BRISTOL

TECHNICAL SUBMITTAL

FIRE PUMP SET
HORIZONTAL END SUCTION
(500 GPM @ 10 BAR)
BRISTOL UL PUMP

CONTRACTOR

EXTENSIVE - BD

Fire Fighting Solutions Provider

ص.ب: ٧٤٥٨٢ ، دبي الامارات العربية المتحدة تيلفون : ٣٤٧٧٠٧٣ / ٣٤٧٢٤٢٦ ٤ ٩٧١+ فاكس : ٣٤٧٢٣٦٣ ٤ ٩٧١+

TECHNICAL SUBMITTAL
FIRE PUMP

0	Issued for Approval	MANICKAM	Nasser Mansour	Nasser Mansour	30-01-23
Rev	Description	Prepared by	Checked	Approved	Date

EQUIPMENT DESCRIPTION

BRISTOL	Vendor Ref. No **BFP22-E-V0211 R1**	Doc. Seq. No **02**	Revision No **0**
	Vendor Doc. No **BFV-ED**		Date: 30-01-2023
Contractor Name: **EXTENSIVE - BD**			
Project Name: **FIRE FIGHTING PUMP SET - 500 GPM @ 10 BAR**			

ITEM	DESCRIPTION	QTY
A	**DIESEL FIRE PUMP** **Q = 500 GPM H = 10 BAR** BRISTOL UL pump model IS100/320H horizontal end suction, complete with: 1. Diesel engine CLARKE model JU4H-UF34, 115 HP, at 3000RPM, dual lead acid batteries, Muffler 2. Automatic diesel pump controller arranged for **12V,** NEMA 2 3. Accessories: • Suction and discharge gauge **MAIN ACCESSORIES** a) Fuel system with 120gal tank and direct reading fuel gauge b) Flow meter GERAND venture type model 500-6" Grooved ends. c) **Pressure Relief valve 3"** d) **Waste cone**	1 1 1 2 1 1 1 1
B	**ELECTRIC FIRE PUMP** **Q = 500 GPM H = 10 BAR** BRISTOL UL pump model IS100/320H horizontal end suction, complete with: 1. Electric motor **100 HP** at 2P, ODP enclosure 50°C ambient, Class F insulation, 1.15 service factor 2. Automatic electric pump controller, suitable for 100HP, GPY, NEMA 2. 3. Accessories: • Suction and discharge gauge • Casing relief valve	1 2 1
C	**JOCKEY PUMP** **Q = 15 GPM H = 10.7 BAR** BRISTOL / RV or Zirantec pump model complete with: 1. Electric motor at 2P, 3/50/415V, TEFC enclosure. 2. Automatic jockey pump controller, NEMA 2	 1

SUB-VENDORS LIST

BRISTOL	Vendor Ref. No	Doc. Seq. No	Revision No
	BFP22-E-V0211 R1	02	0
	Vendor Doc. No		Date: 30-01-2023
	BFV-ED		

Contractor Name:

EXTENSIVE - BD

Project Name:

FIRE FIGHTING PUMP SET - 500 GPM @ 10 BAR

SUB-VENDORS LIST

1	*Diesel engine*	: CLARKE
2	*Diesel controller*	: TORNATECH
3	*Electric Motor*	: US-NIDEC/WEG/MARATHON
4	*Electric Controller*	: TORNATECH
5	*Jockey Pump*	: RV/ZIRANTECH
6	*Jockey Controller*	: TORNATECH
7	*Casing Relief Valve*	: SS
8	*Pressure Relief Valve*	: CLA VAL
9	*Gauges*	: WIKA
10	*Flow Meter*	: GERAND

DIESEL FIRE PUMP
DATA SHEET AND CURVE

ص.ب: ٧٤٥٨٢ . دبي الامارات العربية المتحدة تيلفون : ٣٤٧٧٠٧٣ / ٣٤٧٢٤٢٦ ٤ ٩٧١+ فاكس : ٣٤٧٢٣٦٣ ٤ ٩٧١+
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BRISTOL

FIRE PUMPS

HORIZONTAL SPLIT CASE, END SUCTION, VERTICAL TURBINE,

CONTAINERIZED PUMP, PACKEGED FIRE PUMP, FUEL TANK & ANTI-VORTEX PLATE

Issue 6.0 Version1

END SUCTION TYPE

FM APPROVED

UL LISTED

Description

Are designed according to NFPA 20 for firefighting applications. This pump is designed with latest technology and has premium components for easy maintenance and absolute efficiency .

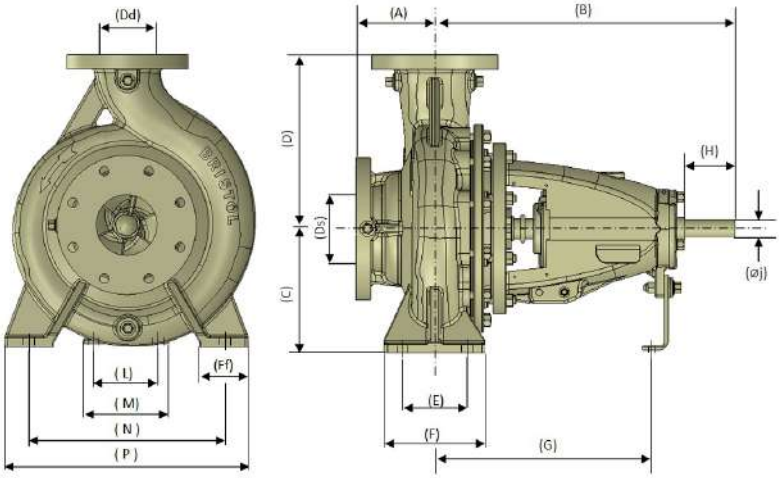
Features

- Available in electric motor driven or engine driven configuration
- UL File No. : EX16459
- Dynamically balanced impellers

Performance Range

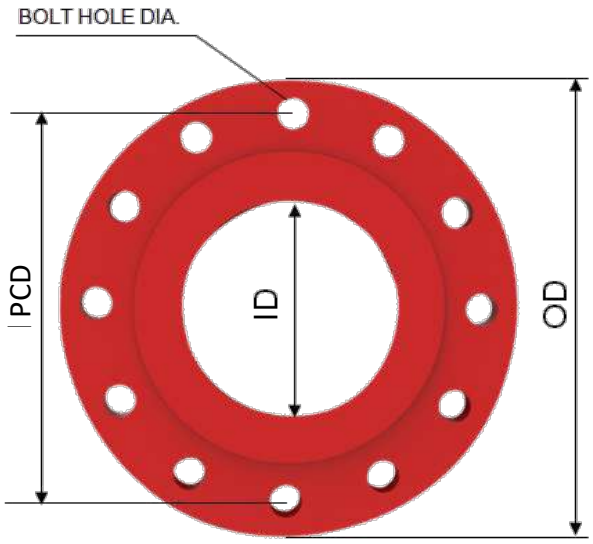
- Capacity : From 50 GPM up to 1000 GPM
- Head : From 50 MTR up to 209 MTR

Pump Dimensions



MODEL	A	B	C	D	E	F	Ff	G	H	L	M	N	P	Ø j	keyway
IS32 - 200	80	360	160	183.5	70	100	50	267	49	110	140	190	240	22.2	4.7X4.7X32 Form A
IS32 - 260	100	360	180	228	95	125	65	267	49	110	140	250	320	22.2	4.7X4.7X32 Form A
IS50 - 320H	125	470	225	285.6	95	125	65	342	79.4	110	140	280	345	28.5	6.35X6.35X44.5 Form A
IS65 - 320H	125	470	225	280	120	160	80	342	79.4	110	140	315	400	28.5	6.35X6.35X44.5 Form A
IS80 - 260	125	470	200	280	120	160	80	342	79.4	110	140	315	400	28.5	6.35X6.35X44.5 Form A
IS80 - 320H	125	470	250	317.4	120	160	80	342	79.4	110	140	315	400	28.5	6.35X6.35X44.5 Form A
IS100 - 260	140	470	225	280	120	160	80	342	79.4	110	140	315	400	28.5	6.35X6.35X44.5 Form A
IS100 - 320H	142	470	250	316	120	160	80	342	79.4	110	140	315	400	28.5	6.35X6.35X44.5 Form A
BEP 3X2.5LP	105	465	180	225	95	125	65	337	80	110	140	250	320	32	6X6X35 Form A
BEP 4X3LP	125	470	180	250	95	125	65	342	80	110	140	280	345	32	8X8X56 Form A
BEP 5X4 HH	140	529	250	315	120	160	80	369	97	110	160	315	400	42	12X8X80 Form C

End Suction Pump
Flange Details

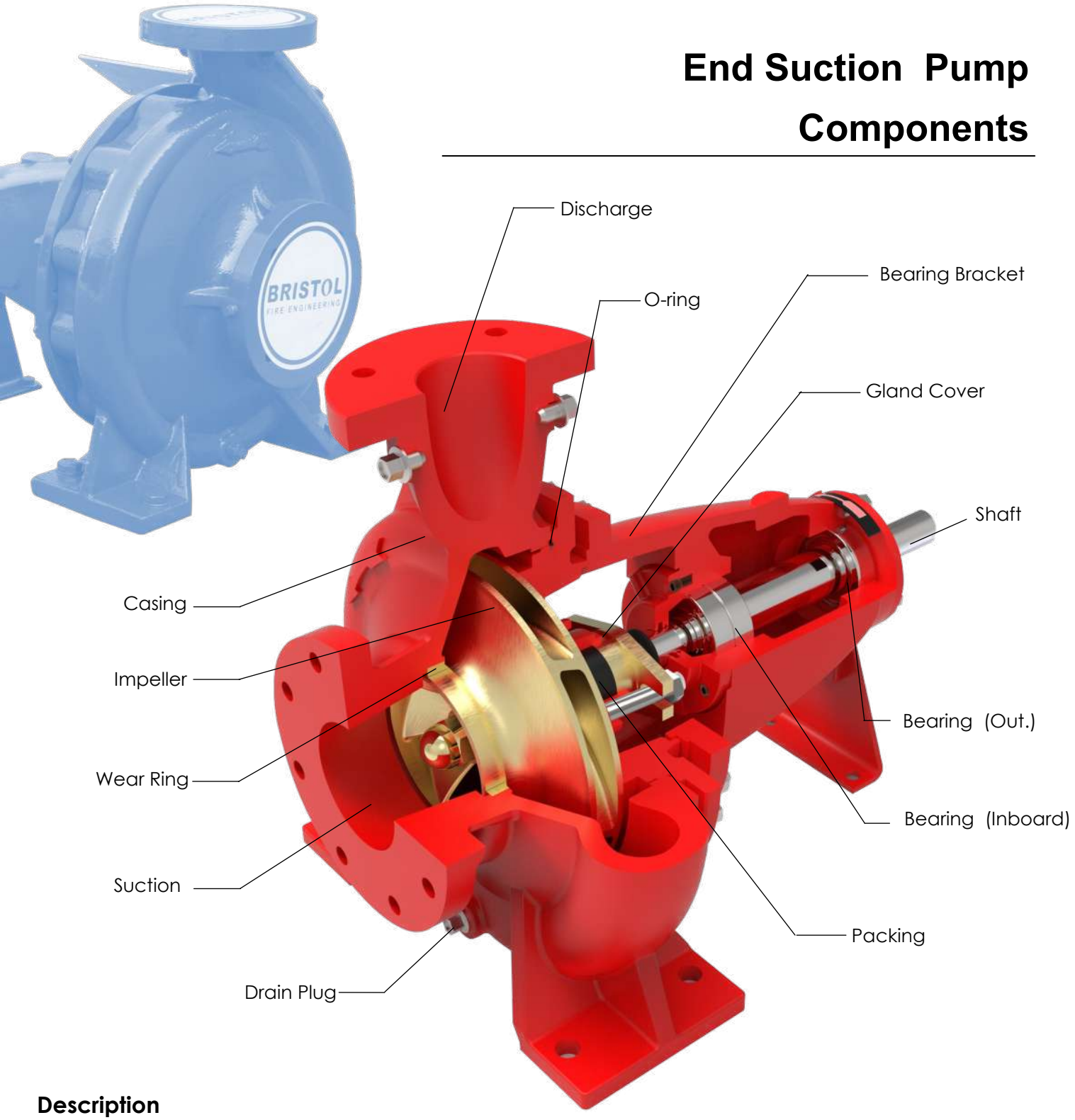


Model	Suction Flange					Discharge Flange				
	ID	OD	No. of Holes	Bolt Hole DIA	PCD	ID	OD	No. of Holes	Bolt Hole DIA	PCD
IS32-200	50	165	4	5/8"-11UNC-2B	120.7	32	140	4	1/2"-13UNC-2B	88.9
IS32-260	50	165	4	5/8"-11UNC-2B	120.7	32	140	4	1/2"-13UNC-2B	88.9
IS50-320H	65	185	4	5/8"-11UNC-2B	139.7	50	165	4	5/8"-11UNC-2B	120.7
IS65-320H	80	200	4	5/8"-11UNC-2B	152.4	65	185	4	5/8"-11UNC-2B	139.7
IS80-260	100	229	8	5/8"-11UNC-2B	190.5	80	200	4	5/8"-11UNC-2B	152.4
IS80-320H	100	229	8	5/8"-11UNC-2B	190.5	80	200	4	5/8"-11UNC-2B	152.4
IS100-260	125	254	8	3/4"-10UNC-2B	215.9	100	229	8	5/8"-11UNC-2B	190.5
IS100-320H	125	254	8	3/4"-10UNC-2B	215.9	100	229	8	5/8"-11UNC-2B	190.5
BEP 3X2.5LP	80	200	8	18	158.75	65	190.5	4	18	150
BEP 4X3LP	100	220	8	18	181	80	200	8	18	158.75
BEP 5X4 HH	125	255	8	22	216	100	230	8	19	190.5

