efficiency/Power factor	Load	Efficiency	Power factor
	100%	**89.5**	**0.9**
	75%	**90.1**	**0.86**
	50%	**89.1**	**0.8**
Bearing	Drive-end	**6311C3**	
	Opposite drive-end	**6311C3**	

LISTED
FIRE PUMP MOTOR
EX26635

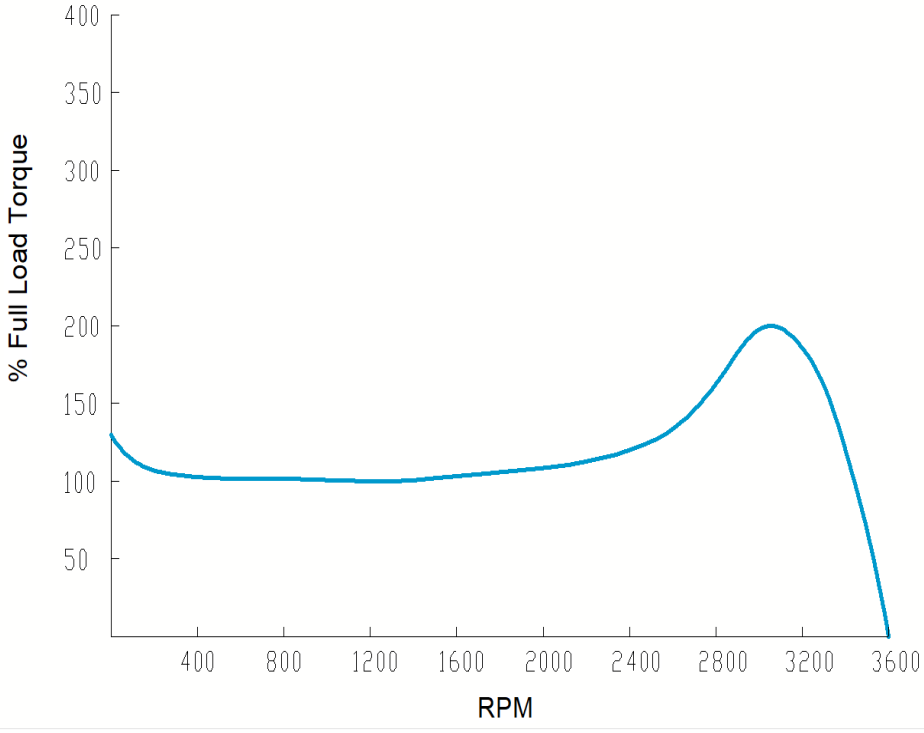
PERFORMANCE CURVES

Torque Values	Torque (lb-ft)	Torque Values	Torque (lb-ft)
Locked Rotor Torque	**58.28**	Breakdown Torque	**89.66**
Pull-Up Torque	**44.83**	Full Load Torque	**44.83**

Load Performance Curve

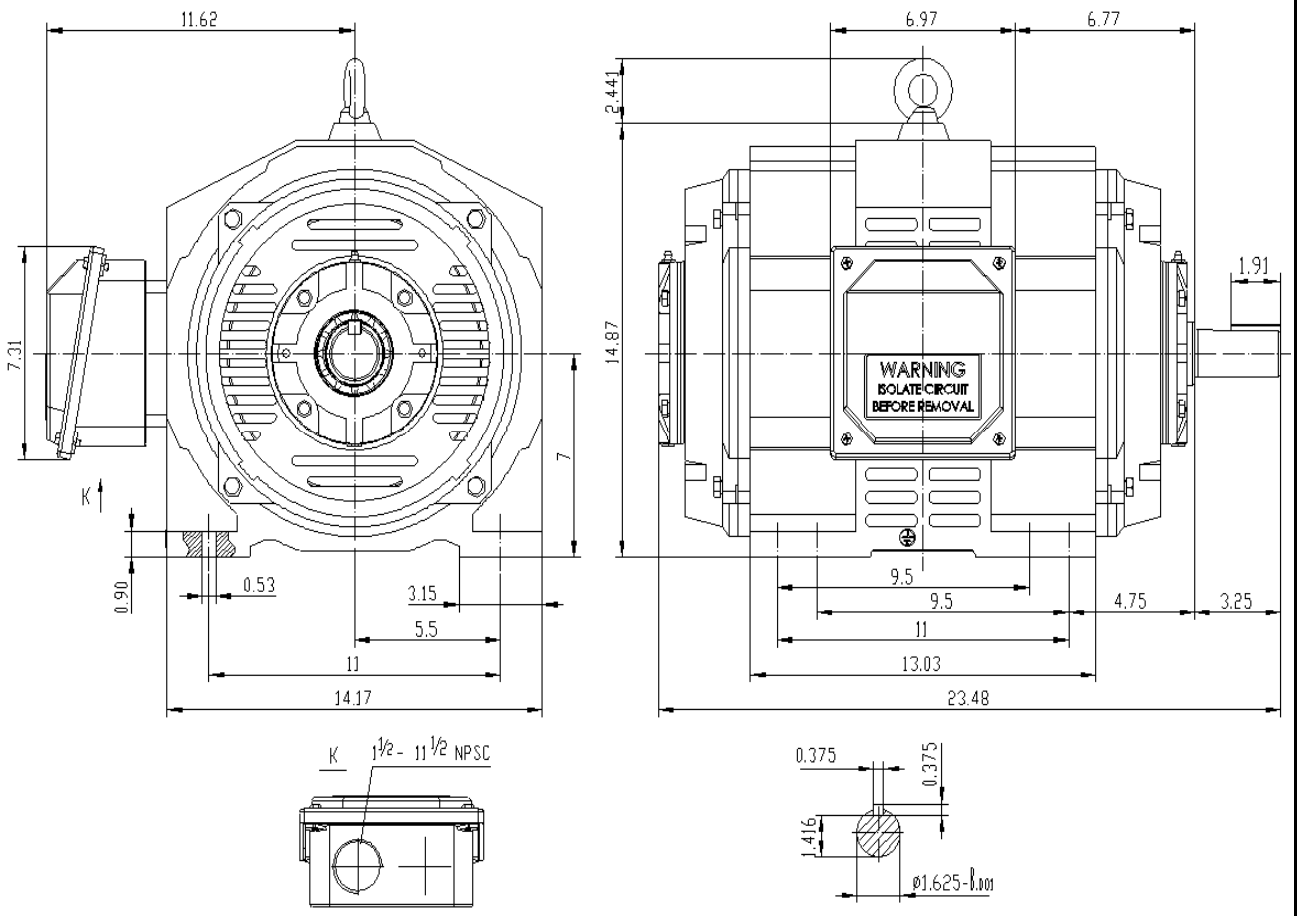


Torque Speed(T-n)Curve



DRAWINGS

Frame size	**286TS**	Frame Material	**Cast iron**
Poles	**2**	DWG NO	**CY228.A16.001**
Units	**Inch**		



MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

ELECTRIC PUMP
CONTROLLER SPECIFICATIONS

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

TORNATECH

Project: _____

Customer: _____

Engineer: _____

Pump Manufacturer: _____

Technical Data
Submittal Document

GPx Series

Full Service
Electric Fire Pump Controller

Contents:

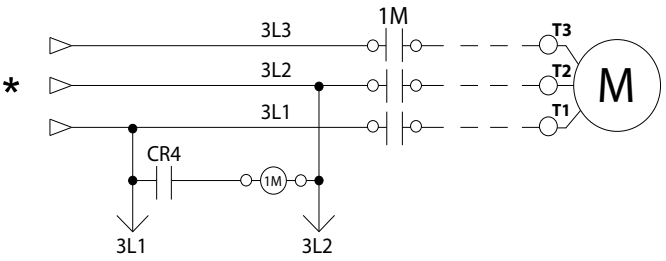
Note: The drawings included in this package are for controllers covered under our standard offering. Actual AS BUILT drawings may differ from what is shown in this package.

c UL us FM APPROVED N.Y.C. APPROVED CE

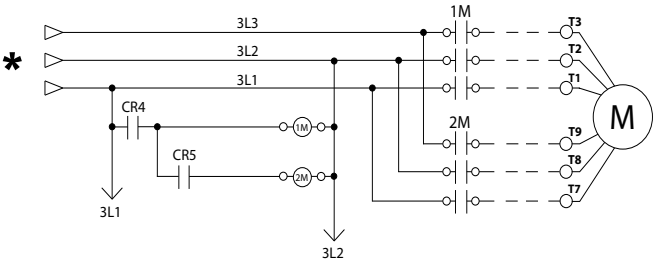
June 2022

Select starting method

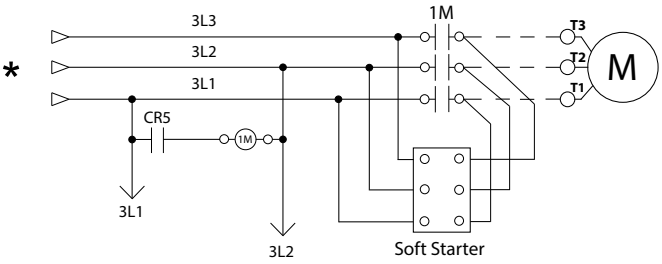
☑ **Model GPA**
Across the line



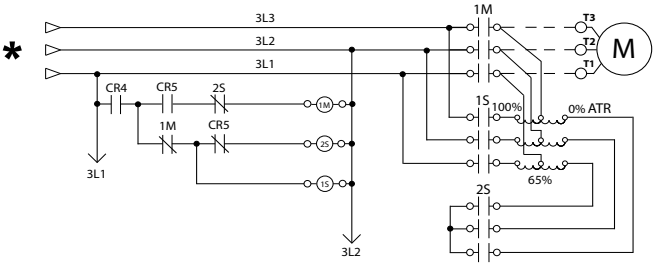
☐ **Model GPP**
Partwinding



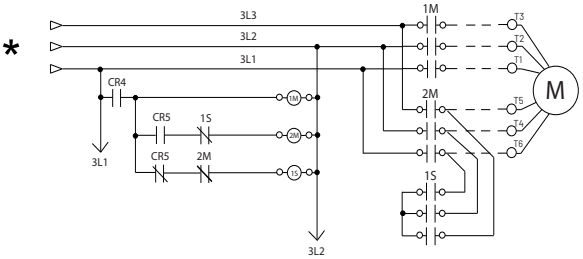
☐ **Model GPS**
Soft Start Soft Stop



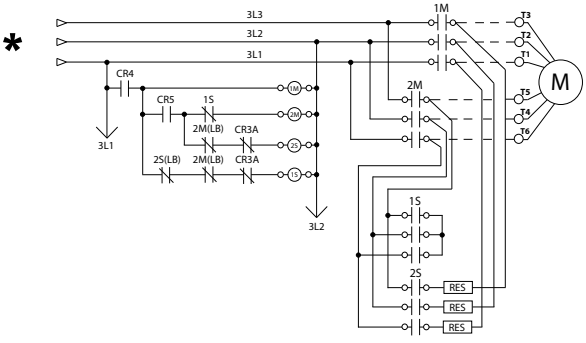
☐ **Model GPR**
Autotransformer



☐ **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	• Isolating switch and circuit breaker assembly: - 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	• Flange mounted • Integrated limit switch • Pull and latch activation • Across the line start (direct on line)
Locked Rotor Protector	• Operate shunt trip to open circuit breaker • Trip between 8 and 20 seconds • Factory set at 600% of motor full load current
Electrical Readings	• Voltage phase to phase (normal power) • Amperage of each phase when motor is running
Pressure Readings	• Continuous system pressure display • Cut-in and Cut-out pressure settings
Pressure and Event recorder	• 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	• 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	• Power available • Motor run • Periodic test • Manual start • Deluge valve start • Remote automatic start • Remote manual start • Emergency start • Pump on demand/Automatic start • Pump room temperature (ºF or ºC) • Lockout
Visual & Audible Alarms	Visual • 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) • Overcurrent • Overvoltage • Phase loss L1 • Phase loss L2 • Phase loss L3 • Phase unbalanced • Pressure transducer fault detected • Pump on demand • Pump room alarm • Service required • Undercurrent • Undervoltage • Check weekly test solenoid • Weekly test cut-in reached Visual and audible • Fail to start
Remote Alarm Contacts	DPDT-8A-250V.AC • Power available • Phase reversal • Motor run • Common pump room alarm (field re-assignable)** • Overvoltage • Undervoltage • Phase unbalance • Low pump room temperature • High Pump room temperature • Common motor trouble (field re-assignable)** • 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	• Embedded microcomputer with software PLC logic • 7.0” color touch screen (HMI technology) • Upgradable software • Multi-language		
Communication Protocol Capability	• Protocol: Modbus • Connection type: Shielded female connector RJ45 • Frame Format: TCP/IP • Addresses: See bulletin MOD-GPx		
Operation	**Automatic Start**	• Start on pressure drop • Remote start signal from automatic device • Deluge valve start	
	Manual Start	• Start pushbutton • Run test pushbutton • Remote start from manual device	
	Stopping	• Manual with Stop pushbutton • Automatic after expiration of minimum run timer ***	
	Timers	Field Adjustable & Visual Countdown	• Minimum run timer ***(off delay) • Sequential start timer (on delay) • Periodic test timer
	Actuation	Visual Indication	• Pressure • Non-pressure
	Mode		• Automatic • Non-automatic

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

☐	A4	Flow switch provision
☐	A8	Foam pump application w/o pressure transducer and run test solenoid valve.
☐	A9	Low zone pump control function
☐	A10	Middle zone pump control function
☐	A11	High zone pump control function
☐	A13	Non-pressure actuated controller w/o pressure transducer and run test solenoid valve
☐	A16	Lockout/interlock circuit from equipment installed inside the pump room
☐	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
☐	B11B	Built in alarm panel same as B11 but 220-240VAC supervisory power
☐	B19A	High motor temperature c/w thermoster relay and alarm contacts (DPDT)
☐	B19B	High motor temperature c/w PT100 relay and alarm contacts (DPDT)
☐	B21	Ground fault alarm detection c/w visual indication and alarm contact (DPDT)
☐	C1	Extra motor run alarm contact (DPDT)
☐	C4	Periodic test alarm contact (DPDT)
☐	C6	Low discharge pressure alarm contact (DPDT)
☐	C7	Low pump room temperature alarm contact (DPDT)
☐	C10	Low water reservoir level alarm contact (DPDT)
☐	C11	High electric motor temperature alarm contact (DPDT)
☐	C12	High electric motor vibration c/w visual indication and alarm contact (DPDT)
☐	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)

☐	C19	Emergency start alarm contact (DPDT)
☐	C20	Manual start alarm contact (DPDT)
☐	C21	Deluge valve start alarm contact (DPDT)
☐	C22	Remote automatic start alarm contact (DPDT)
☐	C23	Remote manual start alarm contact (DPDT)
☐	C24	High pump room temperature alarm contact (DPDT)
☐	C25	Second set of standard alarm contacts (DPDT) (Typical for city of Los Angeles and Denver)
☐	Cx	Additional visual and alarm contact (Specify function) (DPDT)
☐	D1	Low suction pressure transducer for fresh water rated at 0-300PSI with visual indication and alarm contact
☐	D1A	Low suction pressure transducer for sea water rated at 0-300PSI with visual indication and alarm contact
☐	D5	Pressure transducer and run test solenoid valve for fresh water rated for 0-500PSI (for factory calibration purposes only)
☐	D5D	Pressure transducer and run test solenoid valve for sea water rated for 0-500PSI
☐	D10	Omit mounting feet (when applicable)
☐	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*
☐	D13A	High withstand rating for: • 380V to 480V = 65kA* • 600V = 25kA*
☐	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*
☐	D14	Anti-condensation heater & thermostat
☐	D14A	Anti-condensation heater & humidistat
☐	D14B	Anti-condensation heater & thermostat & humidistat

*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:

☐ _____

☐ _____

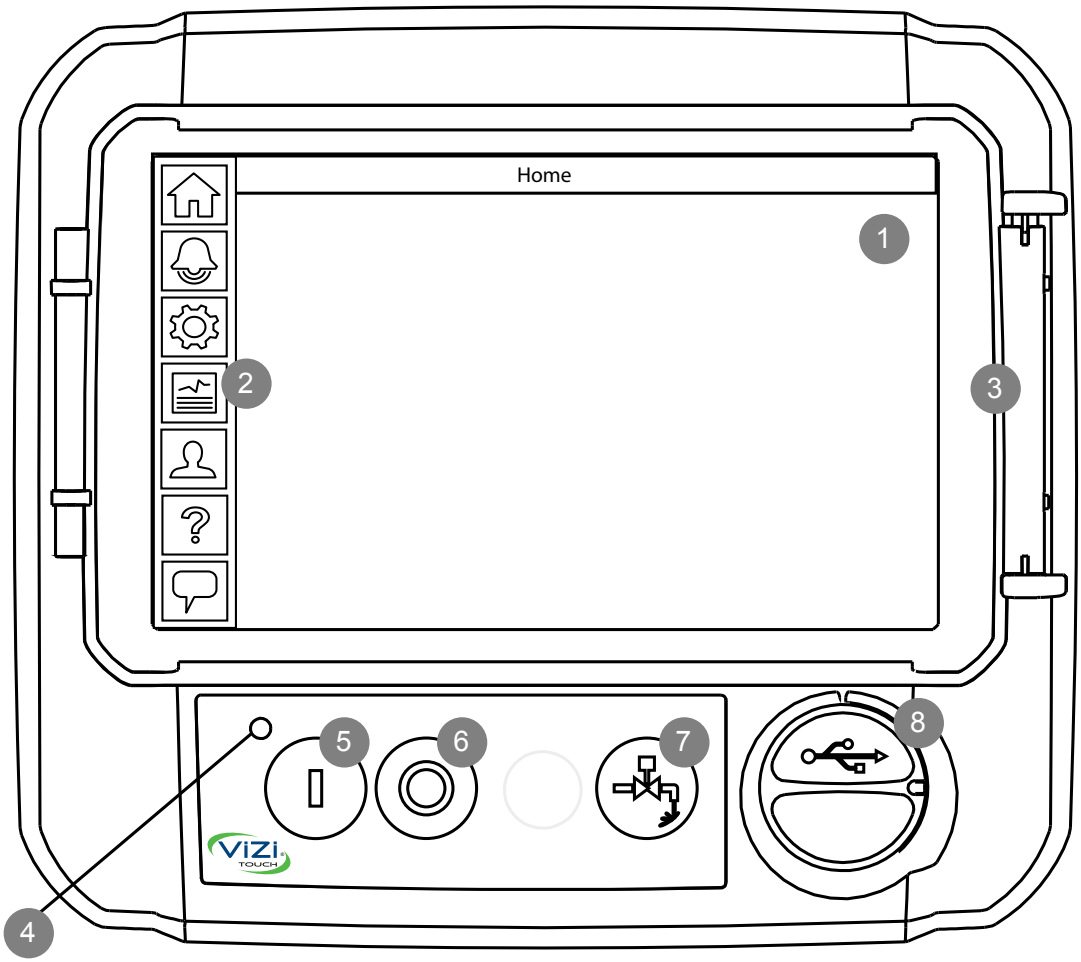
☐ _____

☐ _____

☐ _____

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
2 - Onscreen menu
- HOME page
- ALARM page
- CONFIGURATION page
- HISTORY page
- SERVICE page
- MANUAL page
- LANGUAGES page

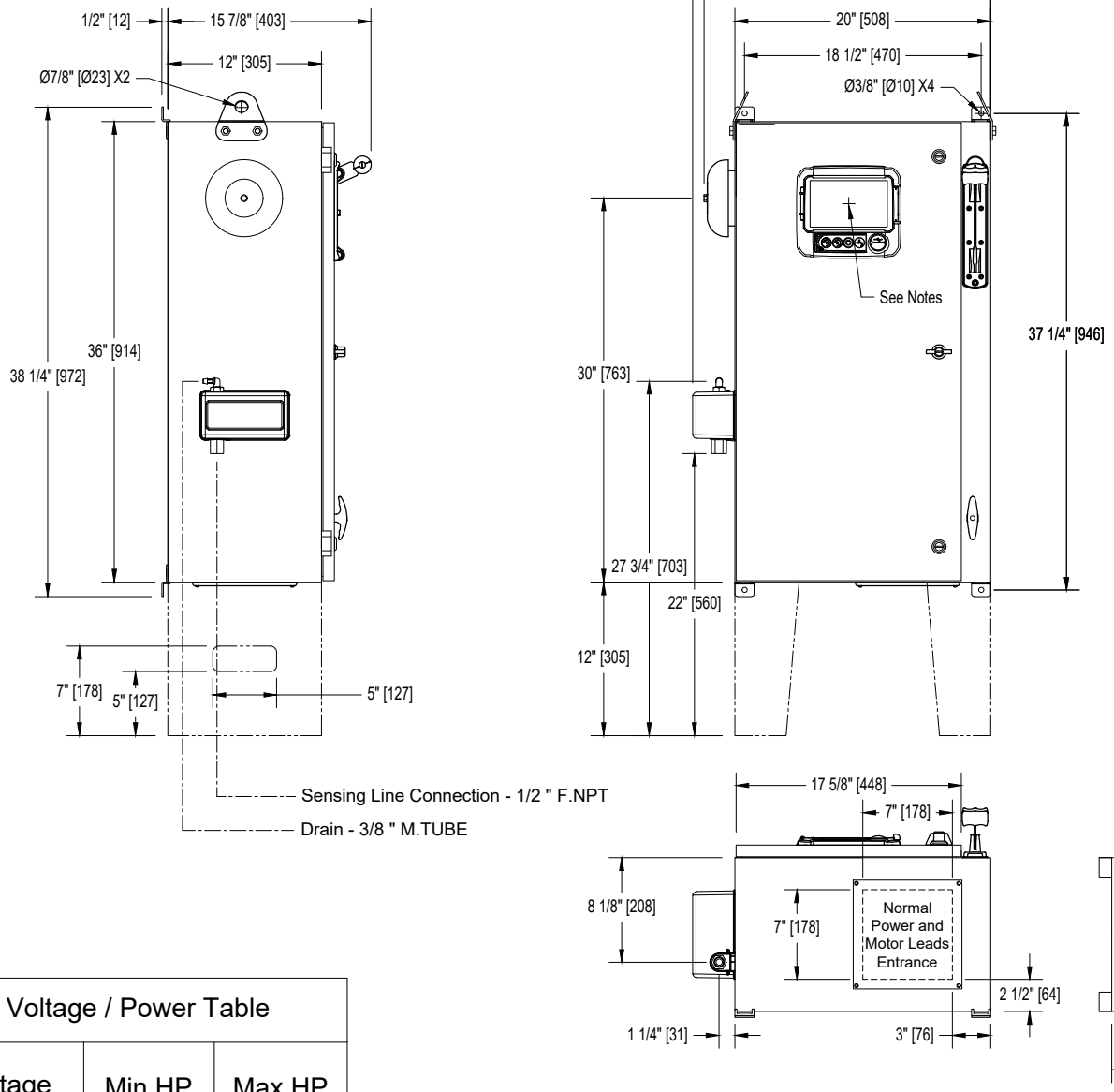
3 - Screen protector
4 - Power LED (3 colors)
5 - START button
6 - STOP button
7 - RUN TEST button
8 - USB port

Electric Fire Pump Controller

Model: GPA/GPY

Dimensions

Built to the latest edition of the NFPA 20 standard



Voltage / Power Table		
Voltage	Min HP	Max HP
208	5	30
220 - 240	5	30
380 - 400 - 415	5	60
440 - 480	5	60
600	5	75

Notes:

- Standard NEMA: NEMA 2
- Standard paint : textured red RAL 3002.
- All dimensions are in inches [millimeters].
- Center of ViZiTouch screen: 29-5/8" [751] 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.