* *Standard for Cast Iron Flanged Fittings : ANSI / ASME B16.1*

* *Standard for Ductile Iron Flanged Fittings : ANSI/ASME B16.42*

End Suction Pump Components



Description

Casing - Ductile Iron 65-45-12 - Heavy-duty power frame

Impeller - Bronze / Stainless Steel

Wear Ring - Bronze is standard for the certified ANSI pumps radially split casing with flange connection

Suction - Horizontal End Suction ANSI 150# or 300# flange drilling is available based on material selection

Discharge - Vertical Centreline Discharge

Bearing Bracket - Ductile Iron 65-45-12 - Heavy-duty power frame

Gland Cover - Bronze - to house a gland seal

Shaft - Stainless Steel - Sleeve shaft as standard for extended seal life

Bearing (Out.) - Deep Grooved Ball Bearing

Bearing (Inb.) - Deep Grooved Ball Bearing

End Suction Pump Selection Chart

FM APPROVED

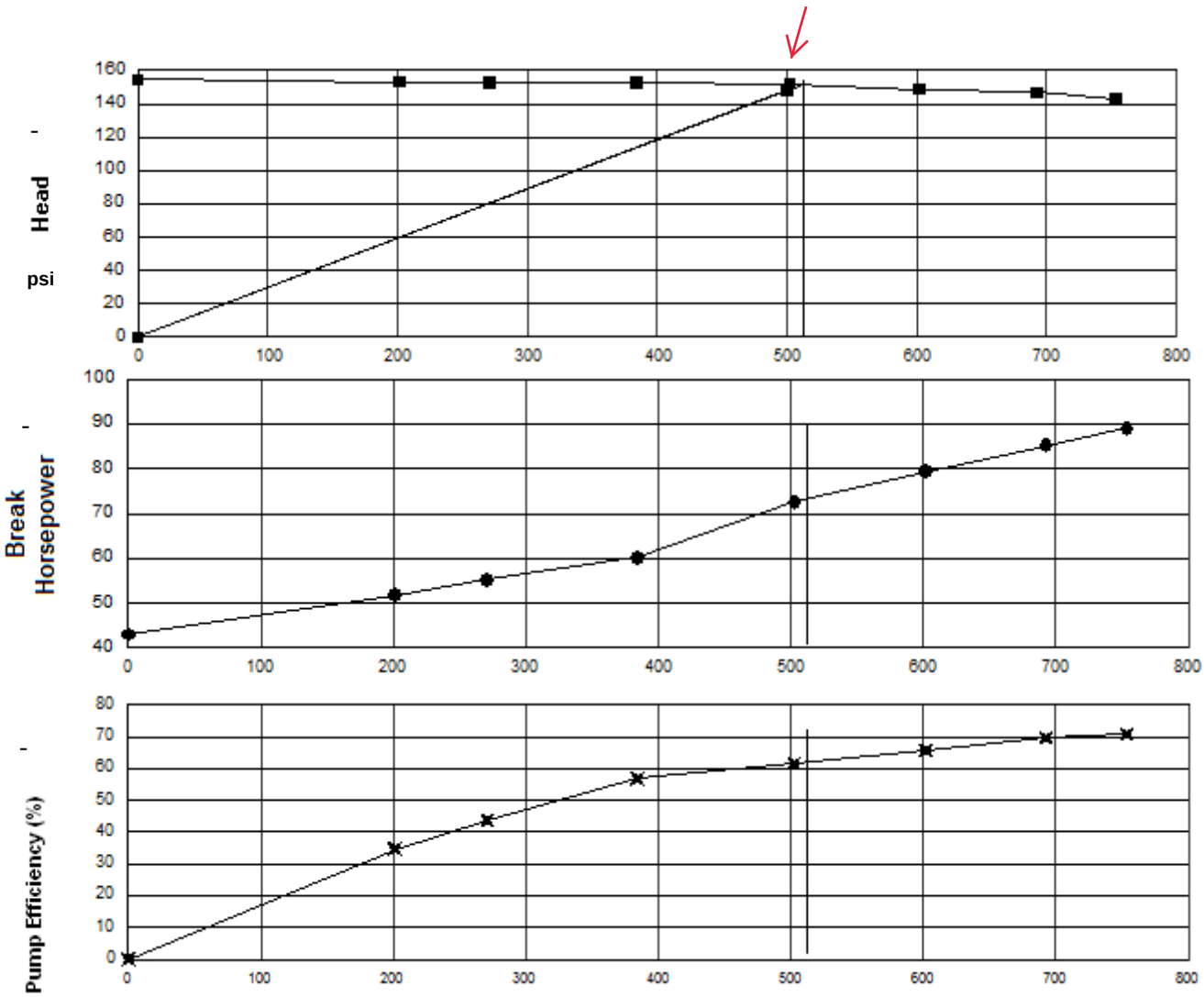
UL LISTED

Model	Rated Capacity (GPM)	Size (In)	UL Listed Pressure (PSI)	FM Approved Pressure (PSI)	Rated Speed (RPM)
IS32 – 200	50	2 x 1 ¼	62-95		2950
IS32 – 200	50	2 x 1 ¼	55-85		2800
IS32 – 260	50	2 x 1 ¼	113 - 130		2950
IS50 – 320H	50	2½ x 2	103-167		2600
IS50 – 320H	50	2½ x 2	88-142		2400
IS32 – 260	100	2 x 1 ¼	103 - 125		2950
IS50 – 320H	100	2½ x 2	178-298		3500
IS50 – 320H	100	2½ x 2	132-210		2950
IS50 – 320H	100	2½ x 2	119-189		2800
IS50 – 320H	100	2½ x 2	102-166		2600
IS50 – 320H	100	2½ x 2	87-141		2400
BEP 3X2.5 LP	100	3 x 2½	60-92		2950
BEP 3X2.5 LP	100	3 x 2½	62-95		3000
BEP 3X2.5 LP	100	3 x 2½	87-134		3550
IS50 – 320H	150	2½ x 2	177-296		3500
IS50 – 320H	150	2½ x 2	132-209		2950
IS50 – 320H	150	2½ x 2	118-188		2800
IS50 – 320H	150	2½ x 2	99-165		2600
IS50 – 320H	150	2½ x 2	84-140		2400
BEP 3X2.5 LP	150	3 x 2½	59-91		2950
BEP 3X2.5 LP	150	3 x 2½	61-94		3000
BEP 3X2.5 LP	150	3 x 2½	86-132		3550
BEP 3X2.5 LP	200	3 x 2½	58-90		2950
BEP 3X2.5 LP	200	3 x 2½	60-93		3000
BEP 3X2.5 LP	200	3 x 2½	85-130		3550
IS50 – 320H	200	2½ x 2	173-296		3500
IS50 – 320H	200	2½ x 2	127-209		2950
IS50 – 320H	200	2½ x 2	113-188		2800
IS65 – 320H	200	3 x 2½	159-290		3500
IS65 – 320H	200	3 x 2½	108-201		2950
IS65 – 320H	200	3 x 2½	97-181		2800
IS65 – 320H	200	3 x 2½	104-158		2600
IS65 – 320H	200	3 x 2½	88-133		2400
IS80 – 260	200	4 x 3		111-151	2950
IS80 – 260	200	4 x 3		115-157	3000
IS65 – 320H	250	3 x 2½	157-290		3500
IS65 – 320H	250	3 x 2½	107-201		2950
IS65 – 320H	250	3 x 2½	97-181		2800
IS65 – 320H	250	3 x 2½	102-155		2600
IS65 – 320H	250	3 x 2½	85-131		2400
BEP 3X2.5 LP	250	3 x 2½	55-88		2950
BEP 3X2.5 LP	250	3 x 2½	57-91		3000
BEP 3X2.5 LP	250	3 x 2½	83-129		3550
BEP 3X2.5 LP	300	3 x 2½	52-85		2950
BEP 3X2.5 LP	300	3 x 2½	80-126		3550
IS65 – 320H	300	3 x 2½	155-289		3500
IS65 – 320H	300	3 x 2½	107-201		2950
IS65 – 320H	300	3 x 2½	97-181		2800
IS65 – 320H	300	3 x 2½	98-152		2600
IS65 – 320H	300	3 x 2½	82-128		2400
IS80 – 260	300	4 x 3		111-150	2950
IS80 – 260	300	4 x 3	167-222	153-206	3550
IS80 – 260	300	4 x 3		115-156	3000
IS80 – 320H	300	4 x 3	159-203		2950
IS80 – 320H	300	4 x 3	143-183		2800

Model	Rated Capacity (GPM)	Size (In)	UL Listed Pressure (PSI)	FM Approved Pressure (PSI)	Rated Speed (RPM)
BEP 3x2.5 LP	300	3 x 2½	54-88		3000
BEP 4x3 LP	300	4 x 3	55-89		2950
BEP 4x3 LP	300	4 x 3	57-92		3000
BEP 4x3 LP	300	4 x 3	82-130		3550
IS80 – 260	400	4 x 3	165-222	152-206	3550
IS80 – 260	400	4 x 3	105-139	110-149	2950
IS80 – 320H	400	4 x 3	158-203		2950
IS80 – 320H	400	4 x 3	142-183		2800
IS100 – 320H	400	5 x 4	123-158	122-236	2950
IS100 – 320H	400	5 x 4	110-142		2800
IS100 – 320H	400	5 x 4	98-172	118-168	2600
IS100 – 320H	400	5 x 4	83-147		2400
BEP 4X3 LP	400	4 x 3	54-87		2950
BEP 4X3 LP	400	4 x 3	56-90		3000
BEP 4X3 LP	400	4 x 3	79-127		3550
IS80 – 260	400	4 x 3	109-144	114-154	3000
IS100 – 320H	400	5 x 4	133-163	126-244	3000
BEP 4X3 LP	450	4 x 3	53-85		2950
BEP 4X3 LP	450	4 x 3	55-88		3000
BEP 4X3 LP	450	4 x 3	78-126		3550
IS80 – 320H	450	4 x 3	157-203		2950
IS80 – 320H	450	4 x 3	140-182		2800
IS100 – 320H	450	5 x 4	122-158		2950
IS100 – 320H	450	5 x 4	110-142		2800
IS100 – 320H	450	5 x 4	98-172		2600
IS100 – 320H	450	5 x 4	83-147		2400
IS100 – 320H	450	5 x 4	133-164		3000
IS80 – 260	500	4 x 3	101-137	108-146	2950
IS80 – 260	500	4 x 3	163-220	150-204	3550
IS80 – 320H	500	4 x 3	155-202		2950
IS80 – 320H	500	4 x 3	136-182		2800
IS100 – 260	500	5 x 4	144-212	134-197	3550
IS100 – 320H	500	5 x 4	122-226	121-235	2950
IS100 – 320H	500	5 x 4	110-142		2800
IS100 – 320H	500	5 x 4	97-172	116-168	2600
IS100 – 320H	500	5 x 4	82-147		2400
BEP 4X3 LP	500	4 x 3	51-84		2950
BEP 4X3 LP	500	4 x 3	53-87		3000
BEP 4X3 LP	500	4 x 3	78-125		3550
IS80 – 260	500	4 x 3	106-142	112-152	3000
IS100 – 320H	500	5 x 4	124-234	125-244	3000
BEP 5X4 HH	500	5 x 4	155-244		2950
IS100 – 320H	750	5 x 4	119-224	119-233	2950
IS100 – 320H	750	5 x 4	104-131		2800
IS100 – 320H	750	5 x 4	89-166	111-166	2600
IS100 – 260	750	5 x 4	113-139	111-143	2950
IS100 – 260	750	5 x 4	140-212	134-195	3550
IS100 – 320H	750	5 x 4	119-232	123-241	3000
IS100 – 260	750	5 x 4	118-144	115-149	3000
BEP 5X4 HH	750	5 x 4	149-239		2950
IS100 – 260	1000	5 x 4	104-131	109-141	2950
IS100 – 260	1000	5 x 4	132 - 208	130-194	3550
IS100 – 260	1000	5 x 4	109-137	113-146	3000
BEP 5X4 HH	1000	5 x 4	140-231		2950

BRISTOL

Model/Stage	IS 100-320H	Design Pressure/Head	145.00	psi
		Design Flow	500.00	GPM
		Rated Speed	2,950	rpm



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DIESEL FIRE PUMP
ENGINE DATA