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

Projection

TORNATECH

NYC Dpt of Building Approved

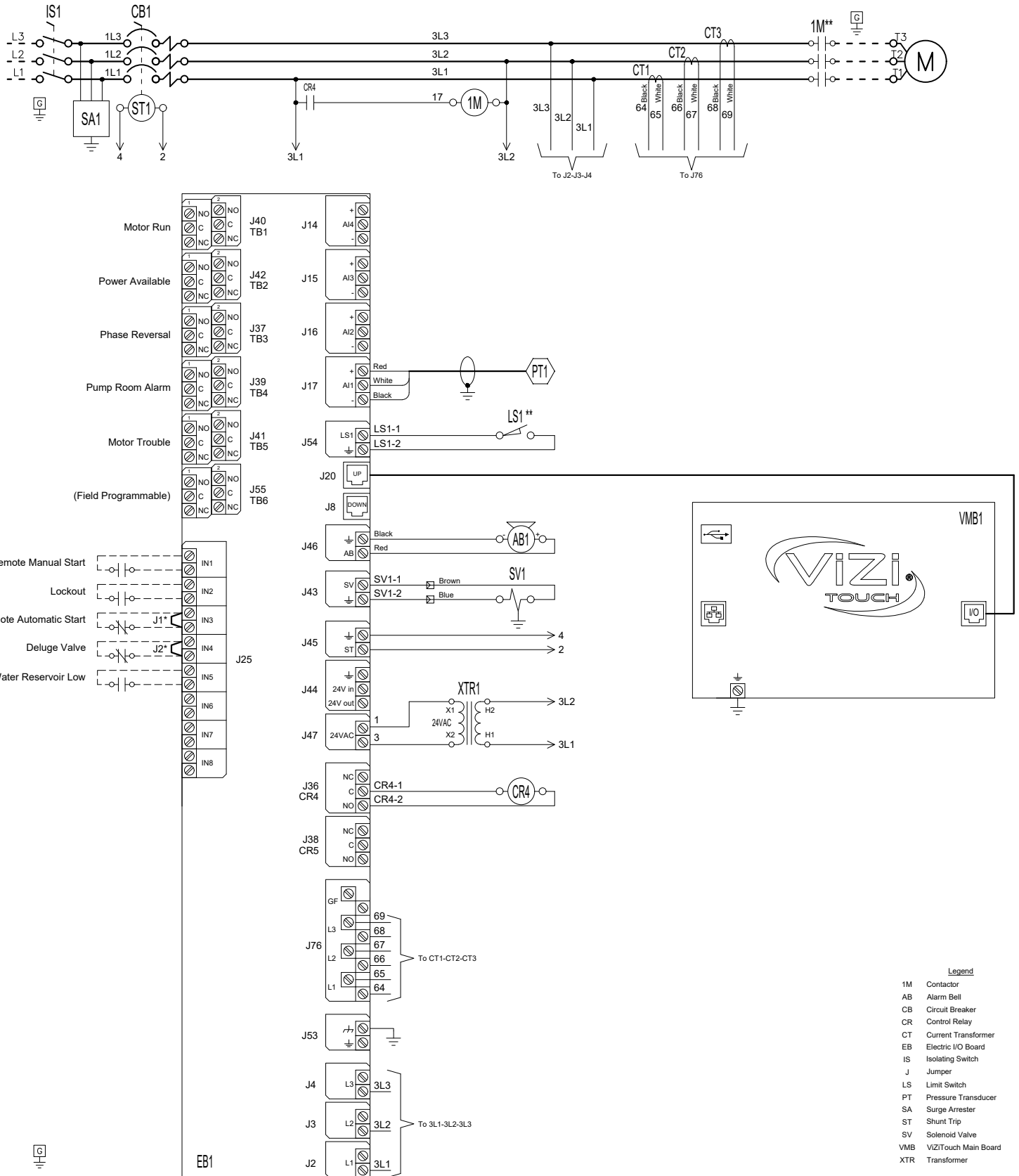
REV.	DESCRIPTION	DD/MM/YY	Drawing number
3.	Removed Seismic logo (optional)	18/05/22	GPX-DI161 /E
2.	New Logo	10/05/18	
1.	Valve Change	21/11/17	CDL

Electric Fire Pump Controller
Full Voltage / Across the Line

Model: GPA

Wiring schematic

Built to the latest edition of the NFPA 20 standard



Legend

1M	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.

NYC Dpt of Building Approved

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

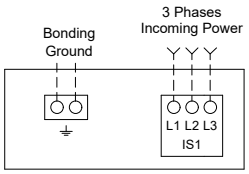
Electric Fire Pump Controller

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 / Voltage	5	7.5	10	15	20	25	30	40	50	60
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 / Voltage	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)
Bending Space	5 " (127 mm)	8 " (203 mm)				12 " (305 mm)					

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 / Voltage	5	7.5	10	15	20	25	30	40	50	60
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 / Voltage	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 (500)
Bending Space	5 " (127 mm)	8 " (203 mm)			12 " (305 mm)						

*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.
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NYC Dpt of Building Approved

REV.	DESCRIPTION	DD/MM/YY	Drawing number
1	Removed Seismic logo (optional)	18/05/22	GPX-TD611 1/2 /E
0	First issue	22/12/20	CDL

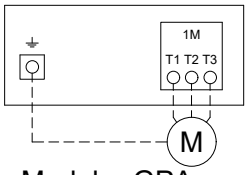
Electric Fire Pump Controller

Model: GPX

Terminal Diagram and Sizing For GPA,GPR & GPS

Built to the latest edition of the NFPA 20 standard

Motor Terminals



Models : GPA,
GPR & GPS

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).
Field Wiring According to Bending Space (AWG or MCM). Terminals T1 - T2 - T3

HP / Voltage	5	7.5	10	15	20	25	30	40	50	60
208	1x (10 to 2)	1x (8 to 2)	1x (8 to 2)	1x (6 to 2)	1x (4 to 2)	1x (3 to 2/0)	1x (2 to 2/0)	1x (1/0 to 3/0)	1x (3/0)	1x (4/0 to 300)
220 to 240	1x (10 to 2)	1x (10 to 2)	1x (8 to 2)	1x (6 to 2)	1x (4 to 2)	1x (4 to 2/0)	1x (3 to 2/0)	1x (1/0 to 3/0)	1x (2/0 to 3/0)	1x (3/0)
380 to 416	1x (10 to 2)	1x (10 to 2)	1x (10 to 2)	1x (8 to 2)	1x (8 to 2)	1x (6 to 2)	1x (6 to 1/0)	1x (4 to 2)	1x (3 to 2/0)	1x (1 to 2/0)
440 to 480	1x (10 to 2)	1x (10 to 2)	1x (10 to 2)	1x (10 to 2)	1x (8 to 2)	1x (8 to 2)	1x (6 to 2)	1x (6 to 2)	1x (4 to 2/0)	1x (3 to 2/0)
600	1x (10 to 2)	1x (10 to 2)	1x (10 to 2)	1x (10 to 2)	1x (10 to 2)	1x (8 to 2)	1x (8 to 2)	1x (6 to 2)	1x (6 to 2)	1x (4 to 2/0)

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

ALUMINUM CONDUCTORS for Contactor (1M).
Field Wiring According to Bending Space (AWG or MCM). Terminals T1 - T2 - T3

HP / Voltage	5	7.5	10	15	20	25	30	40	50	60
208	1x (10 to 2/0) **	1x (10 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) **	1x (2/0) 90°C *	Consult Factory	1x (300)
220 to 240	1x (10 to 2/0) **	1x (10 to 2/0) **	1x (8 to 2/0) **	1x (4 to 2/0) **	1x (3 to 2/0) **	1x (2 to 2/0) **	1x (1 to 2/0) **	1x (2/0)	1x (3/0) 90°C *	Consult Factory
380 to 416	1x (12 to 2/0) **	1x (12 to 2/0) **	1x (10 to 2/0) **	1x (8 to 2/0) **	1x (6 to 2/0) **	1x (6 to 2/0) **	1x (4 to 2/0) **	1x (2 to 2/0) **	1x (1 to1/0)	1x (1/0)
440 to 480	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 (6 to 2/0) **	1x (6 to 2/0) **	1x (4 to 2/0) **	1x (2 to 1/0)	1x (1 to 1/0)
600	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 (4 to 2/0) **	1x (4 to 2/0) **	1x (2 to 1/0)

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

*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.

TORNATECH

NYC Dpt of Building Approved

REV.	DESCRIPTION	DD/MM/YY	Drawing number
1	Removed Seismic logo (optional)	18/05/22	GPX-TD611 2/2 /E
0	First issue	22/12/20	CDL

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 Manual Start	Close to start pump	IN1	J25
Lockout	Close to block start	IN2	J25
Remote Automatic Start	Open to start pump	J1* IN3	J25
Deluge Valve	Open to start pump	J2* IN4	J25

Alarm Inputs (EB1)

Terminals Wire Size:
24 - 12 AWG
0.5 Nm

Water Reservoir Low	Close to signal alarm	IN5	J25

Network Connection (VMB1)

Shielded Female Connector RJ45

Modbus TCP/IP — I/O

Remote Alarm Terminals (EB1)

Terminals Wire Size:
24 - 12 AWG
0.5 Nm

Motor Run	J40	TB1
Power Available	J42	TB2
Phase Reversal	J37	TB3
Pump Room Alarm **	J39	TB4
Motor Trouble **	J41	TB5
(Field Programmable ***)	J55	TB6

Each terminal block:
Normally open — Closes to alarm
Normally closed — Opens to alarm
NO, C, NC

* 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.

NYC Dpt of Building Approved

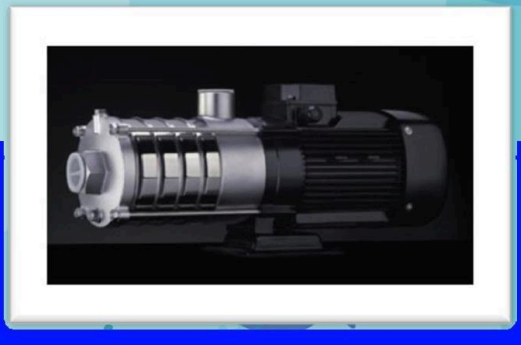
REV.	DESCRIPTION	DD/MM/YY	Drawing number
3	Removed Seismic logo (optional)	18/05/22	GPX-TD603 /E
2	Revised logo	18/06/18	
1	General Revision (added AL coverage)	10/07/17	CDL

MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

JOCKEY PUMP

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

PACIFIC STAINLESS STEEL WATER PUMP

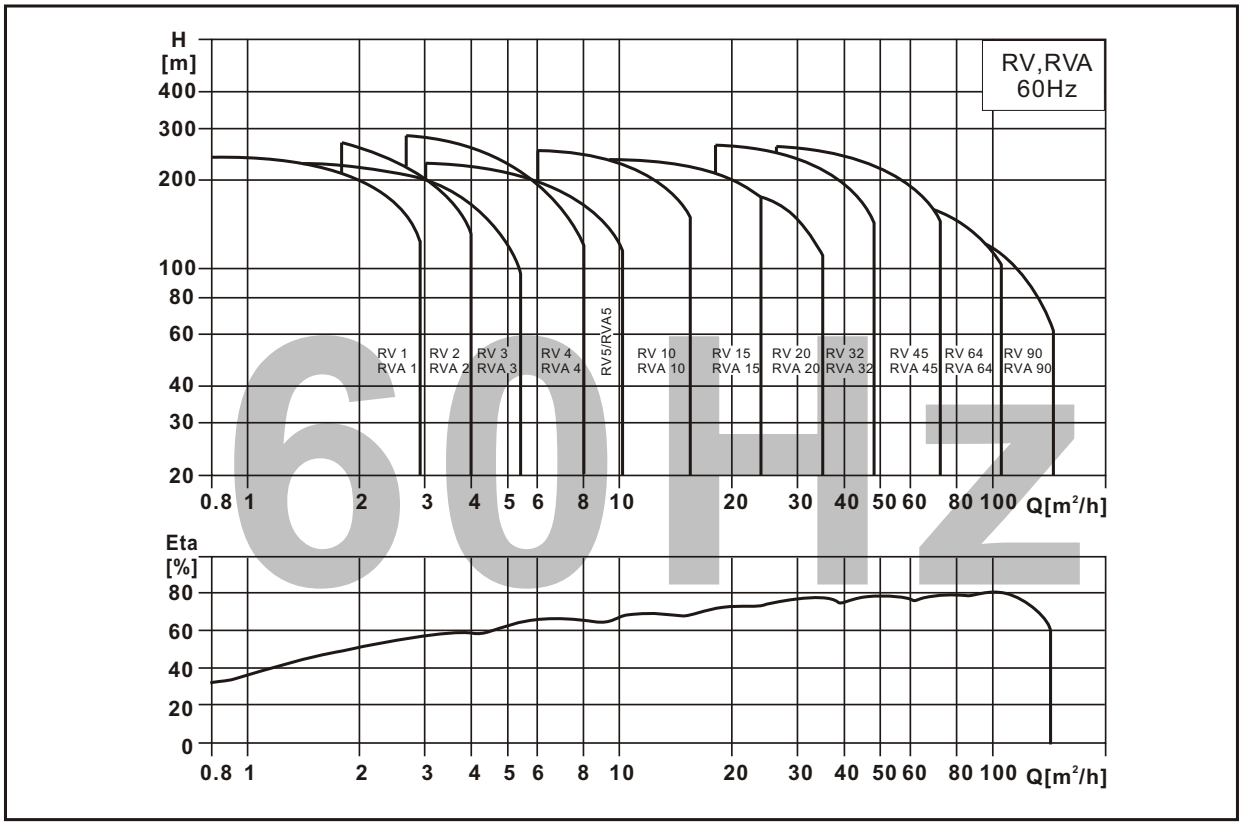


HIGH PERFORMANCE PUMPS FOR ALL WATER APPLICATIONS

Content

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 range

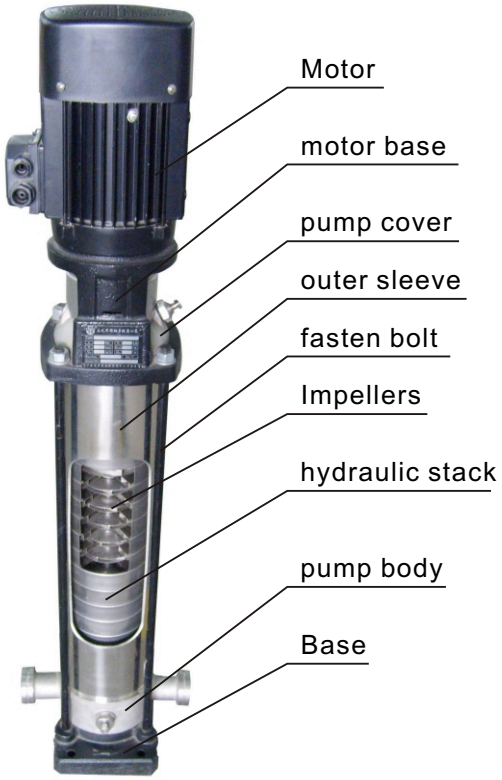
Range	RV1 RVA1	RV2 RVA2	RV3 RVA3	RV4 RVA4	RV5 RVA5	RV10 RVA10	RV15 RVA15	RV20 RVA20	RV32 RVA32	RV45 RVA45	RV64 RVA64	RV90 RVA90
Nominal rated [m^3/h]	1	2	3	4	5	10	15	20	32	45	64	90
Temperature range [℃]	-20~+104											
Temperature on range [℃]	-40~+180								-40~+180			
Max Efficiency [%]	44	45	56	58	65	66	68	69	77	78	80	81
RV pump												
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	●	●	●	●	●	●	●	●	●	●	●	●
RV pump 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												
colomn pipe thread★	G1 G1¼	G1 G1¼	G1 G1¼	G1 G1¼	G1 G1¼	G1½ G2	G2½	G2½	–	–	–	–
colomn 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
Cuttingferrule 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℃, if the ambient temperature exceeds +40℃, 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.

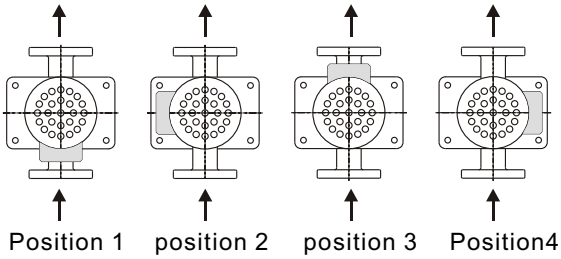
Terminal box positions

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.

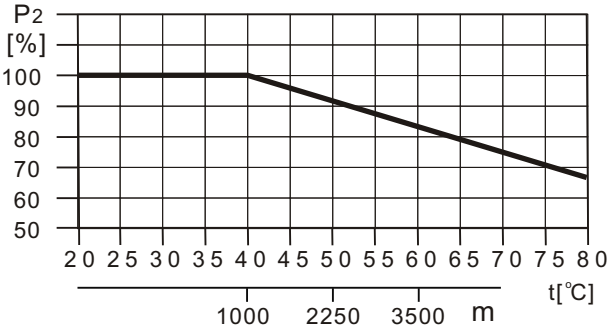
Fig2. Terminal box positions



Viscosity

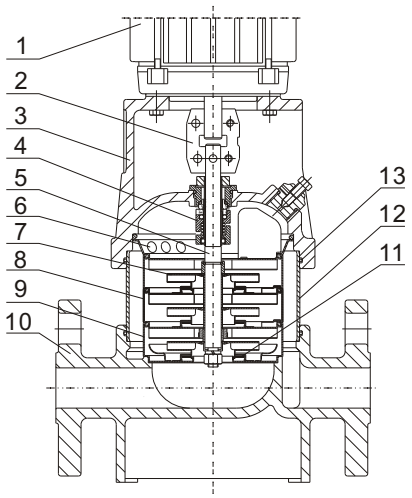
The pumping of liquids with densities or kinematic viscosities higher than those of water will cause a considerable pressure drop, a drop in the hydraulic performance and a rise in the power consumption.
In such situations the pump should be fitted with a larger motor, if in doubt.

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

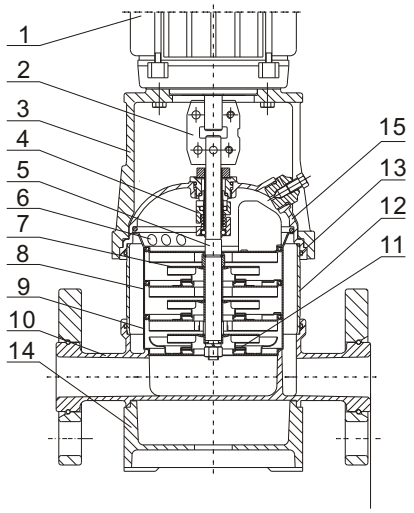


Example:
From the Fig.3, the pump is installed at an altitude exceeding altitude 3500 meters, P2 will decrease to 88%, if the ambient temperature is up to 70℃,P2 will decrease to 78%.

RV1,2,3,4,5
Sectional drawing



RVA1,2,3,4,5
Sectional drawing



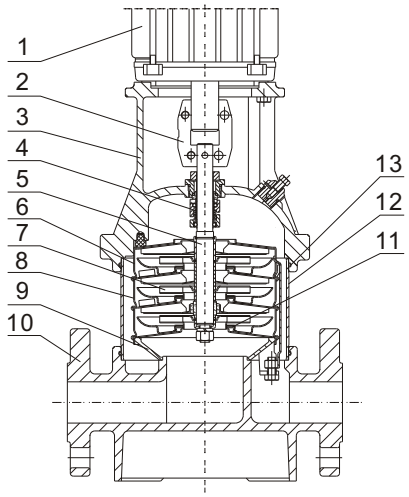
Material RV

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		

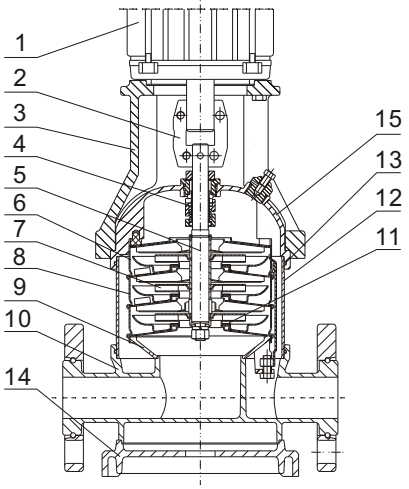
Material RVA

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

RV10,15,20
Sectional drawing



RVA10,15,20
Sectional drawing



Material RV

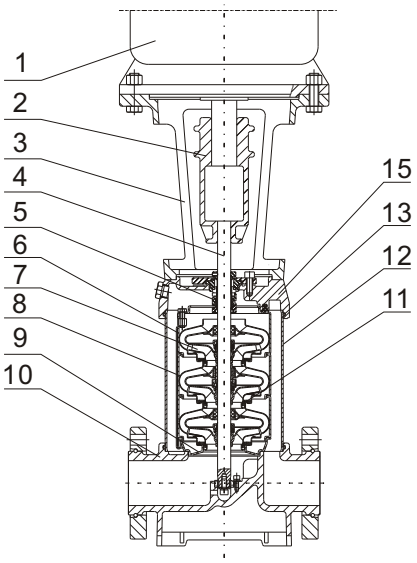
No.	Description	Material	EN/DIN	AISI/ASTM
1	Motor			
2	Shaft connector			
3	Pump head	Cast iron	EN-JL1030	ASTM25B
4	Mechanical seal			
5	Shaft	S.S		AISI420
6	Outlet	S.S	1.4301	AISI304
7	Impeller	S.S	1.4301	AISI304
8	Hydraulic stack	S.S	1.4301	AISI304
9	Settled cover	S.S	1.4301	AISI304
10	Pump body	Cast 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

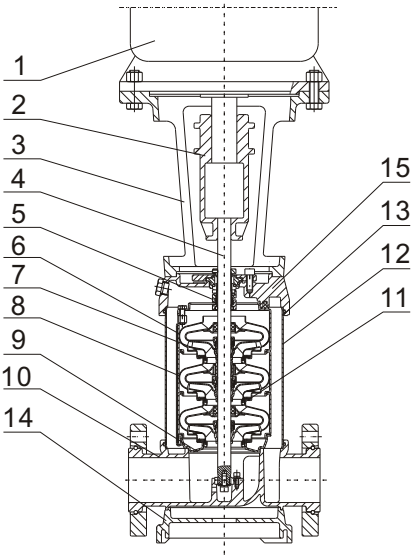
RV32,45,64,90

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……

RV 32 -10 -1-F-J1-A-A01-I-E-HURV-C

- Model
- Nominal flow(m^3/h)
- Number of impellers
- small impeller (0 means no)
- Pump body
- Pump cover / mechanical
- shaft material
- Mechanical seal
- Plastic parts
- Outer sleeve, Hydraulic stack , impeller
- Motor
- Frame

Codes

F-B2-A-A01-I-E-BUCE-C

Pump body code
RV1,2,3,4,5,10,15,20 serises
F: cast iron pump body +cast iron fixed flange
RV32,45,64,90,120,150,200 serises
F: cast iron pump body +cast iron ativity flange
RVA1,2,3,4,5,10,15,20 serises
F: canst stainless steel pump body + cast iron flange
G: cast stainless steel pump body + cast xtainless steel flange
H: cast stainless steel pump body +fixed welding stainless steel flange
K: cast stainless steel pump body+ fixed welding punching flange
P: cast stailess steel(PJE)
S: cast stailess steel (union): cylinder thread
Z: cast stailess steel (union): cone thread
B: cast stailess steel (union): NPT thread
RVA32,45,64,90,120,150,200 serises
F: cast stainless steel pump body +cast iron atifivty flange
G: cast stainless steel pumpb body +cast stailess steel atifivty flange
H: cast stainless steel pumpb body +cast stailess steel fixed flange

Pump cover / sealing machine code
RV1,2,3,4,5,10,15,20 serises
H1: cartridge type mechanical seal +cast iron pump cover
H2: seperate type mechanical seal +cast iron pump cover
RV32,45,64,90,120,150,200 serises
H1: cartridge type mechanical seal + cast iron pump cover
RVA1,2,3,4,5,10,15,20 serises
J1: cartridge type mechanical seal +cast stainless steel pump cover
J2: seperate type mechanical seal + cast stainless steel pump cover
B1: cartridge type mechanical seal + punching pump cover
B2: seperate type mechanical seal + punching pumpcover
RVA32,45,64,90,120,150,200 serises
J1: cartridge type mechanical seal + cast stainless steel pump cover
F1: cartridge type mechanical seal + cast stainless steel pump cover

Pump shaft material code
A:SUS304
B:SUS316
C:SUS431
D:2Cr13

Mechanical seal
H :type mechanical
B: separate type mechanical
Q: Silicon carbide
U:Tungsten carbide
C: graphite
E:EPDM
V:Viton

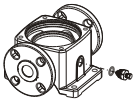
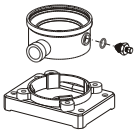
The connection model of pipeline
E : EPDM
V: Viton
N: NBR

Outer sleeve, Hydraulic stack, impeller
I :SUS304
G: SUS316

Motor

Frame
A:Small flange frame
(Pump head for V18 type motor)
B:The large flange frame
(pump head for V1 type motor)

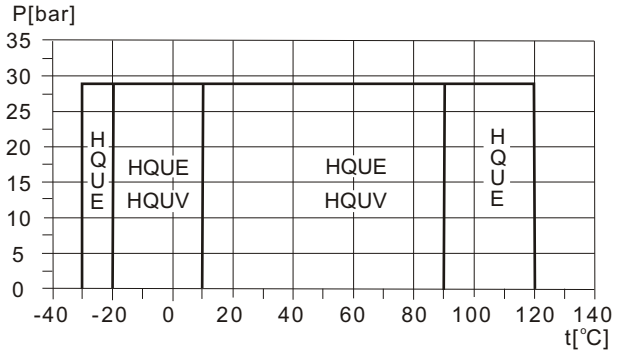
Maximum operating pressure and temperature range

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

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 clean water 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 s haft seal reduced.

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

Example of operating and inlet pressures :

The values for operating and inlet pressures shown in the table must not be considered in dividually 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=11.3bar.