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CLARKE®

FIRE PUMP ENGINES

MODELS

JU4H-UF04 JU4H-UF14 JU4H-UF24 JU4H-UFH2 JU4H-UF50
JU4H-UF10 JU4H-UF20 JU4H-UF34 JU4H-UF40 JU4H-UF52
JU4H-UF12 JU4H-UF22 JU4H-UFH0 JU4H-UF42 JU4H-UF54

UK Purchased

FM-UL-cUL APPROVED RATINGS KW/*BHP*

JU4H MODEL	RATED SPEED											
	1470		1760		2100		2350		2600		2800		3000	
UF04							37	*50*	*41*	*55*	45	*60*	45	*60*
UF10			31	*41*	38	*51*	41	*55*						
UF12							41	*55*	44	*59*				
UF14							41	*55*	44	*59*	52	*70*	53	*71*
UF20			45	*60*	50	*67*	54	*72*						
UF22							54	*72*	56	*75*				
UF24							54	*72*	56	*75*	60	*80*	62	*83*
UF34							63	*85*	63	*85*	78	*104*	86	*115*
UFH0			54	*73*	66	*88*	73	*98*						
UFH2							73	*98*	74	*99*				
UF40			70	*94*	78	*105*	79	*106*						
UF42							79	*106*	79	*106*				
UF50	59	*79*	82	*110*	97	*130*	95	*127*						
UF52							95	*127*	95	*127*				
UF54							91	*122*	104	*139*	108	*145*	108	*145*

Picture shown represents a JU4H-NA engine model

SPECIFICATIONS

ITEM	JU4H MODELS					
	UF04/10/12/14	UF20/22/24	UF34	UFH0/H2	UF40/42	UF50/52/54
Number of Cylinders	4					
Aspiration	NA		T			
Rotation*	CW					
Overall Dimensions – mm (in.)	989 (39) H x 1226 (48) L x 916 (36.1) W		1166 (45.9) H x 1357 (53.4) L x 934 (36.8) W			
Crankshaft Centerline Height – mm (in.)	356 (14)					
Weight – kg (lb)	413 (910)		424 (935)			
Compression Ratio	17.6:1		17.0:1			
Displacement – l (cu. in.)	4.5 (275)					
Engine Type	4 Stroke Cycle – Inline Construction					
Bore & Stroke – mm (in.)	106 x 127 (4.19 x 5.00)					
Installation Drawing	D545					
Wiring Diagram AC	C07651					
Wiring Diagram DC	C072145					
Engine Series	John Deere 4045 Series					

Abbreviations: CW – Clockwise NA – Naturally Aspirated T – Turbocharged L - Length W – Width H - Height
*Rotation viewed from Heat Exchanger / Front of engine

CERTIFIED POWER RATING

- Each engine is factory tested to verify power and performance.
- Although FM-UL ratings are shown at specific speeds, Clarke engines can be applied at any intermediate speed. To determine the intermediate speed power; make a linear interpolation from the Clarke FM-UL power curve. Contact Clarke or your Pump OEM Representative to obtain details.

ENGINE RATINGS BASELINES

- Engines are to be used for stationary emergency standby fire pump service only. Engines are to be tested in accordance with NFPA 25.
- Engines are rated at standard SAE conditions of 29.61 in. (752.1 mm) Hg barometer and 77°F (25°C) inlet air temperature [approximates 300 ft. (91.4 m) above sea level] by the testing laboratory (see SAE Standard J 1349).
- A deduction of 3 percent from engine horsepower rating at standard SAE conditions shall be made for diesel engines for each 1000 ft. (305 m) altitude above 300 ft. (91.4 m)
- A deduction of 1 percent from engine horsepower rating as corrected to standard SAE conditions shall be made for diesel engines for every 10°F (5.6°C) above 77°F (25°C) ambient temperature.

c UL us

Meets NFPA 20 Requirements

FM C US APPROVED

CLARKE®

FIRE PUMP ENGINES

MODELS

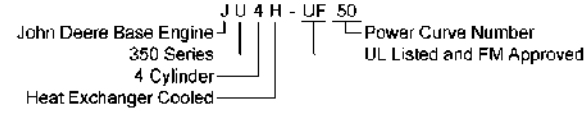
JU4H-UF10 JU4H-UF20 JU4H-UF34 JU4H-UF40
JU4H-UF12 JU4H-UF22 JU4H-UFH0 JU4H-UF42 JU4H-UF52
JU4H-UF14 JU4H-UF24 JU4H-UFH2 JU4H-UF50 JU4H-UF54

ENGINE EQUIPMENT

EQUIPMENT	STANDARD	OPTIONAL
Air Cleaner	Direct Mounted, Washable, Indoor Service with Drip Shield	Disposable, Drip Proof, Indoor Service Outdoor Type, Single or Two Stage (Cyclonic)
Alarms	Overspeed Alarm & Shutdown, Low Oil Pressure, Low & High Coolant Temperature, Low Raw Water Flow, High Raw Water Temperature	Low Coolant Level, Low Oil Level, Oil Filter Differential Pressure, Fuel Filter Differential Pressure, Air Filter Restriction
Alternator	12V-DC, 42 Amps; with Poly-Vee Belt and Guard	24V-DC, 40 Amps; with Belt Guard
Coupling	Bare Flywheel	Listed Driveshaft and Guard, UF10/12/14, UF20/22/24 – CDS10-SC; UFH0/H2, UF40/42 – CDS20-SC; UF50/52/54 – CDS30-S1
Engine Heater	230V-AC, 1000 Watt	115V-AC, 1000 Watt
Exhaust Flex Connection	For NA Engines - SS, Clamped, 3” For T Engines – SS, Clamped, 4”	SS Flex, Clamped, 4” & 5”
Exhaust Protection	Blankets on Naturally Aspirated Models, Metal Guards on Manifolds and Turbocharger on Turbocharged Models	
Flywheel Housing	SAE #3	
Flywheel Power Take Off	11.5” SAE Industrial Flywheel Connection	
Fuel Connections	Fire Resistant, Flexible, USA Coast Guard Approved, Supply and Return Lines	
Fuel Filter	Primary Filter with Priming Pump	
Fuel Injection System	Stanadyne, Direct Injection	
Fuel Solenoid	12V-DC Energized to Stop (ETS)	12V-DC Energized to Run (ETR); 24V-DC Energized to Run (ETR); 24V-DC Energized to Stop (ETS)
Governor, Speed	Constant Speed, Mechanical	
Heat Exchanger	Tube and Shell Type, 4 BAR (60 PSI), BSP(F) Connections	Sea Water Compatible
Instrument Panel	English and Metric, Tachometer, Hourmeter, Water Temperature, Oil Pressure and Two (2) Voltmeters	
Junction Box	Integral with Instrument Panel; For DC Wiring Interconnection to Engine Controller	
Lube Oil Cooler	Engine Water Cooled, Plate Type	
Lube Oil Filter	Full Flow with By-Pass Valve	
Lube Oil Pump	Gear Driven, Gear Type	
Manual Start Control	On Instrument Panel with Control Position Warning Light	
Overspeed Control	Electronic with Reset and Test on Instrument Panel	
Raw Water Cooling Loop – w\Alarms	Galvanized	Seawater, All 316SS, High Pressure
Raw Water Cooling Loop – Solenoid Operation	Automatic from Fire Pump Controller and from Engine Instrument Panel (for Horizontal Fire Pump Applications)	Not Supplied (for Vertical Turbine Fire Pump Applications)
Run – Stop Control	On Instrument Panel with Control Position Warning Light	
Starters	Two (2) 12V-DC	Two (2) 24V-DC
Throttle Control	Adjustable Speed Control, Tamper Proof	
Water Pump	Centrifugal Type, Poly-Vee Belt Driven	

Abbreviations: DC –Direct Current, AC – Alternating Current, SAE – Society of Automotive Engineers, NA – Naturally Aspirated, T- Turbocharged, BSP(F) – British Standard Pipe Thread (Female), SS – Stainless Steel

MODEL NOMENCLATURE (8 Digit Models)



CLARKE®

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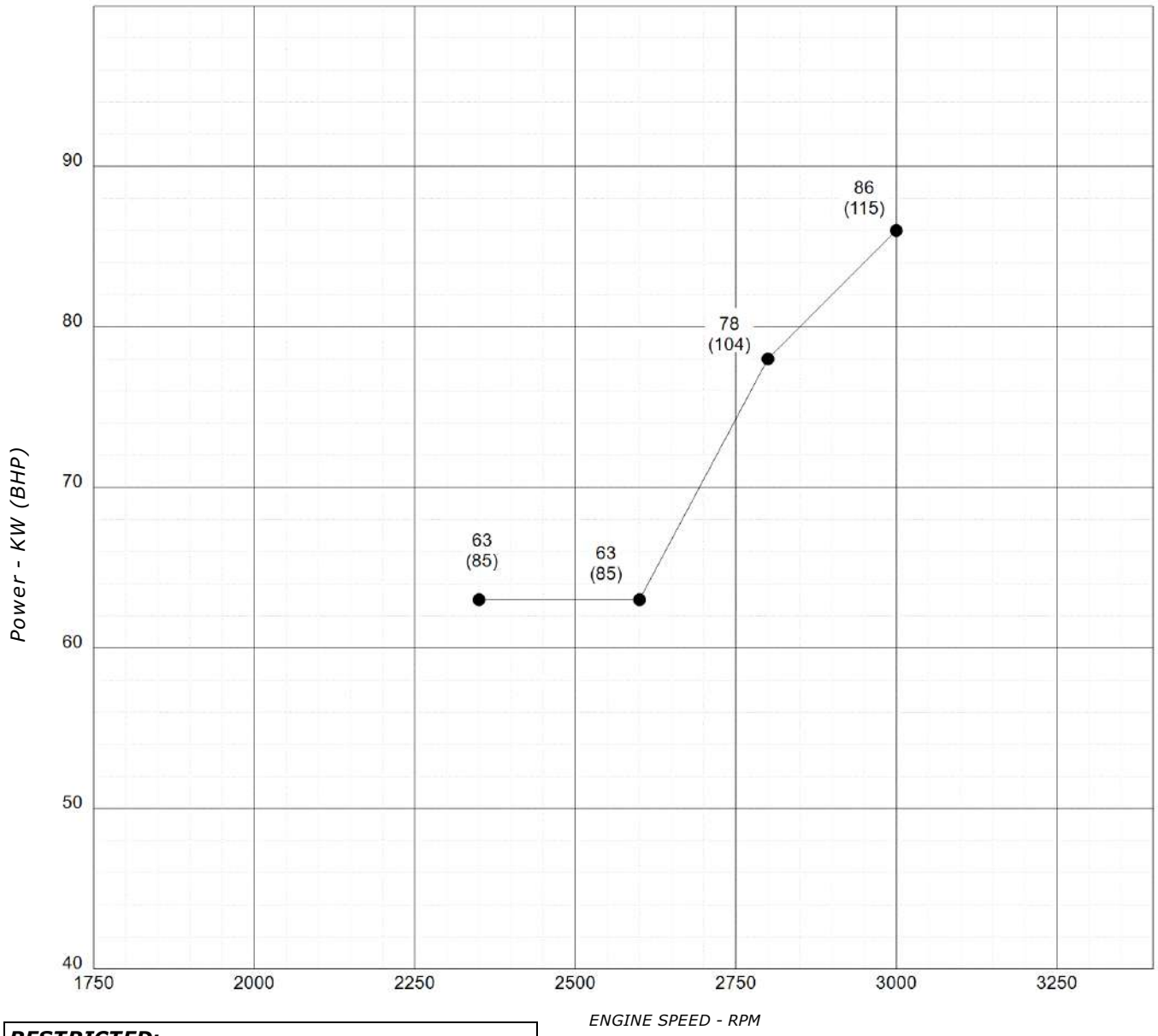
www.clarkefire.com

C133432 revM
11APR17

Specifications and information contained in this brochure subject to change without notice.