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=10.2bar. 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

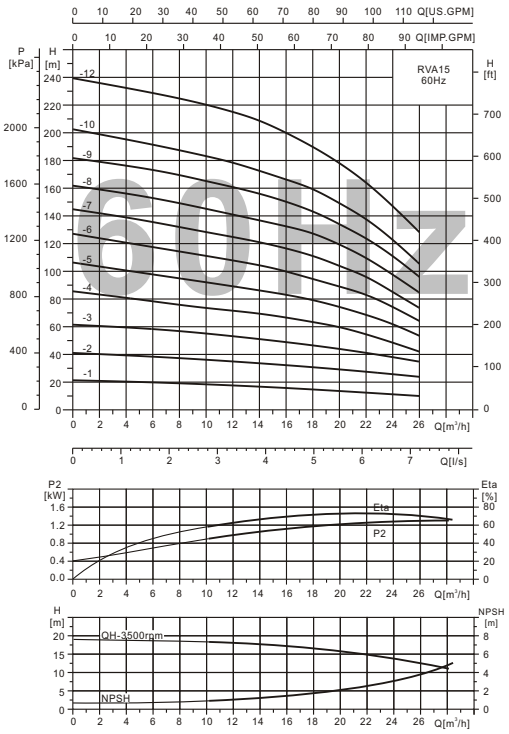
selection of pumps should be based on:

- 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

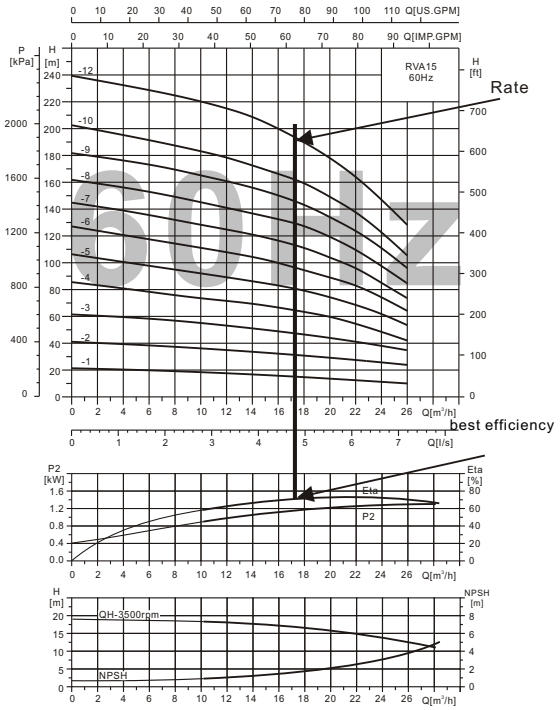
When sizing a pump the following must be taken into accounting:

- 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 ope-ratingat 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.7best efficiency

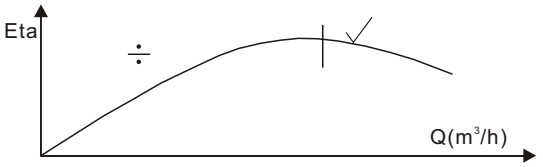
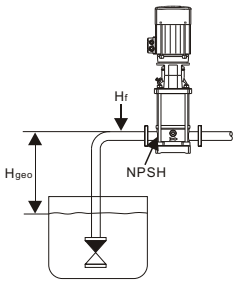


Fig.8 dimensional data



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 in to 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

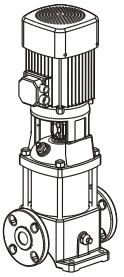


Fig. 10 pump connections

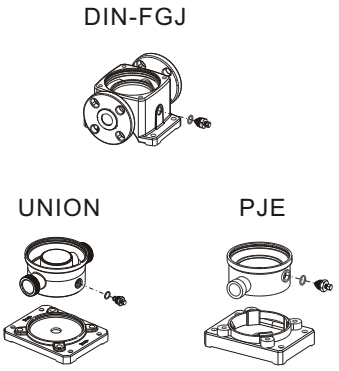


Fig.11 Shaft seal (cartridge type)

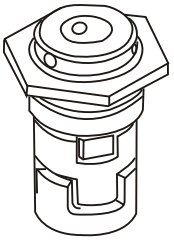
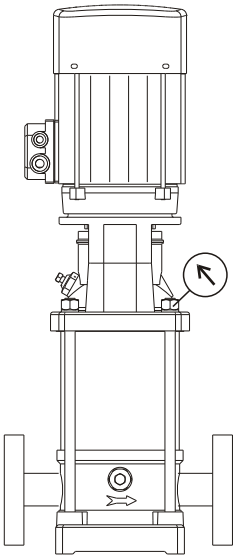


Fig.12 Inlet pressure and operating pressure



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:

$H=P_b*10.2-NPSH-Hf-Hv-Hs$

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 deivering).

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

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

Hs = safty margin=minimum 0.5 metres head.

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

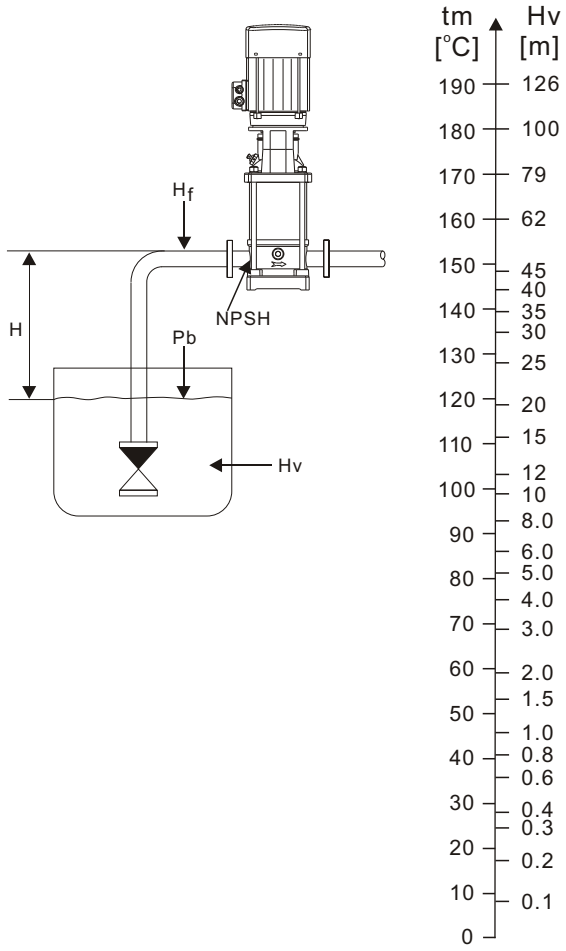
Example:

P_b=1bar
pump model:RVA10,50Hz
flow: 10m^3/h
NPSH(P36 reference:2.1 metres head.
liquid temperature:+50C
Hv(reference picture4):1.3metres head.
$H=P_b*10.2-NPSH-Hf-Hv-Hs$
$H=1*10.2-2.1-3.0-1.3-0.5=3.3$(metres)

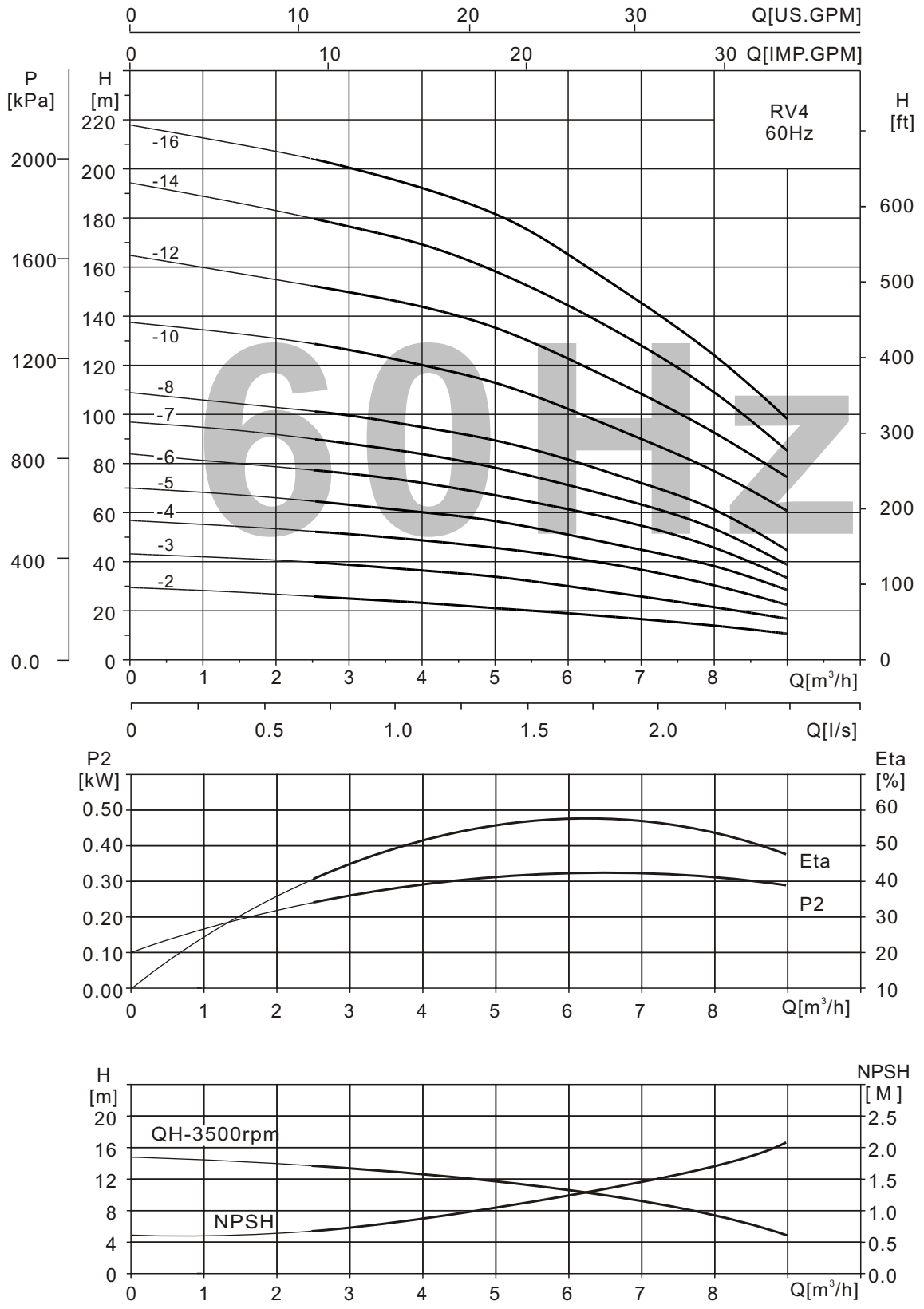
It means the pump can operate at a suction lift of maximum 3.3 metres head.

exchaged meter head to bar:
1 metre head=1*0.0981=0.0981bar
exchaged metre head to kpa:
1 metre head=1*9.81=9.81kpa.

Fig.13 Mimimum inlet pressure-NPSH



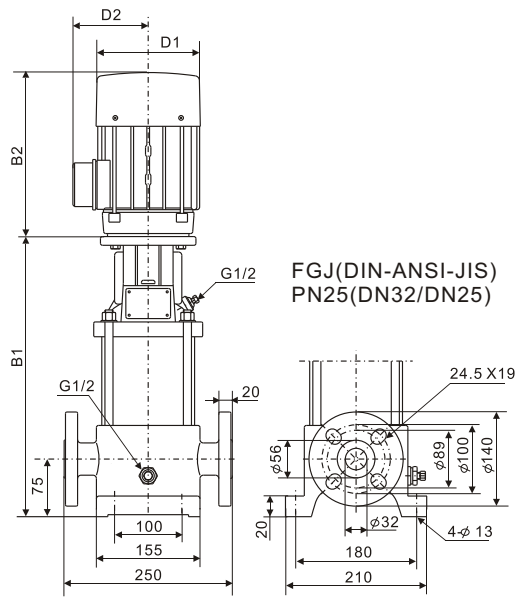
Performance Curve



Performance Table

Model	Power P_2(kW)	Q (m^3/h)	2.5	3.0	4.0	5.0	6.0	7.0	8.0	9.0
RV4-2	0.75		26	25	23	21	19	16	14	11
RV4-3	1.1		39	38	36	32	28	24	21	18
RV4-4	1.5		52	50	48	44	38	35	31	22
RV4-5	2.2		65	62	60	55	49	44	39	27
RV4-6	2.2		78	75	72	67	59	54	47	33
RV4-7	3.0		92	88	84	78	69	62	55	38
RV4-8	3.0	H (m)	104	100	95	90	79	72	63	44
RV4-10	4.0		130	125	120	113	102	90	80	61
RV4-12	4.0		156	150	145	136	122	109	96	74
RV4-14	5.5		182	176	170	159	145	129	112	86
RV4-16	5.5		207	201	196	183	165	146	128	98

Installation sketches



Dimensions and weights

Model	Dimensions(mm)						Weight (kg)
	B1	B2	B1+B2	D	D1	D2	
RV4-2	262	205	467	-	133	102	25
RV4-3	286	241	527	-	154	111	28
RV4-4	304	241/293	545	-	151	111	30
RV4-5	330	275/293	605	-	177	116	38
RV4-6	348	275/293	623	-	177	116	39
RV4-7	366	293	641	-	177	116	43
RV4-8	384	293	659	-	177	116	44
RV4-10	440	305	745	-	197	148	45
RV4-12	476	305	781	-	197	148	46
RV4-14	517	390	907	300	275	210	74
RV4-16	553	390	943	300	275	210	75

Technical Data

Standard motor

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

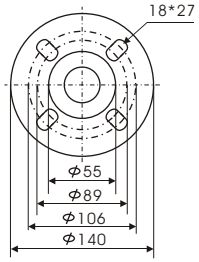
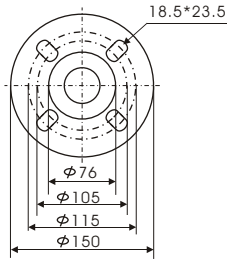
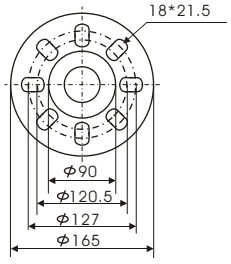
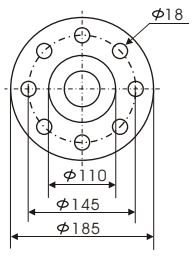
High efficiency motor

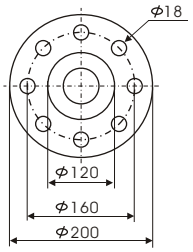
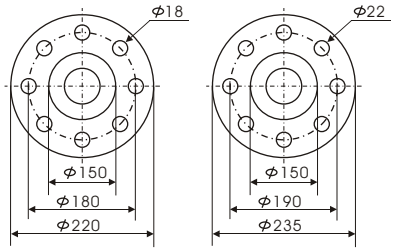
Power P_2（kW）	Voltage（V）	Current I_N（A）	Power factor cos φ	EFFiciency（%）	I_{st}/I_N
0.75	△220/Y380	△3.1/Y1.8	0.83	77.6	6.7
1.1	△220/Y380	△4.2/Y2.4	0.83	82.9	7.4
1.5	△220/Y380	△5.6/Y3.2	0.84	84.2	7.7
2.2	△220/Y380	△7.9/Y4.6	0.85	85.7	7.6
3.0	△220/Y380	△10.4/Y6.0	0.87	86.8	7.6
4.0	△380/Y660	△7.9/Y4.5	0.88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

Remark：Special motor is available on request.

Pipe connection

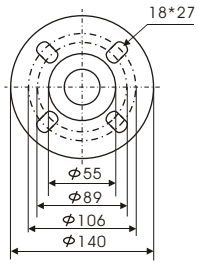
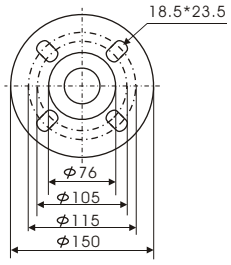
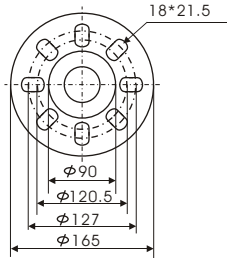
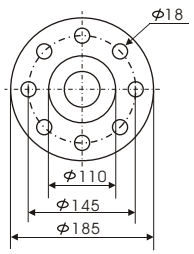
Various sets of counter flanges and couplings are available.
Counter flange for RV series
A set consists of one counter flange, one gasket, bolts and nuts.
(Remarks: The above accessories are not necessary for pumps,
there will be extra charge for them if needed)

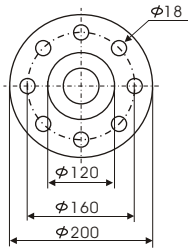
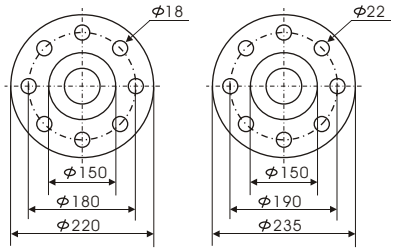
counter flange	pump type	description	rated pressure	pipe work Connection	product Number
	RV1 RV2 RV3 RV4 RV5	Threaded	16 bar,EN 1092-2	G1	
		For welding	25 bar,EN 1092-2	25mm,nominal	
		Threaded	16 bar,EN 1092-2	G1 1/4	
		For welding	25 bar,EN 1092-2	32mm,nominal	
	RV10	Threaded	16 bar,EN 1092-2	G1 1/2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

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	

Counter flange for RVA series

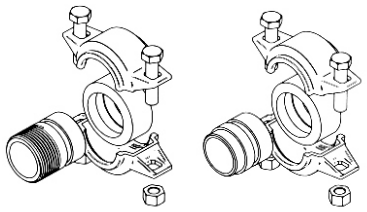
they are made of stainless steel EN1.4403(AISI304)
A set consists of one counter flange, one gasket, bolts and nuts.
(Remarks: The above accessories are not necessary for pumps,
there will be extra charge for them if needed)

counter flange	pump type	description	rated pressure	pipe work Connection	product Number
	RVA1 RVA2 RVA3 RVA4 RVA5	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	
	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 RVA20	Threaded	16 bar,EN 1092-2	G2	
		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	

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 RVA4 RVA5	Threaded	80bar	$G1^{1}/_{4}$	EPDM	2
					FKM	2
		For welding	80bar	DN32	EPDM	2
					FKM	2
	RVA10 RVA15 RVA20	Threaded	70bar	G2	EPDM	2
					FKM	2
		For welding	70bar	DN50	EPDM	2
					FKM	2

Edition:2013.08

MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

JOCKEY PUMP CONTROLLER

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
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

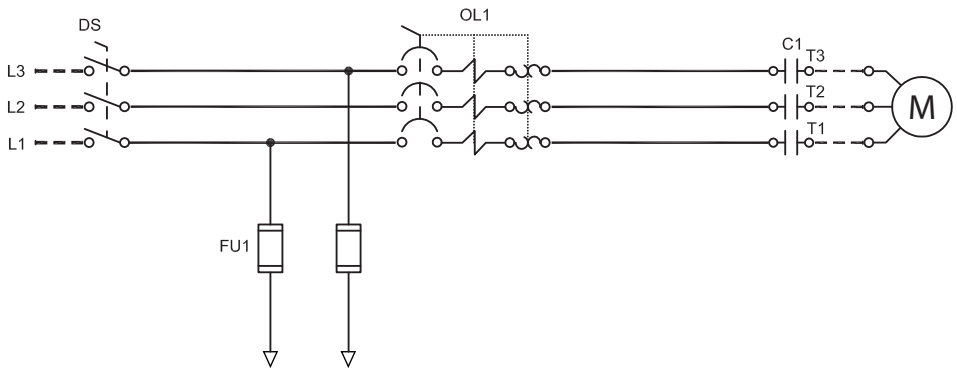
Note: The drawings included in this package are for controllers covered under our standard offering. Actual AS BUILT drawings may differ from what is shown in this package.

c UL us N.Y.C. APPROVED CE OPTIONAL SEISMIC COMPLIANT

March 2020

Technical Data

Model JP3 Jockey Pump Controller



N.Y.C. APPROVED

OPTIONAL

SEISMIC COMPLIANT

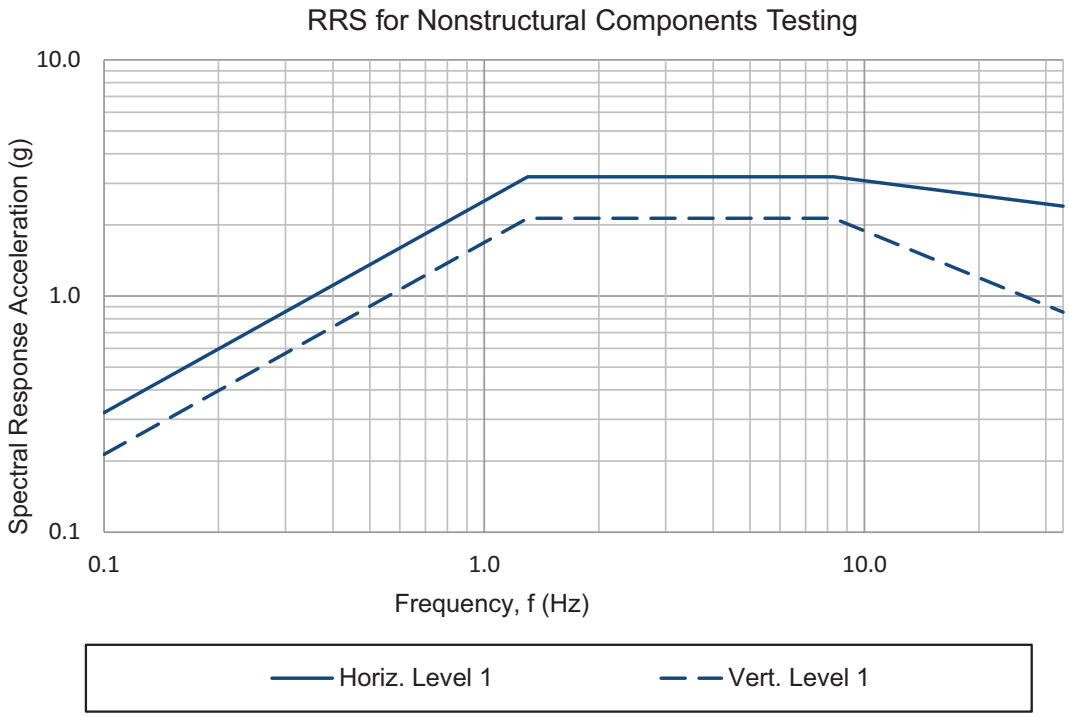
Listing	Underwriters Laboratory (UL)	UL508A - Industrial Pump Controllers
	CSA	CSA C22.2 No. 14 Industrial Control Equipment
	New York City	Accepted for use in the City of New York by the Department of Buildings
	Seismic Certification	See page 4 for details
	Optional	
	☐ CE Mark	Various EN, IEC & CEE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

Fuseless Motor Starter	• Main disconnect – padlockable – rotary type handle – door interlocked • Thermo-magnetic motor protector • Contactor		
Control Circuit	• 24V.AC		
***iPD*+ Operator Interface**	• Solid state controls • All adjustments on door front • Navigation pushbuttons		
Pressure Sensing	• 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	• Manual motor start/run LED
	• Automatic motor start/run LED
	• Motor overload
	• Pressure reading
	  • Start pressure
	  • Stop pressure
	  • System pressure
	• System pressure diagnostic LED’s
	  • 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	• Minimum run timer (off delay) • Delay start timer (on delay) • Visual countdown		
Counters	• Pump start counter • Elapsed timer meter (hours / non-resettable)		
Operators	• 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	• 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