CLARKE®

FIRE PUMP MODEL: JU4H-UF34
Heat Exchanger Cooled
Turbocharged
4.5L 4 Cylinder



RESTRICTED:
Use only for Stand-By Fire Pump Applications

ENGINE PERFORMANCE:
STANDARD CONDITIONS: (SAE J1349, ISO 3046)
77°F (25°C) AIR INLET TEMPERATURE
29.61 IN. (751.1MM) HG BAROMETRIC PRESSURE
#2 DIESEL FUEL (SEE C13940)

Ken Wauligman

Ken Wauligman 27OCT06

NAMEPLATE kW (MAXIMUM PUMP LOAD)

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CREATED	DATE CREATED
KRW	05/19/04

ENGINE MODEL JU4H-UF34

DRAWING NO.	REV
C131945	A

CLARKE®

JU4H-UF34
INSTALLATION & OPERATION DATA (I&O)
UK Produced

Basic Engine Description

Engine Manufacturer	John Deere Co.
Ignition Type	Compression (Diesel)
Number of Cylinders	4
Bore and Stroke - mm (in)	106 (4.19) X 127 (5)
Displacement - L (in³)	4.5 (275)
Compression Ratio	17.0:1
Valves per cylinder	
Intake	1
Exhaust	1
Combustion System	Direct Injection
Engine Type	In-Line, 4 Stroke Cycle
Fuel Management Control	Mechanical, Rotary Pump
Firing Order (CW Rotation)	1-3-4-2
Aspiration	Turbocharged
Charge Air Cooling Type	None
Rotation, viewed from front of engine, Clockwise (CW)	Standard
Engine Crankcase Vent System	Closed
Installation Drawing	D545
Weight - kg (lb)	424 (935)

Power Rating	**2350**	**2600**	**2800**	**3000**
Nameplate Power - kW (HP) [1]	63 (85)	63 (85)	78 (104)	86 (115)

Cooling System - [C051001]	**2350**	**2600**	**2800**	**3000**
Engine Coolant Heat - kW (Btu/sec)	42.2 (40)	44.3 (42)	53.8 (51)	61.2 (58)
Engine Radiated Heat - kW (Btu/sec)	9.9 (9.4)	9.9 (9.4)	11.2 (10.6)	11.8 (11.2)
Heat Exchanger Minimum Flow				
15°C (60°F) Raw H_2O - L/min (gal/min)	26.5 (7)	26.5 (7)	34.1 (9)	34.1 (9)
37°C (100°F) Raw H_2O - L/min (gal/min)	37.9 (10)	37.9 (10)	45.4 (12)	53 (14)
Heat Exchanger Maximum Cooling Raw Water				
Inlet Pressure - bar (psi)	14 (203)			
Flow - L/min (gal/min)	98.4 (26)			
Typical Engine H_2O Operating Temp - °C (°F)	76.7 (170) - 87.8 (190)			
Thermostat				
Start to Open - °C (°F)	76.7 (170)			
Fully Opened - °C (°F)	87.8 (190)			
Engine Coolant Capacity - L (qt)	12.5 (13.2)			
Coolant Pressure Cap - kPa (lb/in²)	68.9 (10)			
Maximum Engine Coolant Temperature - °C (°F)	93.3 (200)			
Minimum Engine Coolant Temperature - °C (°F)	71.1 (160)			
High Coolant Temp Alarm Switch - °C (°F)	96.1 (205)			

Electric System - DC	**Standard**		**Optional**	
System Voltage (Nominal)	12		24	
Battery Capacity for Ambients Above 32°F (0°C)				
Voltage (Nominal)	12	{C07633}	12	{C07633}
Qty. Per Battery Bank	1		2	
SAE size per J537	8D		8D	
CCA @ 18°C (0°F) per J537	1400		1400	
Reserve Capacity - Minutes per J537	430		430	
Battery Cable Circuit, Max Resistance - ohm	0.0012		0.0012	
Battery Cable Minimum Size				
0-3.1m Circuit Length [2]	00		00	
3.1m-4.1m Circuit Length [2]	000		000	
4.1m-5.1m Circuit Length [2]	0000		0000	
Charging Alternator Maximum Output - Amp,	40	{C071363}	55	{C071366}
Starter Cranking Amps, Rolling - @15°C (60°F)	225	{C07888/C07889}	250	{C07819/C07820}

* All footnotes are at the bottom of Page 2

CLARKE®

JU4H-UF34
INSTALLATION & OPERATION DATA (I&O)
UK Produced

Exhaust System (Single Exhaust Outlet)	**2350**	**2600**	**2800**	**3000**
Exhaust Flow - m³/min (ft.³/min)	17 (602)	17.9 (631)	22.3 (788)	25.8 (910)
Exhaust Temperature - °C (°F)	519 (966)	483 (901)	511 (952)	509 (949)
Maximum Allowable Back Pressure - kPa (in H_2O)	7.5 (30)	7.5 (30)	7.5 (30)	7.5 (30)
Minimum Exhaust Pipe Dia. - mm (in) [3]	102 (4)	102 (4)	102 (4)	102 (4)

Fuel System	**2350**	**2600**	**2800**	**3000**
Fuel Consumption - L/hr (gal/hr)	17 (4.5)	29.5 (7.8)	34.4 (9.1)	32.6 (8.6)
Fuel Return - L/hr (gal/hr)	34.1 (9)	36 (9.5)	37.5 (9.9)	39 (10.3)
Fuel Supply - L/hr (gal/hr)	51.1 (13.5)	65.5 (17.3)	71.9 (19.0)	71.5 (18.9)
Fuel Pressure - kPa (lb/in²)	20.7 (3) - 41.4 (6)			
Minimum Line Size - Supply - in.	.50 Schedule 40 Steel Pipe			
Pipe Outer Diameter - mm (in)	21.5 (0.848)			
Minimum Line Size - Return - in.	.375 Schedule 40 Steel Pipe			
Pipe Outer Diameter - mm (in)	17.1 (0.675)			
Maximum Allowable Fuel Pump Suction Lift with clean Filter - mH_2O (in H_2O)	0.8 (31)			
Maximum Allowable Fuel Head above Fuel pump, Supply or Return - m (ft)	1.4 (4.5)			
Fuel Filter Micron Size	2			

Heater System	**Standard**	**Optional**
Engine Coolant Heater		
Wattage (Nominal)	1000	1000
Voltage - AC, 1 Phase	230 (+5%, -10%)	115 (+5%, -10%)
Part Number	{C122192}	{C122188}

Air System	**2350**	**2600**	**2800**	**3000**
Combustion Air Flow - m³/min (ft.³/min)	6.6 (231.6)	7.2 (255)	8.6 (305.2)	10 (352.9)
Air Cleaner	**Standard**		**Optional**	
Part Number	{C03249}		{C03327}	
Type	Indoor Service Only, with Shield		Canister, Single-Stage	
Cleaning method	Washable		Disposable	
Air Intake Restriction Maximum Limit				
Dirty Air Cleaner - kPa (in H_2O)	2.5 (10)		2.5 (10)	
Clean Air Cleaner - kPa (in H_2O)	1.2 (5)		1.2 (5)	
Maximum Allowable Temperature (Air To Engine Inlet) - °C (°F)	54.4 (130)			

Lubrication System	
Oil Pressure - normal - kPa (lb/in²)	345 (50) - 655 (95)
Low Oil Pressure Alarm Switch - kPa (lb/in²)	138 (20)
In Pan Oil Temperature - °C (°F)	104 (220) - 118 (245)
Total Oil Capacity with Filter - L (qt)	15.1 (16)

Lube Oil Heater	**Optional**	**Optional**
Wattage (Nominal)	150	150
Voltage	240V (+5%, -10%)	120V (+5%, -10%)
Part Number	{C04431}	{C04430}

Performance	**2350**	**2600**	**2800**	**3000**
BMEP - kPa (lb/in²)	717 (104)	648 (94)	738 (107)	758 (110)
Piston Speed - m/min (ft/min)	597 (1958)	661 (2167)	711 (2333)	762 (2500)
Mechanical Noise - dB(A) @ 1m	C131534			
Power Curve	C131945			

NOTE: This engine is intended for indoor installation or in a weatherproof enclosure. [1] Derate 3% per every 1000 ft. 304.8m above 300 ft. 91.4m and derate 1% for every 10°F 5.55 °C above 77°F 25°C. [2] Positive and Negative Cables Combined Length. [3] Minimum Exhaust Pipe Diameter is based on: 15 feet of pipe, one 90° elbow, and one Industrial silencer. A Back-pressure flow analysis must be performed on the actual field installed exhaust system to assure engine maximum allowable back pressure is not exceeded. See Exhaust Sizing Calculator on www.clarkefire.com. { } indicates component reference part number.

CLARKE®

JU4H, JU4R & JU6H, JU6R ENGINE MODELS
ENGINE MATERIALS AND CONSTRUCTION

Air Cleaner
Type……. .. Indoor Usage Only
Oiled Fabric Pleats
Material……. Surgical Cotton
Aluminum Mesh

Air Cleaner - Optional
Type……Canister
Material…… Pleated Paper
Housing…… Enclosed

Camshaft
Material……Cast Iron
Chill Hardened
Location……. In Block
Drive……...Gear, Spur
Type of Cam……... Ground

Charge Air Cooler (JU6H-60,62,68,74,84, 94, T8, T0, T2, ADK0, AD58, ADNG, ADN0, ADQ0, ADR0, AAQ8, AARG, ADP8, ADP0, ADT0, AD88, ADR8, AD98, ADS0, ADW8, ADX8, AD98 only)
Type…….. ……Raw Water Cooled
Materials (in contact with raw water)
Tubes…… ……90/10 CU/NI
Headers ……36500 Muntz
Covers ……83600 Red Brass
Plumbing ……316 Stainless Steel/ Brass
90/10 Silicone

Charge Air Cooler (JU6R-AA67, 59, 61, PF, Q7, RF, S9, 83 only)
Type…..……Air to Air Cooled
Materials
Core……Aluminum

Coolant Pump
Type…… …… Centrifugal
Drive…… …… Poly Vee Belt

Coolant Thermostat
Type……Non Blocking
Qty……1

Cooling Loop (Galvanized)
Tees, Elbows, Pipe……. Galvanized Steel
Ball Valves…… Brass ASTM B 124,
Solenoid Valve…… Brass
Pressure Regulator……. Bronze
Strainer……Cast Iron (1/2" - 1" loops) or
Bronze (1.25" - 2" loops)

Cooling Loop (Sea Water)
Tees, Elbows, Pipe……. 316 Stainless Steel
Ball Valves…… 316 Stainless Steel
Solenoid Valve…… 316 Stainless Steel
Pressure Regulator/Strainer Cast Brass ASTM B176
C87800

Cooling Loop (316SS)
Tees, Elbows, Pipe……. 316 Stainless Steel
Ball Valves…… 316 Stainless Steel
Solenoid Valve…… 316 Stainless Steel
Pressure Regulator/Strainer 316 Stainless Steel

Connecting Rod
Type……I-Beam Taper
Material…… Forged Steel Alloy

Crank Pin Bearings
Type……Precision Half Shell
Number…… 1 Pair Per Cylinder
Material…… Wear-Guard

Crankshaft
Material…… Forged Steel
Type of Balance…… Dynamic

Cylinder Block
Type……One Piece with
Non-Siamese Cylinders
Material…… Annealed Gray Iron

Cylinder Head
Type…….. …… Slab 2 Valve
Material……Annealed Gray Iron

Cylinder Liners
Type…….. …… Centrifugal Cast, Wet Liner
Material…… Alloy Iron Plateau, Honed

Fuel Pump
Type…….. …… Diaphragm
Drive……Cam Lobe

Heat Exchanger (USA) - JU4H & JU6H Only
Type…… Tube & Shell
Materials
Tube & Headers……Copper
Shell…….. …… Copper
Electrode……Zinc

Heat Exchanger (UK) - JU4H & JU6H Only
Type…… Tube & Bundle

Materials
Tube & Headers……Copper
Shell…… Aluminum

Injection Pump
Type…… Rotary
Drive……Gear

Lubrication Cooler
Type…… Plate

Lubrication Pump
Type…… Gear
Drive……Gear

Main Bearings
Type…… Precision Half Shells
Material……Steel Backed-Aluminum
Lined

Piston
Type and Material……Aluminum Alloy with
Reinforced Top Ring Groove
Cooling…… Oil Jet Spray

Piston Pin
Type…… Full Floating - Offset

Piston Rings
Number/Piston…… 3
Top…… Keystone Barrel Faced -
Plasma Coated
Second…… Tapered Cast Iron
Third……Double Rail Type
w/Expander Spring

Radiator - JU4R & JU6R Only
Type…… Plate Fin
Materials
Core…… Copper & Brass
Tank & Structure…… Steel

Optional
Marine Coating…… Baked Phenolic

Valves
Type…….. …… Poppet
Arrangement…… ….. Overhead Valve
Number/Cylinder……1 intake
1 exhaust
Operating Mechanism…… Mechanical Rocker Arm
Type of Lifter…… Large Head
Valve Seat Insert……Replaceable

JU4H-UF34
Stationary Fire Pump Engine Driver
EMISSION DATA
EPA 40 CFR Part 60

4 *Cylinders*
Four *Cycle*
Lean *Burn*
Turbocharged

500 PPM SULFUR #2 DIESEL FUEL								
RPM	BHP [3]	FUEL GAL/HR (L/HR)	GRAMS / HP- HR				EXHAUST	
			NMHC	NOx	CO	PM [4]	°F (°C)	CFM (m^3/min)
2800	104	9.1 (34.4)	0.36	3.15	0.75	0.12	952 (511)	788 (22.3)
3000	115	8.6 (32.6)	0.33	3.23	0.90	0.13	949 (509)	910 (25.8)

Notes:

1) *4045TF252 Base Engine Model manufactured by John Deere Corporation.*
   For John Deere Emissions Conformance to EPA 40 CFR Part 60 see Page 2 of 2.
2) *The Emission Warranty for this engine is provided directly to the owner by John Deere Corporation. A copy of the John Deere Emission Warranty can be found in the Clarke Operation and Maintenance Manual.*
3) *Engines are rated at standard conditions of 29.61in. (7521 mm) Hg barometer and 77°F (25° C) inlet air temperature. (SAE J1349)*
4) *PM is a measure of total particulate matter, including PM_{10}.*

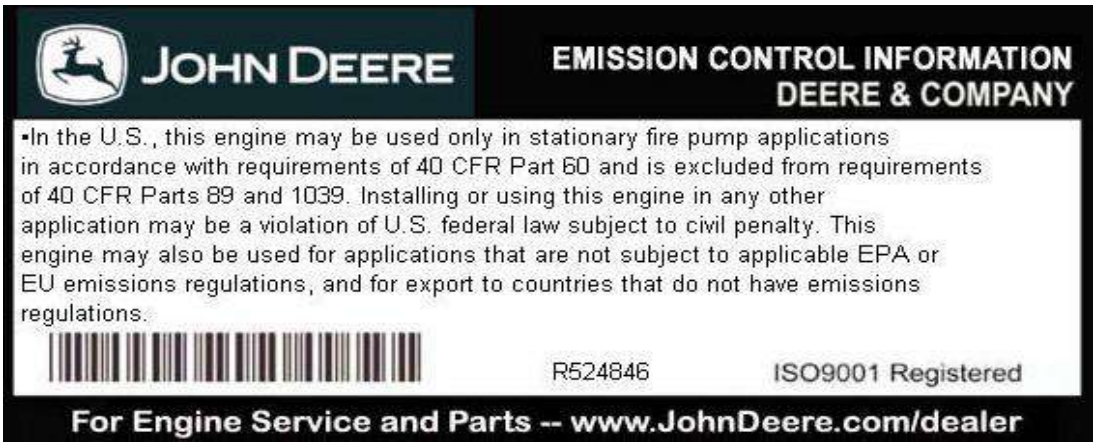
CLARKE
FIRE PROTECTION PRODUCTS
3133 EAST KEMPER ROAD
CINCINNATI, OH 45241

John Deere Power Systems
3801 W. Ridgeway Ave., PO Box 5100
Waterloo, Iowa USA 50704-5100

31 October 2007

Subject: Fire Pump Ratings – Conformance to EPA 40 CFR Part 60 (NSPS requirements)

All John Deere stationary fire pump engines conform to the requirements of 40 CFR Part 60. All such engines include an emission label, stating the engine conforms to the requirements of 40 CFR Part 60. An example of the emission label is show below:



This label applies to all of the following engine models, sold to Clarke Fire Protection, for use in stationary fire pump applications:

John Deere Engine Model
4045DF120
4045DF159
4045TF252
4045TF254
4045TF220
6068TF252
6068TF254
6068HF252
6068HF254
6068HF120
6068TF220
6081AF001
6081HF001
6125AF001
6125HF070

All engines conforming to 40 CFR Part 60 (identified by emission label, as shown above) are covered under the emissions warranty of 40 CFR Part 89.

Sincerely,

Kyle J. Tingle
Regional Sales Manager, JDPS

DATUMS:

-A- - MOUNTING FACE OF FLYWHEEL
-B- - ENGINE CRANKSHAFT HORIZONTAL ℄
-C- - ENGINE CRANKSHAFT VERTICAL ℄
⊕ - CENTER OF GRAVITY
↷ - CLOCKWISE (CW) ROTATION WHEN VIEWED FROM FRONT OF ENGINE

CAUTION:

ALL PLUMBING MUST BE SUPPORTED AND/OR ISOLATED SO THAT NO WEIGHT OR STRESS IS APPLIED TO ANY ENGINE COMPONENT

ATTENTION:

REFER TO THE SPECIFIC MODELS' "INSTALLATION AND OPERATION DATA" FOR INSTALLATION GUIDELINES

AVAILABLE MODELS:

JU4H-UF34, -UFHO, -UFH2, -UF40
JU4H-UF42, -UF50, *-UF52, -UF54

**SEE PG3 FOR JU4H-UF52 RAW WATER CONNECTIONS*

NOTES:

1) *FUEL SUPPLY* PIPING FROM TANK TO ENGINE SHOULD BE 1/2" MINIMUM PIPE DIAMETER
2) *FUEL RETURN* PIPING FROM TANK TO ENGINE SHOULD BE 3/8" MINIMUM PIPE DIAMETER
3) COOLING LOOP SHOWN IS BASED ON STANDARD CONSTRUCTION AND FM SIZING CONDITIONS

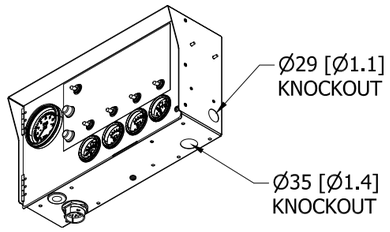
FOR ALTERNATE LOOP CONSTRUCTION (STAINLESS STEEL, SEA WATER AND HIGH PRESSURE) SIZES MAY VARY

DRAWING SUBJECT TO CHANGE WITHOUT NOTICE
DO NOT SCALE

CONTROLLED DRAWING

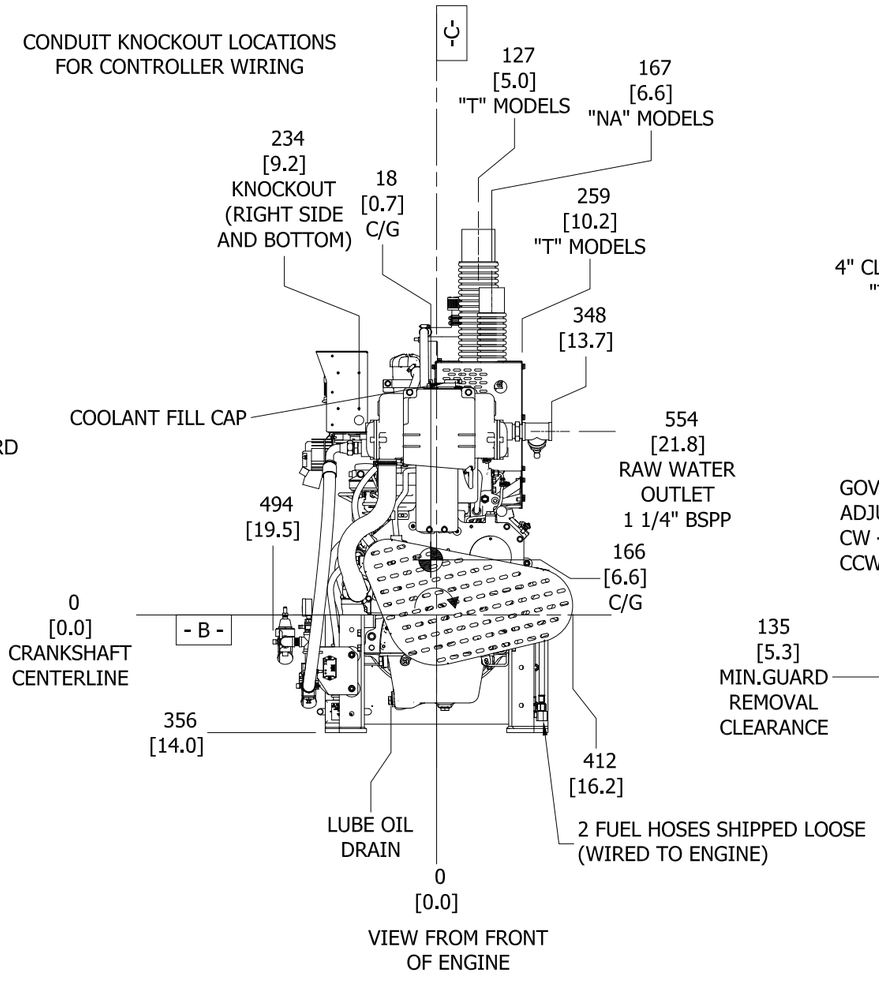
THIS IS A REGISTERED PART WITH A THIRD PARTY AGENCY FOR USE ON A PRODUCT. NO SUBSTITUTIONS ARE ALLOWED. CONSULT ENGINEERING PRIOR TO AND REGARDING ANY CHANGE.

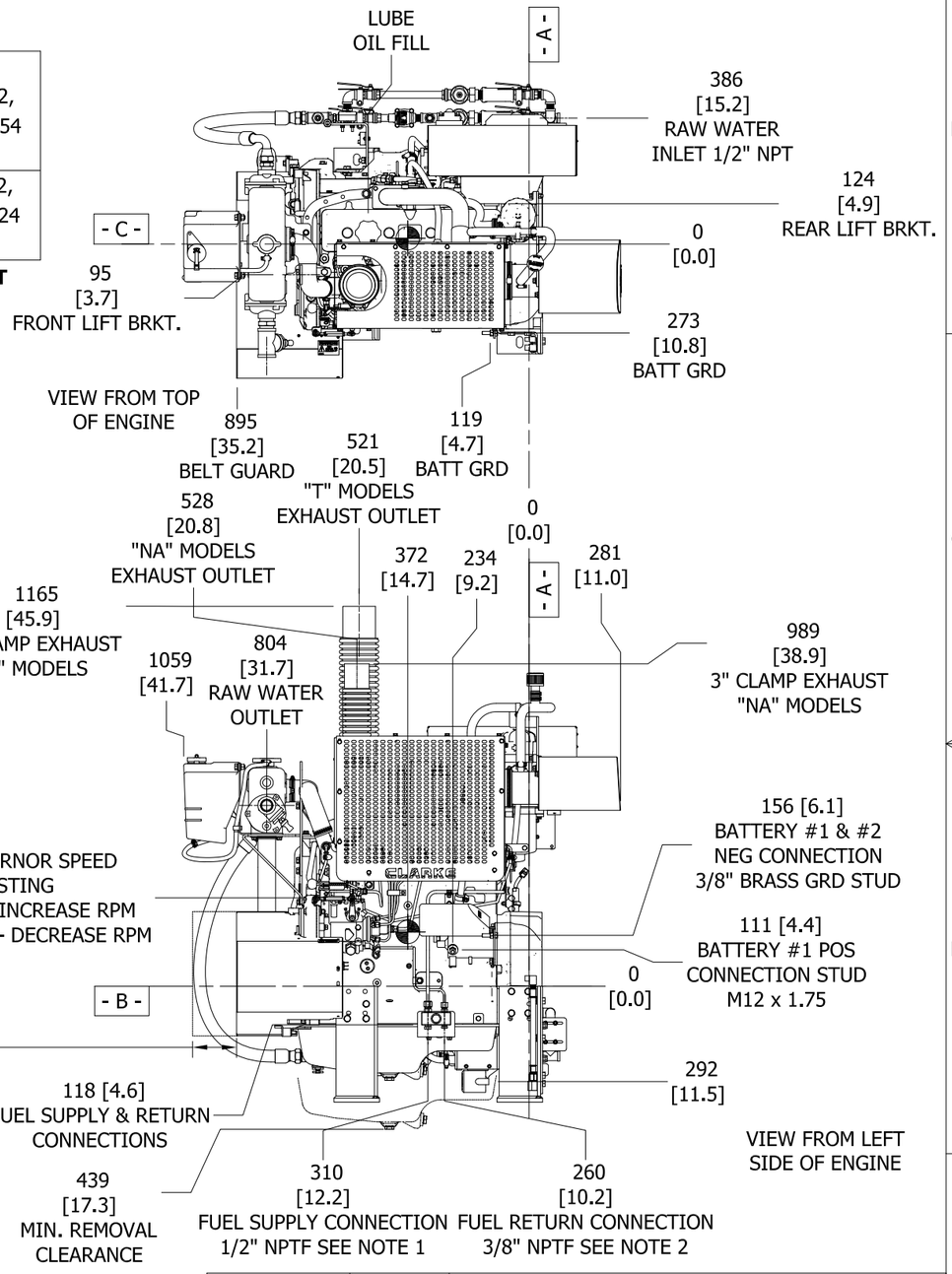
FOR ENGINE SPECIFIC OPTIONS SEE www.clarkefire.com



"T" MODELS	JU4H-UF34, -UFH0, JU4H-UFH2, -UF40, -UF42, JU4H-UF50, *-UF52, -UF54 SHOWN
"NA" MODELS	JU4H-UF04, -UF10, -UF12, -UF14, -UF20, -UF22, -UF24 IN PHANTOM

***FOR JU4H-UF52 RAW WATER INLET DIMENSIONS SEE PG. 3**





REV	DESCRIPTION	ECN#	DWN	APVD	DATE
V	UPDATED TOLERANCE, LOGO & DIMENSION PRECISION	5393	NMM	MGL	09MAY18
W	UPDATED ENGINE VIEWS	5983	LJV	NMM	03DEC19

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SUBMITTAL TOLERANCE

ALL DIMENSIONS CAN VARY ± 9,53 [0.375]