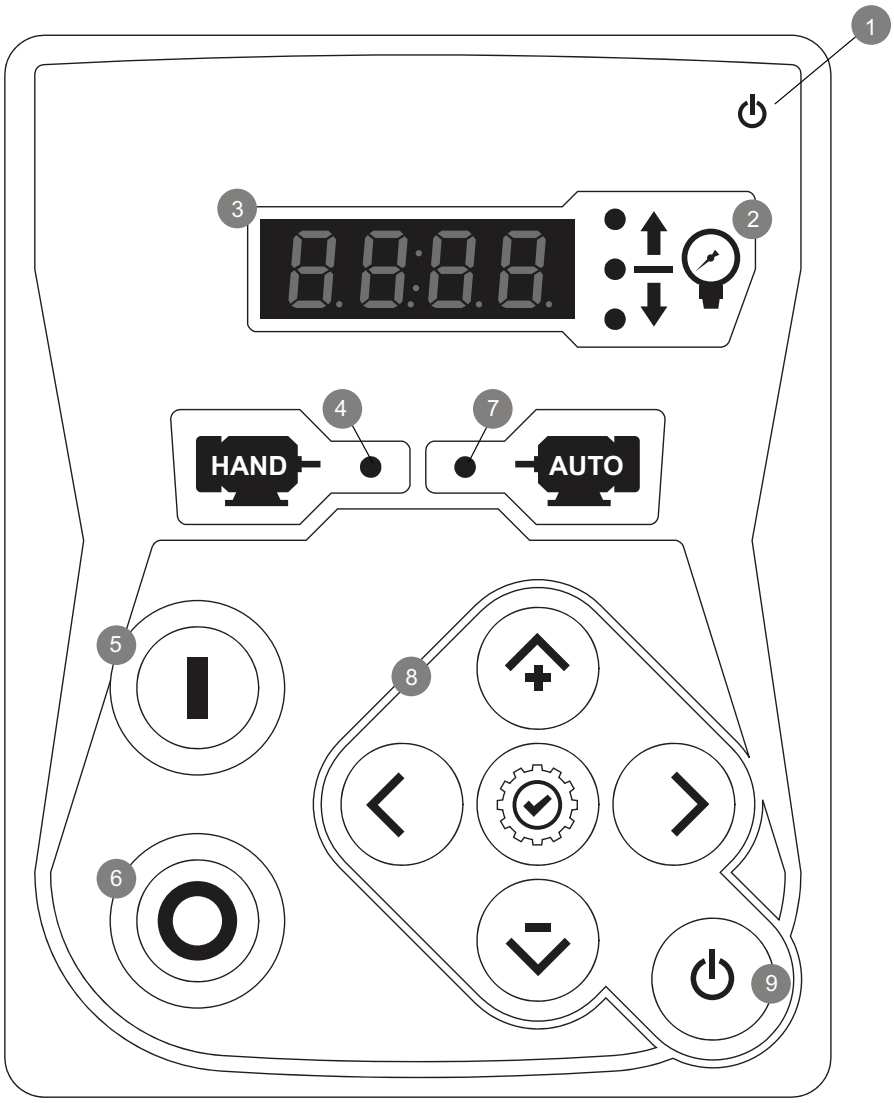
Notes:
- Components are tested in accordance with ICC-ES AC156, IBC 2015 & CBC 2016.
- OSHPD Special Seismic Certification Preapproval (OSP)

☐ A4	Elapsed time meter (time totalizer)
☐ A5	Motor run alarm contact
☐ A6	Loss of power alarm contact
☐ A7	Overload or short circuit alarm contact
☐ D11D	Pressure transducer 0-600psi with ½" MNPT 316 stainless steel bushing
☐ D14	Export packing for 1 controller
☐ D13A	Externally mounted wetted parts
☐ D14	Export packing for 1 controller
☐ D18	Audible alarm
☐ D19	Anti-condensation heater and thermostat
☐ D20	Anti-condensation heater and humidistat
☐ D21	Tropicalization
☐ D22	Phase reversal / failure pilot light and alarm contact
☐ D23	Controller power healthy pilot light and alarm contact
☐ D24	Pump failure via current sensing relay with pilot light and dry alarm contact
☐ D25	Low zone pump control function
☐ D26	Mid zone pump control function
☐ D27	High zone pump control function
☐ D28	Selector switch in auto alarm contacts
☐ D29	Selector switch in off alarm contacts
☐ D30	Motor heater circuit
☐ 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.)
☐ 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.)
☐ D34	Service entrance rated - 42kA short circuit withstand rating: • 600V - 60hz (7.5hp max.)

☐ 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

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

Jockey Pump Controller

Across the Line / 3 Phase

Dimensions

Model:JP3

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

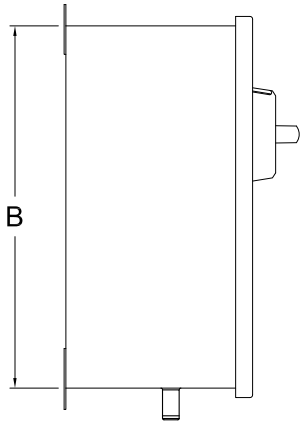
PER QUOTE DRAWING No.

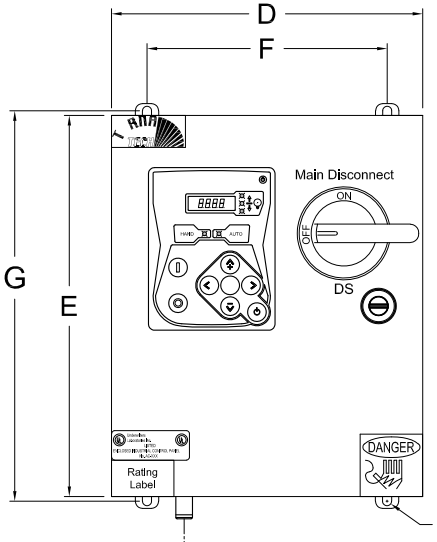
SEISMIC CERTIFIED PER IBC COMPLIANT | UL | CSA | NYC Dpt of Building Approved

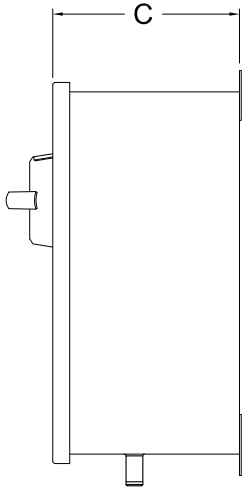
REV.	DESCRIPTION	DD/MM/YY
6	Modified J19 Outputs ID	10/06/16
7	Revised logo	18/06/18
8	Sensing line connection changed	25/03/25

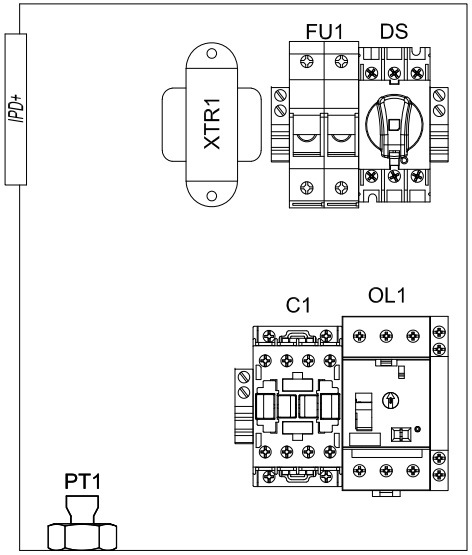
TORNATECH

Drawing No. JP3-DI500/E

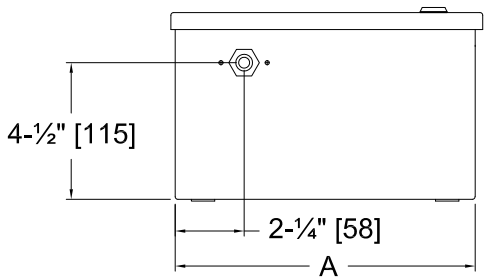








Standard Internal Layout



Dimensions*							
Maximum Motor Horsepower					Enclosure Dimensions	Door Dimensions	Anchor Dimensions
200-208V	220-240V	380-416V	440-480V	575-600V	A X B X C	D X E	F X G
10HP	10HP	15HP	20HP	25HP	10"X12"X6-½"	10-⅝"X12-⅝"	8"X12-¾"
20HP	30HP	40HP	60HP	60HP	16"X16"X7-½"	16-½"X16-½"	14"X16-¾"

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.

Projection

Jockey Pump Controller

Across the Line / 3 Phase

Wiring schematic

Model:JP3

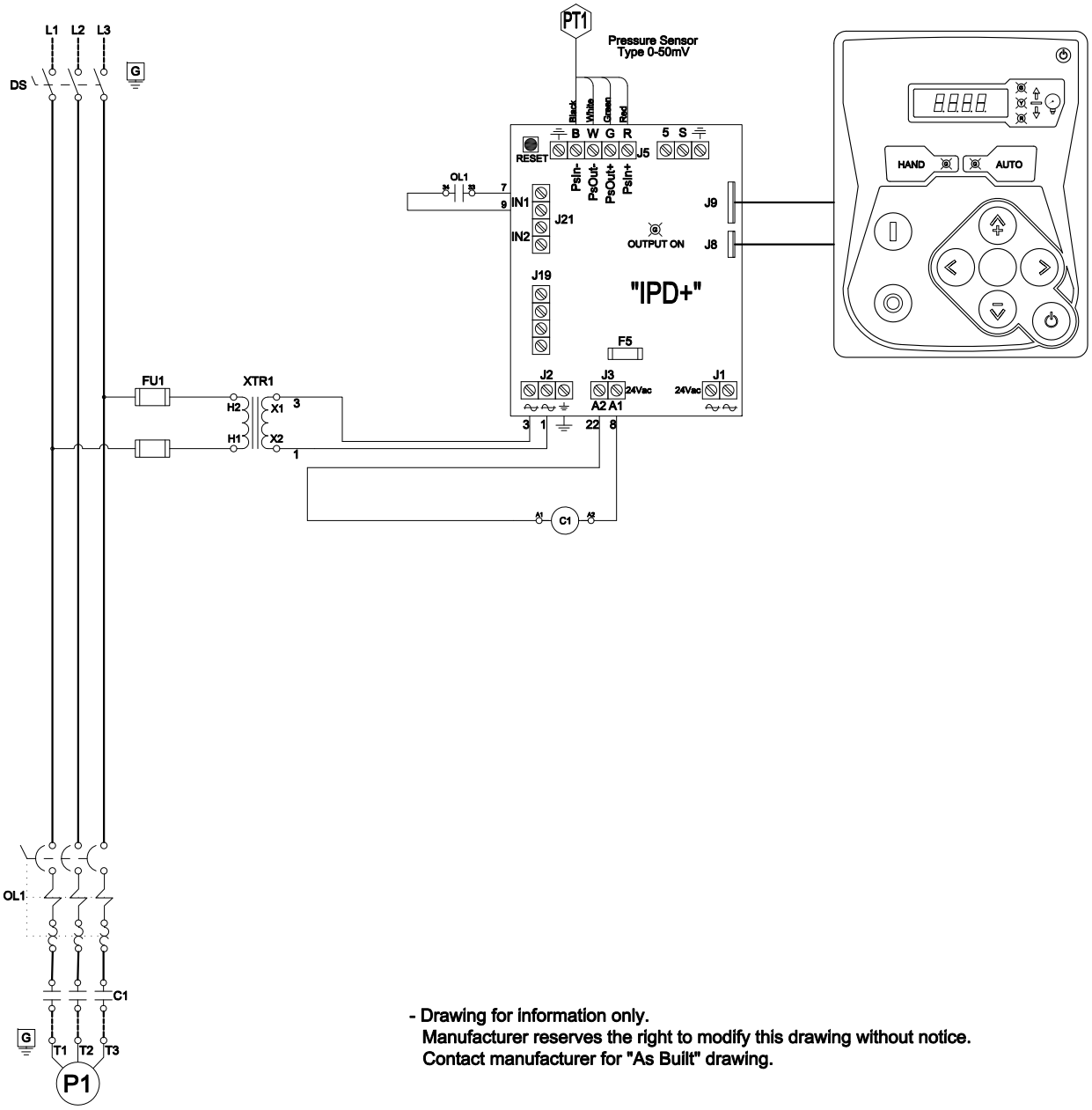
Built to the latest edition of the UL 508A & CSA C22.2 No.14 standard

PER QUOTE DRAWING No.

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

Drawing No.

JP3-WS500/E



- 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

Line and Motor Terminal Size

Model:JP3

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

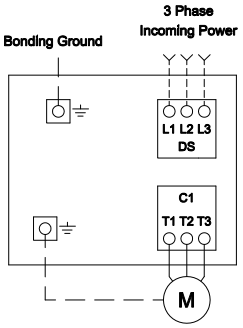
PER QUOTE DRAWING No.