CONTROLLED DRAWING: YES ☒ NO ☐

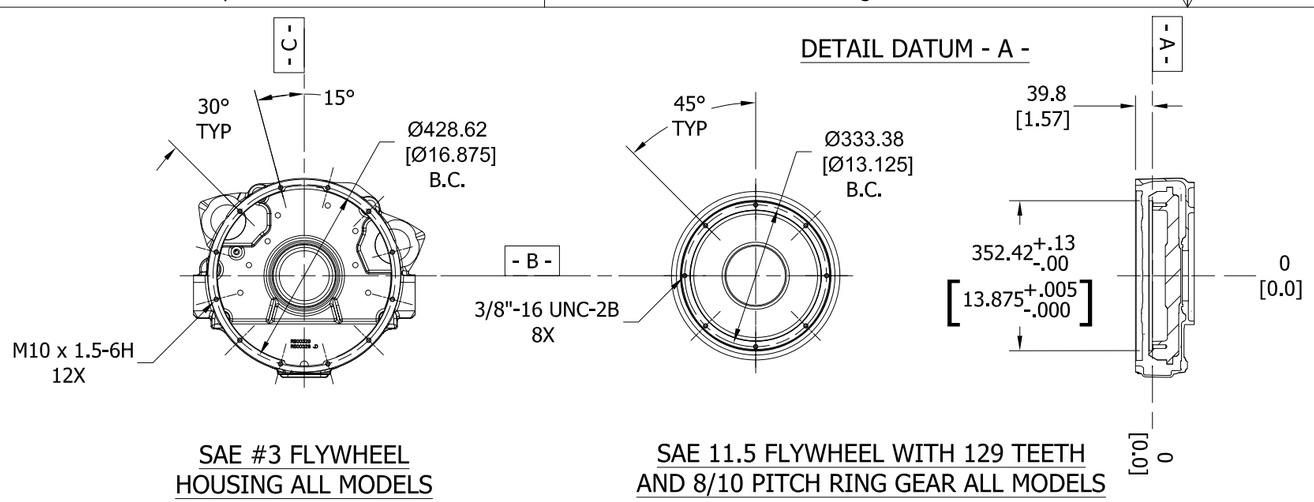
CLARKE®

DRWN	MLAUER
DATE	30AUG04
ENGR	KJKUNKLER
MATERIAL	.
ASSEMBLY	.
SIMILAR TO	D534

NAME: INSTALLATION DRAWING, FIRE PUMP ENGINE- JU4H-UF MODELS

PART NO. D545 REV W

SCALE NTS | UNITS MM [INCH] | PAGE 1 OF 3

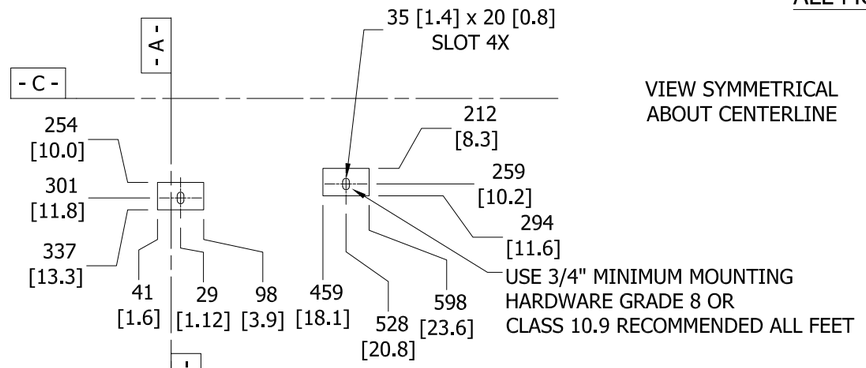


SAE #3 FLYWHEEL HOUSING ALL MODELS

SAE 11.5 FLYWHEEL WITH 129 TEETH AND 8/10 PITCH RING GEAR ALL MODELS

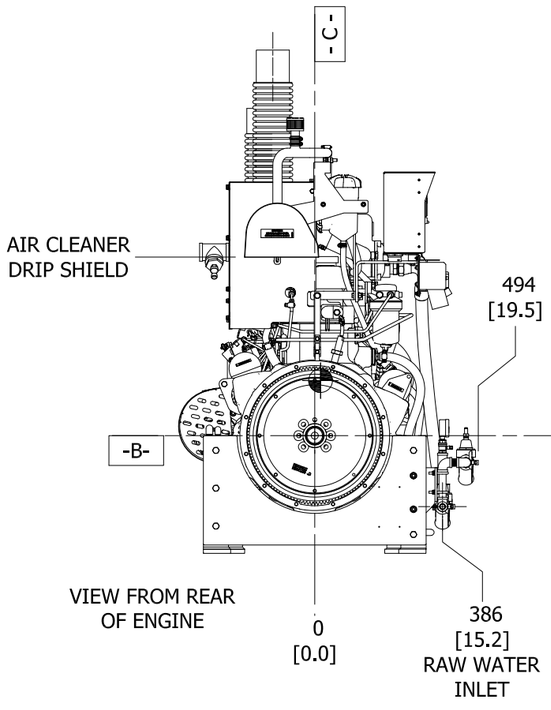
DETAIL DATUM - A -

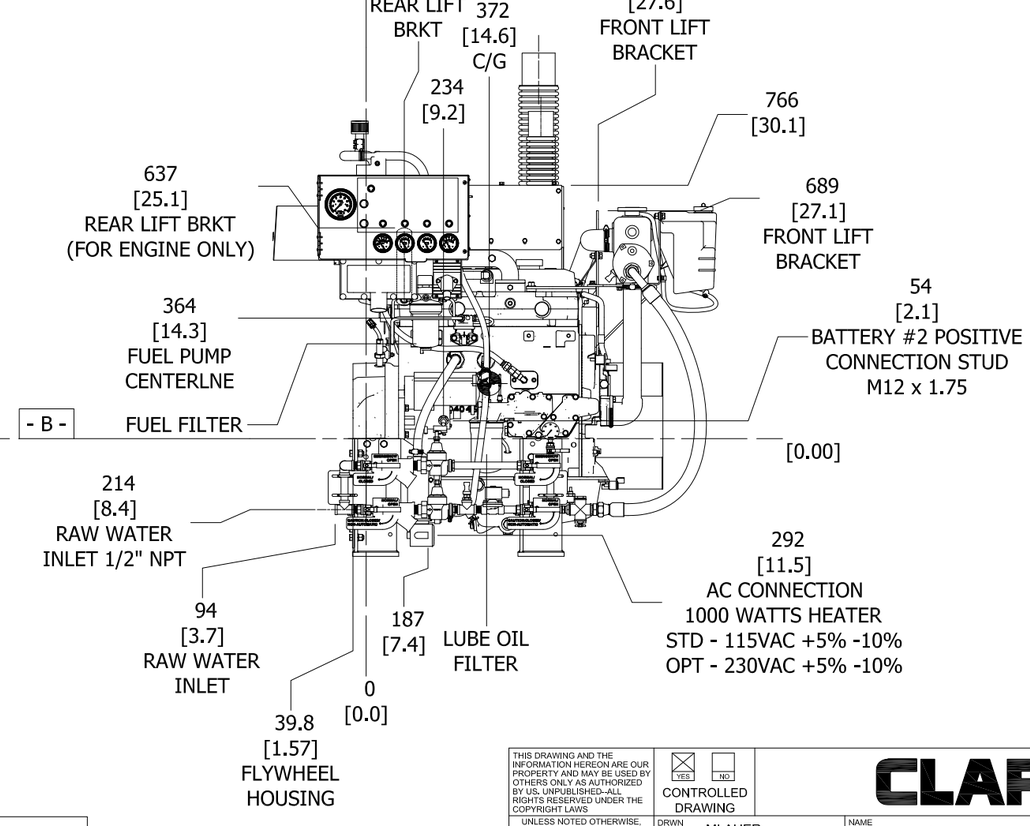
MOUNTING FEET ALL MODELS



VIEW SYMMETRICAL ABOUT CENTERLINE

USE 3/4" MINIMUM MOUNTING HARDWARE GRADE 8 OR CLASS 10.9 RECOMMENDED ALL FEET





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DO NOT SCALE

FOR ENGINE SPECIFIC OPTIONS SEE www.clarkefire.com

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SUBMITTAL TOLERANCE

ALL DIMENSIONS CAN VARY ± 9,53 [0,375]

CONTROLLED DRAWING: YES ☒ NO ☐

CLARKE®

DRWN	MLAUER
DATE	30AUG04
ENGR	KJKUNKLER
MATERIAL	.
ASSEMBLY	.
SIMILAR TO	D534

NAME: INSTALLATION DRAWING, FIRE PUMP ENGINE- JU4H-UF MODELS

PART NO. D545 REV W

SCALE NTS | UNITS MM [INCH] | PAGE 2 OF 3

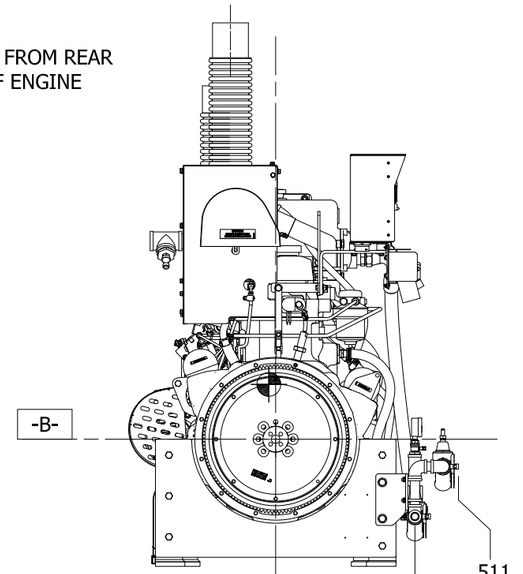
"T" (TURBOCHARGED) MODELS	JU4H-UF52

FOR ALL OTHER MODELS SEE PAGE 2

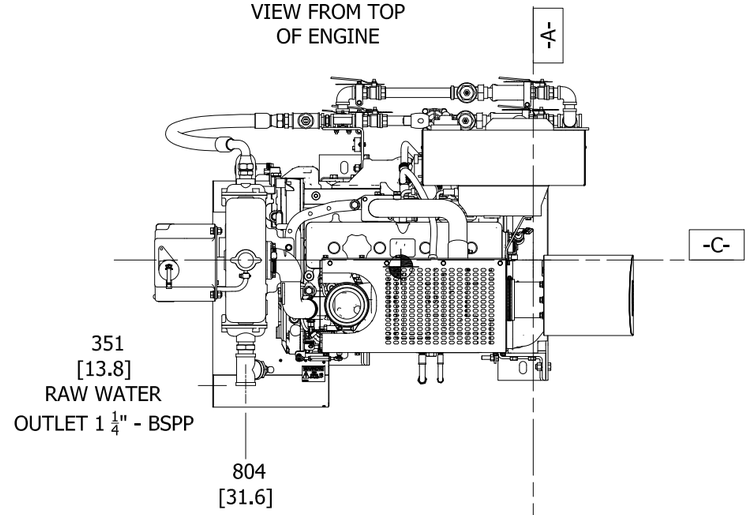
DRAWING SUBJECT TO CHANGE WITHOUT NOTICE

DO NOT SCALE

VIEW FROM REAR OF ENGINE



VIEW FROM TOP OF ENGINE



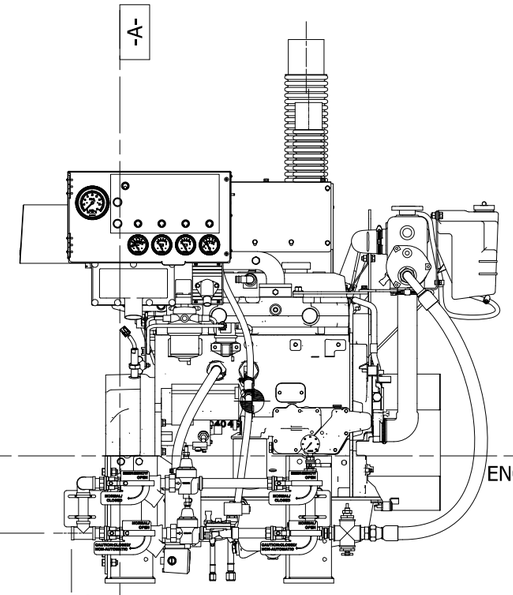
DATUMS:

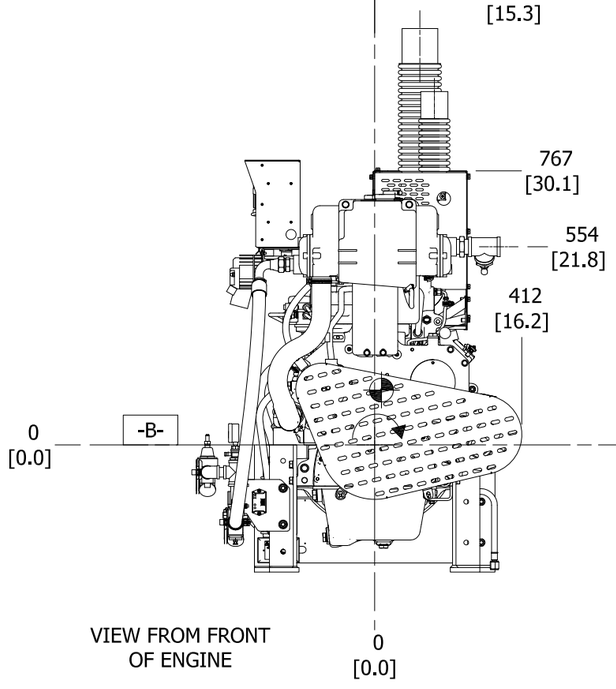
-A- - MOUNTING FACE OF FLYWHEEL
-B- - ENGINE CRANKSHAFT HORIZONTAL ℄
-C- - ENGINE CRANKSHAFT VERTICAL ℄

- CENTER OF GRAVITY

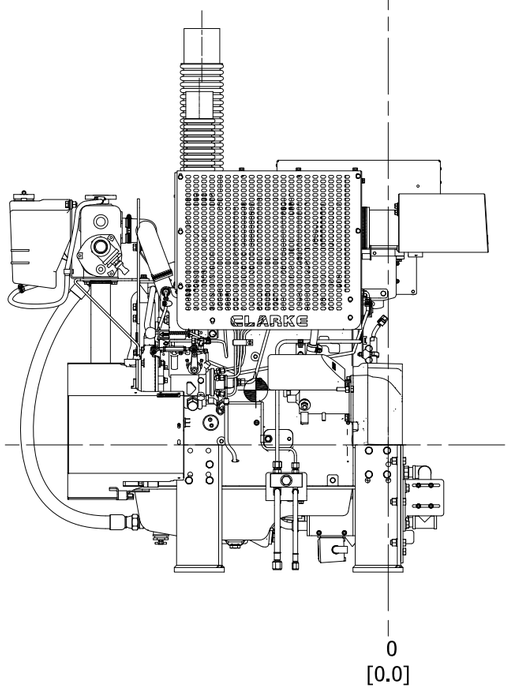
- CLOCKWISE (CW) ROTATION WHEN VIEWED FROM FRONT OF ENGINE

VIEW FROM RIGHT SIDE OF ENGINE





VIEW FROM FRONT OF ENGINE



JU4H-UF52 RAW WATER INLET & OUTLET LOCATIONS OTHERWISE SAME AS ALL OTHER MODELS

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SUBMITTAL TOLERANCE

ALL DIMENSIONS CAN VARY ± 9,53 [0.375]

YES ☒ NO ☐ CONTROLLED DRAWING

CLARKE®

DRWN	MLAUER
DATE	30AUG04
ENGR	KJKUNKLER
MATERIAL	.
ASSEMBLY	.
SIMILAR TO	D534

NAME: INSTALLATION DRAWING, FIRE PUMP ENGINE- JU4H-UF MODELS

PART NO. D545 REV W

SCALE NTS | UNITS MM [INCH] | PAGE 3 OF 3

CLARKE®

JU4H-UF34

FIRE PUMP DRIVER

NOISE DATA

Mechanical Engine Noise *

RPM	BHP	OVERALL dB(A)	Octave Band 31.5 Hz dB(A)	63 Hz dB(A)	125 Hz dB(A)	250 Hz dB(A)	500 Hz dB(A)	1k Hz dB(A)	2k Hz dB(A)	4k Hz dB(A)	8k Hz dB(A)	16k Hz dB(A)
2800	104	104.80	67.20	72.90	89.60	89.00	95.50	100.30	98.70	95.50	87.50	76.30
3000	115	105.50	66.80	73.40	88.10	89.50	97.70	101.10	99.90	96.90	90.40	76.70

Raw Exhaust Engine Noise **

RPM	BHP	OVERALL dB(A)	Octave Band 31.5 Hz dB(A)	63 Hz dB(A)	125 Hz dB(A)	250 Hz dB(A)	500 Hz dB(A)	1k Hz dB(A)	2k Hz dB(A)	4k Hz dB(A)	8k Hz dB(A)	16k Hz dB(A)
2800-3000	104-115	105.80	0.00	95.60	100.00	94.70	96.90	96.50	99.20	95.40	86.10	79.70

** Values above are provided at 3.3ft (1m) from engine block and do not include the raw exhaust noise.*

*** Values above are provided at 23ft (7m), 90° horizontal, from a vertical exhaust outlet and does not include noise created mechanically by the engine.*

The above data reflects nominal values for a typical engine of this model, speed and power in a free-field environment, tested at a no-load condition.

Installation specifics such as background noise level and amplification of noise levels from reflecting off of surrounding objects, will affect the overall noise levels observed. As a result of this, Clarke makes no guarantees to the above levels in an actual installation.

DIESEL FIRE PUMP CONTROLLER DATA

ص.ب: ٧٤٥٨٢ . دبي الامارات العربية المتحدة تيلفون : ٣٤٧٧٠٧٣ / ٣٤٧٢٤٢٦ ٤ ٩٧١+ فاكس : ٣٤٧٢٣٦٣ ٤ ٩٧١+
P.O.Box: 74582 Dubai, UAE. Tel : +971 4 3472426 / 3477073 Fax : +971 4 3472363 E -mail: sales@bristol-fire.com, www.bristol-fire.com

TORNATECH

Project: _____

Customer: _____

Engineer: _____

Pump Manufacturer: _____

Technical Data
Submittal Document

Model GPD

Diesel Engine Driven 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 OPTIONAL SEISMIC COMPLIANT

February 2019

Technical Data

Model GPD Diesel Fire Pump Controller

Standard, Listings, Approvals and Certifications	Built to NFPA 20 (latest edition)	
	Underwriters Laboratory (UL)	• UL218 - Fire Pump Controllers • CSA C22.2 No. 14 Industrial Control Equipment
	FM Global	Class 1321/1323
	New York City	Accepted for use in the City of New York by the Department of Buildings
	Seismic Certification	See page 5 for details
	Optional	
	☐ CE Mark	Various EN, IEC & CEE directives and standards
Enclosure	**Protection Rating** ☑ Standard: NEMA 2 (IP31) **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 ☐ IP54 ☐ IP55 ☐ IP65 ☐ 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	

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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	4” alarm bell - 85 dB at 10ft. (3m)
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 Failure • Charger 2 Failure • Weak battery 1 • Weak battery 2 • Battery 1 overvoltage • Battery 2 overvoltage • Loss of continuity 1 • Loss of continuity 2 • High fuel level • Fuel tank leak • PLD low suction pressure • High raw water temperature • Low pump room temperature • High pump room temperature • ECM warning • Weekly test cut-in not reached • Check weekly test solenoid • Pressure transducer fault • Invalid Cut-In • Service required Visual and Audible • Engine trouble • Controller trouble • Engine low oil pressure • Engine high temperature • Engine low temperature • Engine overspeed • DC Failure • Battery 1 Failure • Battery 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 • Fail to start • Fuel injection malfunction** • ECM selector switch in alternate position*** • Battery #1 & battery #2 failure • DC failure • Loss of continuity (starter) #1 and/or #2 • PLD low suction pressure • Overspeed • Fail when running • Low oil pressure • Common pump room trouble (field re-assignable)* • Low fuel level • High fuel level • Fuel tank leak • Low pump room temperature • High pump room temperature • AC Failure • H-O-A selector switch in OFF or HAND • Free (field programmable)*

*Except if option C13 is ordered. Tornatech reserves the right to use any of these four alarm points for special specific application requirements
**Applicable to electronic engines only.
*** Applicable to electronic engines only. Alarms when ECM selector switch on the engine is in alternate mode.

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Terminals for Field Connections for External Devices	• Low fuel level • Remote AUTOMATIC start • Deluge valve start (re-assignable) • Fuel tank leak (re-assignable) • High fuel level (re-assignable)		
ViZiTouch V2 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 • Deluge valve start • Remote start from manual device	

	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.

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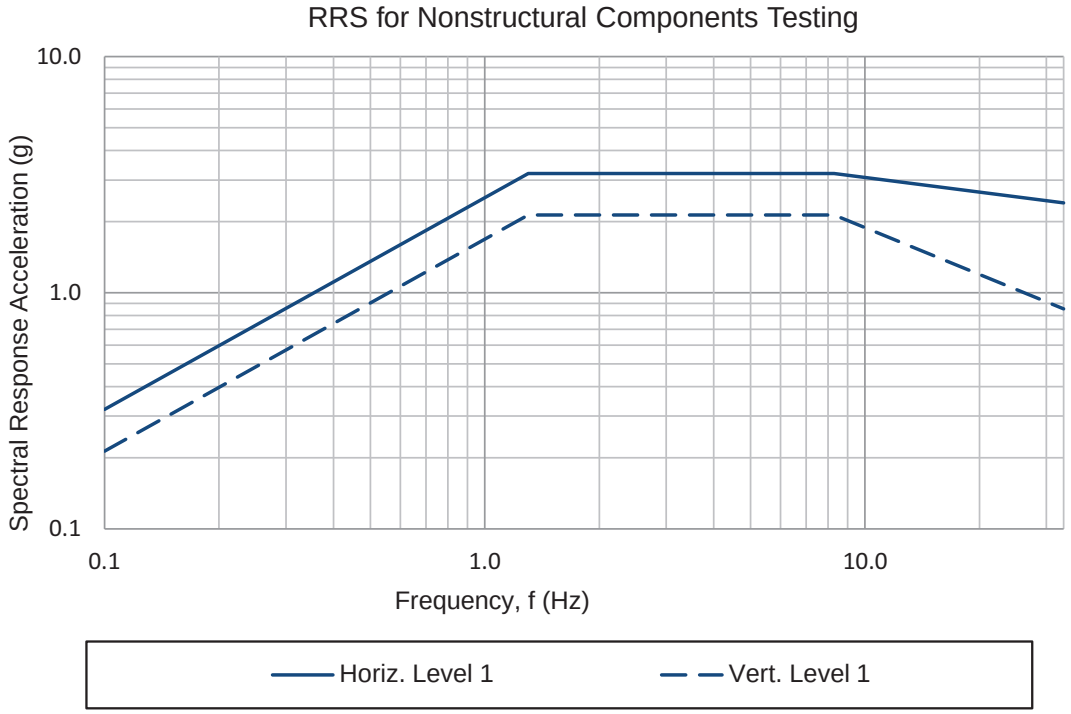
Seismic Certification	Seismic Certification Company	TRU Compliance, LLC A Tobalski Watkins Affiliate					TWEI Project No.: 15014				
	Mounting details	Rigid wall mounting									
	Seismic Information	Building Code	Test Criteria	Seismic Parameters	S_{DS}	z/h	I_P	A_{FLX-H}	A_{RIG-H}	A_{FLX-V}	A_{RIG-V}
		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)

This is a Marketing document. Please consult factory for more information.
Manufacturer reserves the right to modify this information without notice

☐ 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

☐	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.

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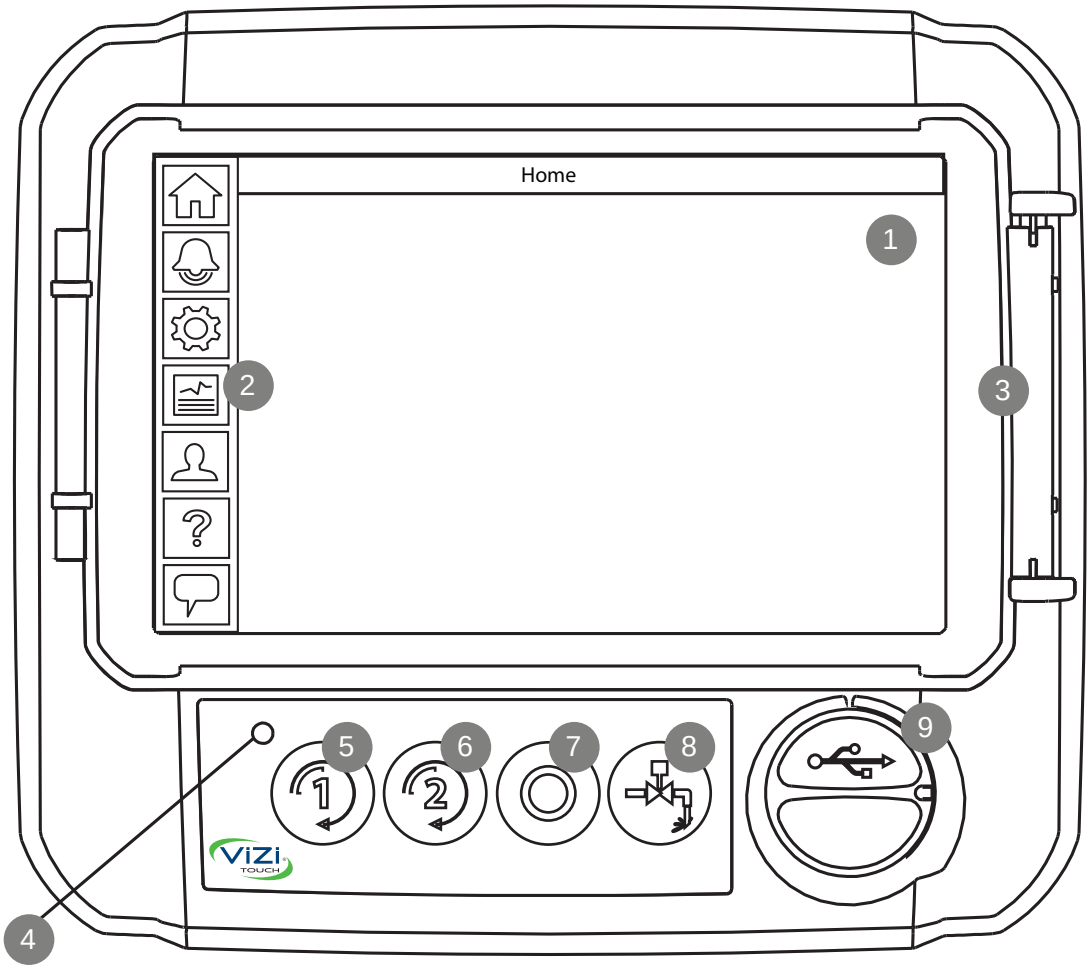
ViZiTouch V2 Operator Interface