SEISMIC CERTIFIED COMPLIANT | NYC Dpt of Building Approved

REV.	DESCRIPTION	DD/MM/YY
5	Modified Tornatech & 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

MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

ACCESSORIES

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

Flow Meter

0	*SUBMITTED FOR APPROVAL*	*MS*	*KY*		
Rev	***Description***	***Prepared***	***Checked***	***Approved***	***Date***

GERAND ENGINEERING

"MODEL G" FIRE PUMP TEST METERS

Accurate Pump Performance and Quality Service for 50 Years

NEW

BEST VALUE IN THE INDUSTRY

5 YEAR WARRANTY

MANUFACTURED IN THE USA

HIGH GRADE MATERIALS:

CARBON STEEL, STAINLESS STEEL, EPOXY AND MONEL

FM APPROVED

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

FM APPROVED

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	4¼" 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			
500	5"	715	250-1000	5"	12"	13¾"
500	6"	743	250-1000	6"	13"	14¼"
750	6"	743	375-1500			
1000	6"	743	500-2000			
1250	6"	743	625-2500			
1500	8"	750	750-3000	7"	15'	16¼"
2000	8"	750	1000-4000			
2500	8"	750	1250-5000			

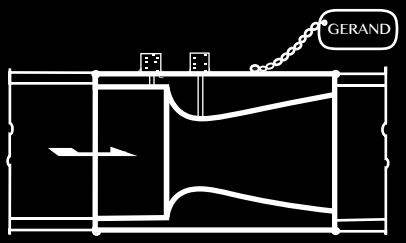
WWW.GERAND.COM FOR MORE INFORMATION

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

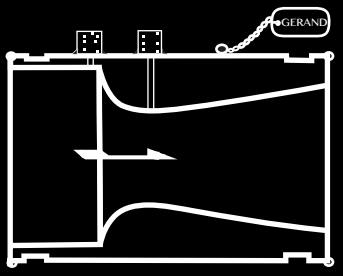
2300 EDGEWOOD AVE, MINNEAPOLIS, MN 55426 952.374.1320 WWW.GERAND.COM

VENTURI STYLES

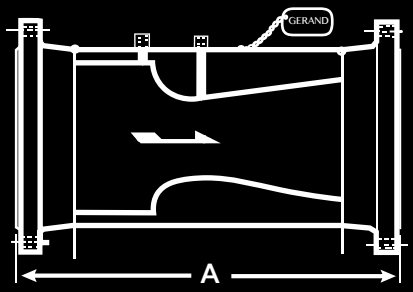
BUTTWELD



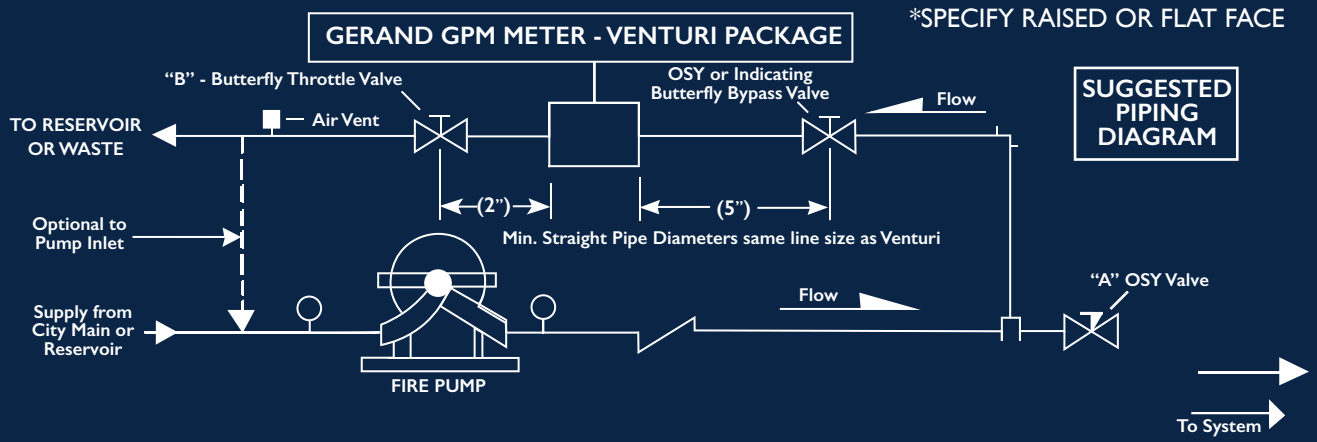
GROOVED



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.

MANUFACTURED IN U.S.A.

CERTIFIED ISO 9001:2008 COMPANY

FM APPROVED

MENA MECHANICAL INDUSTRIES CO.	Vendor Ref. No.
	Vendor Doc. No.
	Contractor Ref. No
Project Name:	Contractor Job No.

Pressure Gauge

Rev	Description	Prepared	Checked	Approved	Date
0	SUBMITTED FOR APPROVAL	MS	KY		

Bourdon Tube Pressure Gauges
Standard Series
Type 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

Bourdon Tube Pressure Gauge Type 111.10SP

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
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

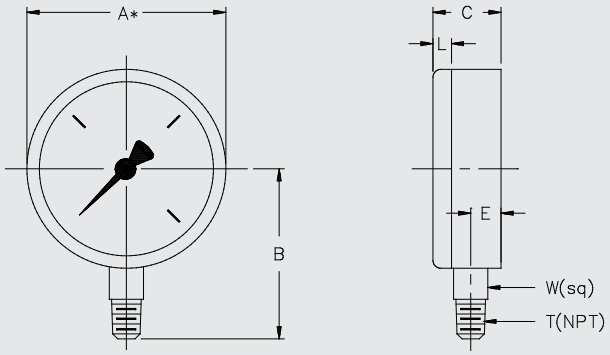
Approvals
UL listed (UL-393)
Factory Mutual

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.

WIKA 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

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. ±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

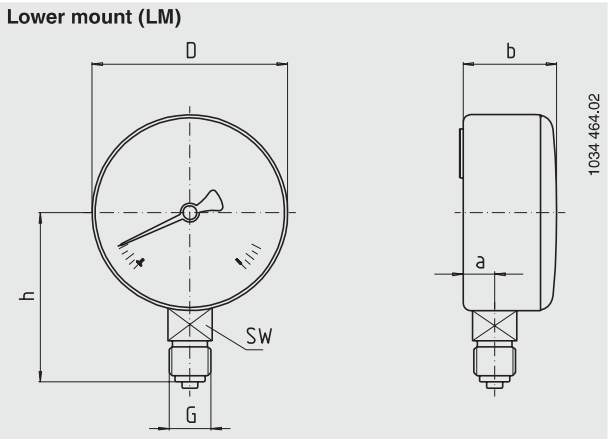
Dial
Plastic, white, with pointer stop pin
Black lettering

Pointer
Plastic, black

Dimensions in mm

Standard version

Lower mount (LM)



NS	Dimensions in mm						Weight in kg
	a	b	D	G	h ±1	SW	
40	9.5	26	39	G ⅛ B	36	14	0.09
50	9.5	28	49	G ¼ B	45	14	0.11
63	9.5	28	62	G ¼ B	53.5	14	0.15

Process connection per EN 837-1 / 7.3

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

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

WIKA Alexander Wiegand SE & Co. KG
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63911 Klingenberg/Germany
Tel. +49 9372 132-0
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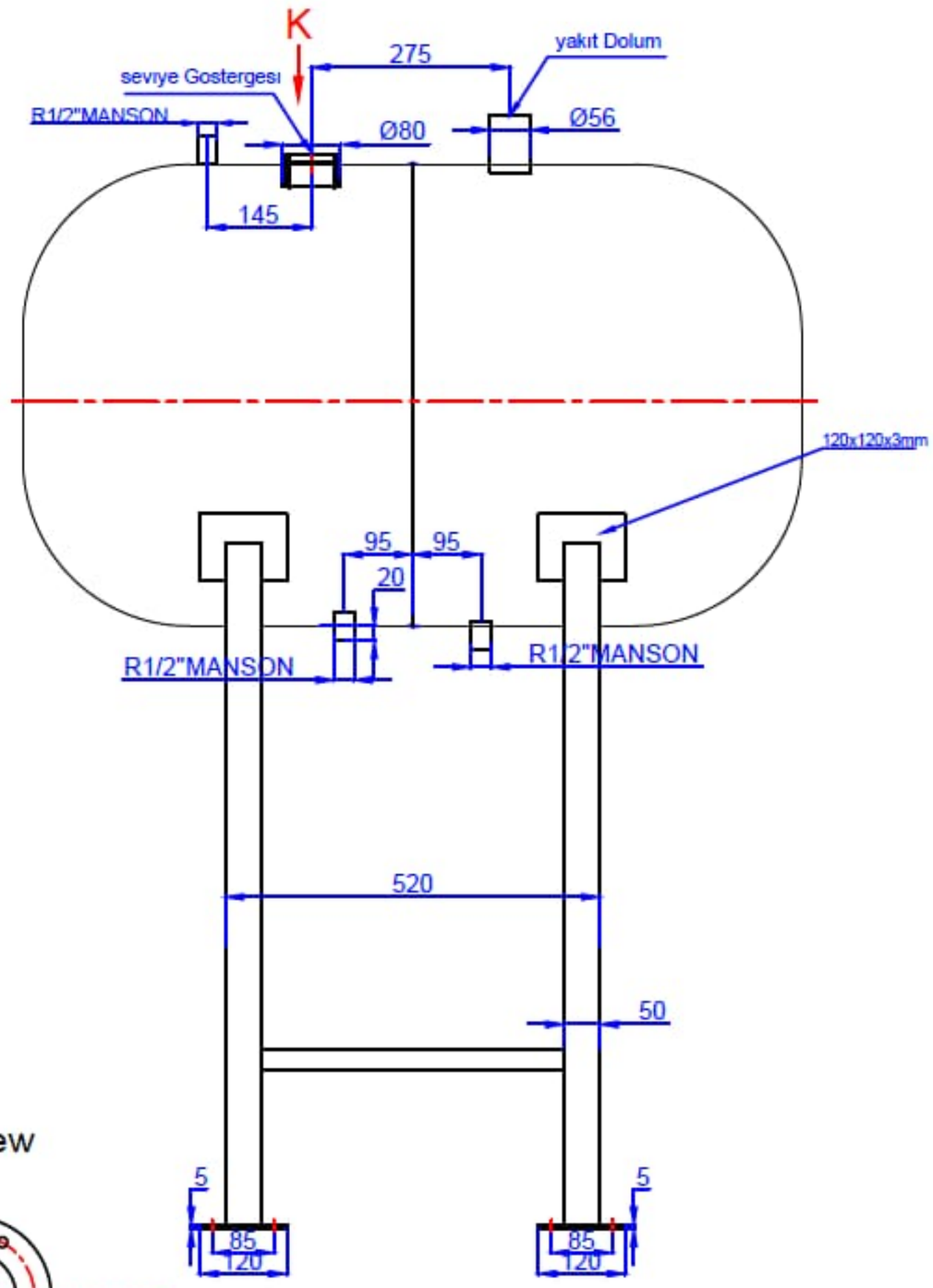
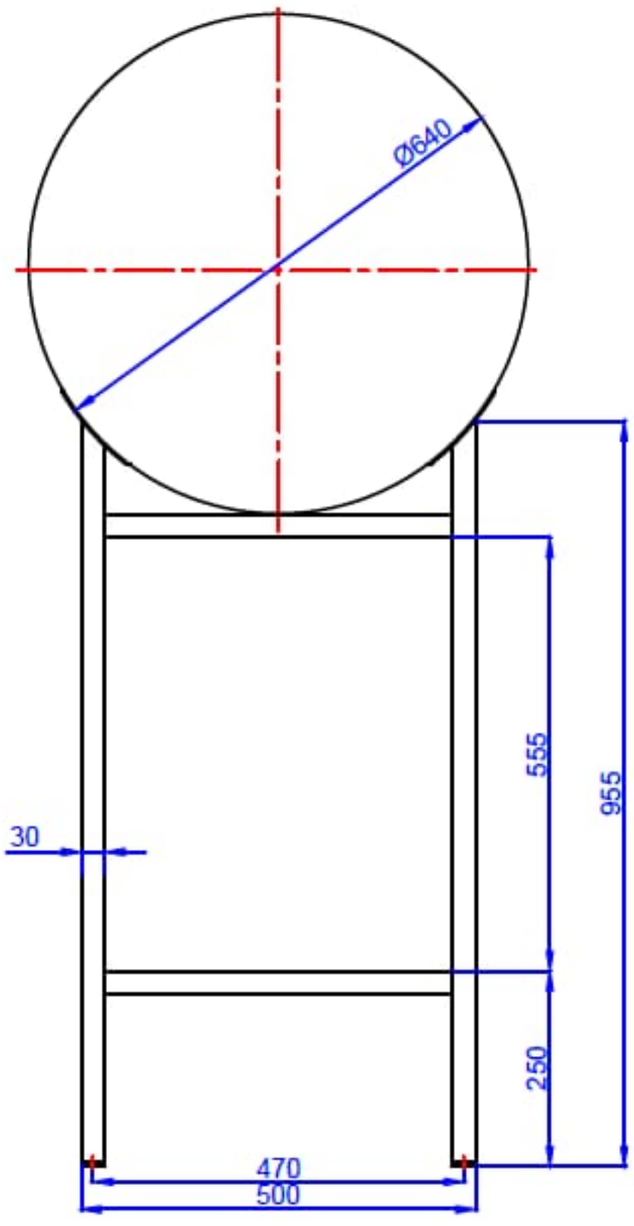
08/2014 GB





K View

The level indicator
flange will look like this.

300 LT DIESEL TANK