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 - CRANK 1 button
6 - CRANK 2 button
7 - STOP button
8 - RUN TEST button
9 - USB port

This is a Marketing document. Please consult factory for more information.
Manufacturer reserves the right to modify this information without notice

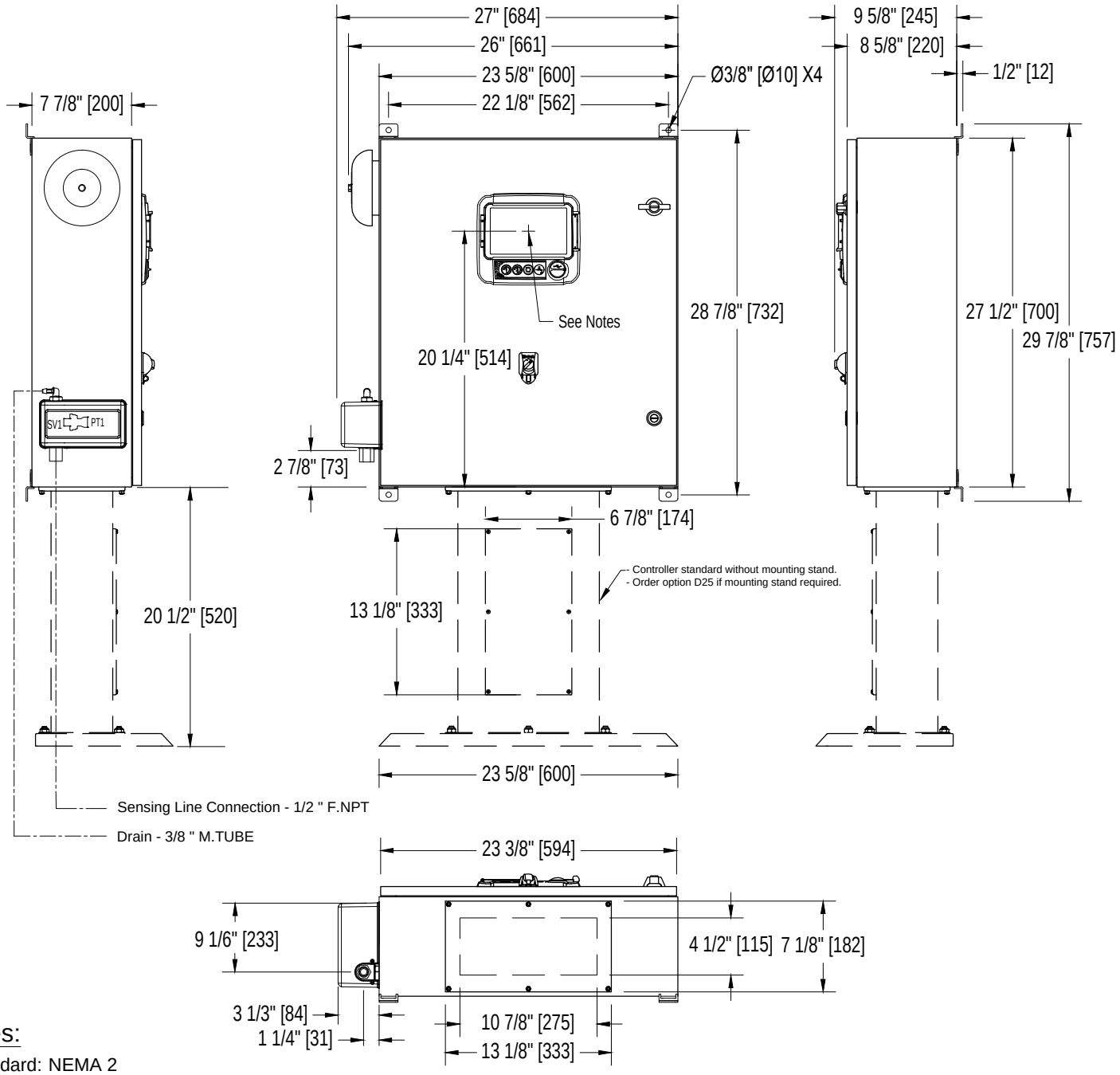
Diesel Engine Fire Pump Controller

12Vdc or 24Vdc Negative Ground

Model: GPD

Dimensions

Built to the latest edition of the NFPA 20 standard



Notes:

- Standard: NEMA 2
- Standard paint : textured red RAL 3002.
- All dimensions are in inches [millimeters].
- Center of ViZiTouch 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.
- Seismic mounting to be rigid wall only.

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

Projection

TORNATECH

SEISMIC COMPLIANT

NYC Dpt of Building Approved

REV.	DESCRIPTION	DD/MM/YY	Drawing number
			GPD-DI700 /E
1.	Revised logo	18/06/18	
0.	First issue	18/11/16	CDL

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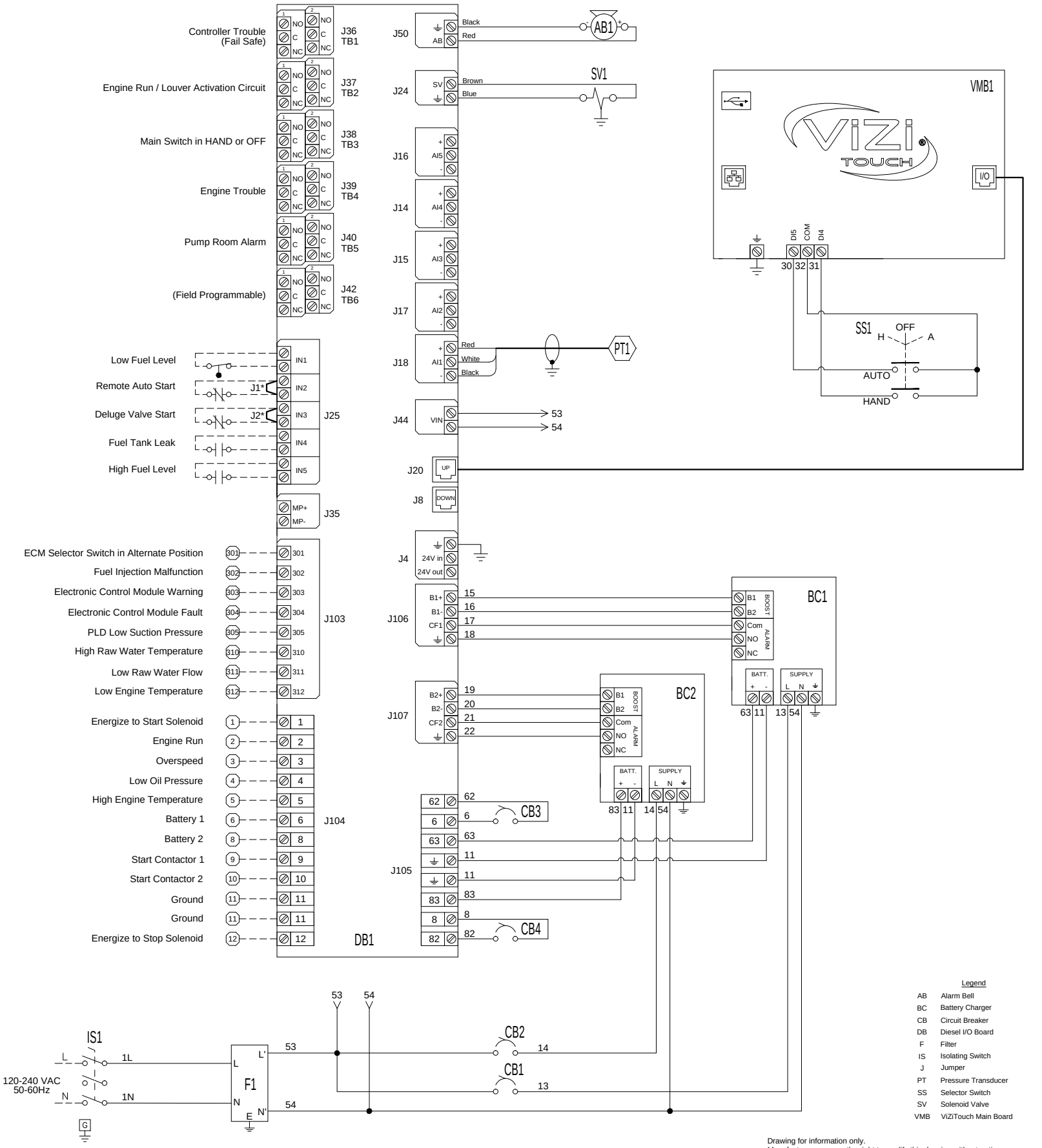
Diesel Engine Fire Pump Controller

12VDC or 24VDC Negative Ground

Wiring schematic

Model: GPD

Built to the latest edition of the NFPA 20 standard



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	ViZiTouch Main Board

* Remove jumper to use this feature

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

SEISMIC COMPLIANT

NYC Dpt of Building Approved

REV.	DESCRIPTION	DD/MM/YY	Drawing number
2	Revised logo	18/06/18	GPD-WS700 /E
1	Corrected SS1 inputs	16/01/17	
0	First issue	10/11/16 CDL	

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Diesel Engine Fire Pump Controller

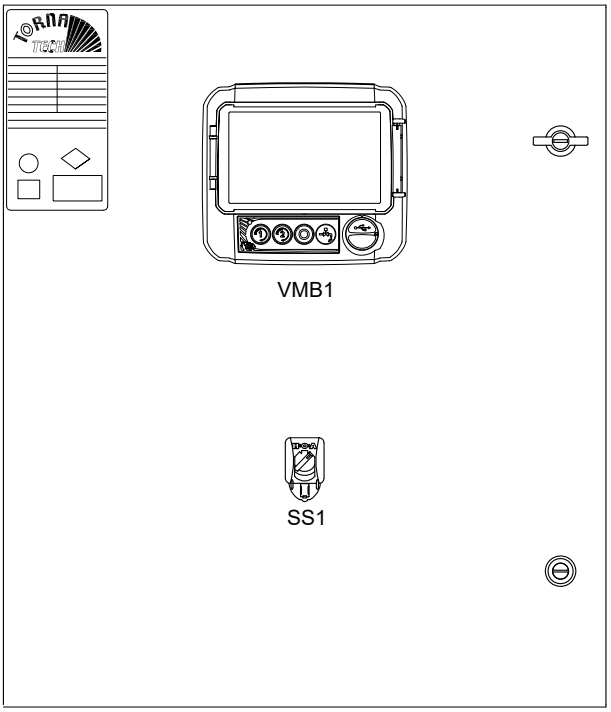
12VDC or 24VDC Negative Ground

Layout

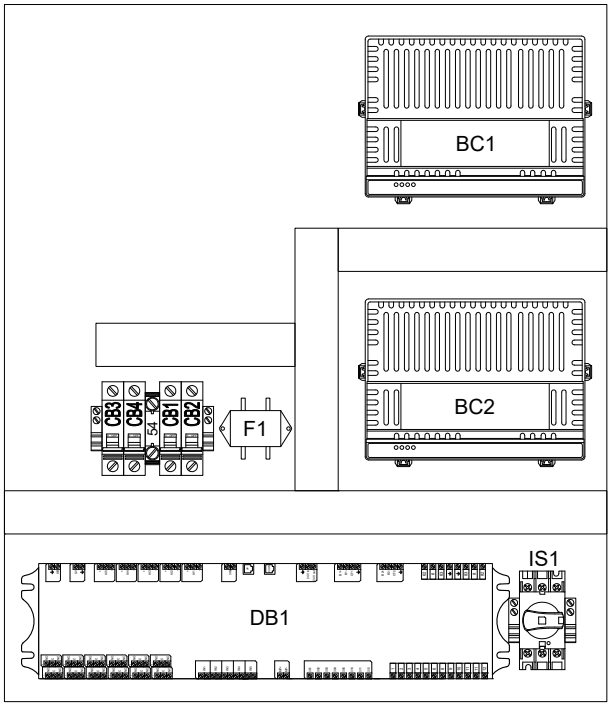
Model: GPD

Built to the latest edition of the NFPA 20 standard

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	ViZiTouch Main Board



Front Door Layout



Internal Layout

REV.	DESCRIPTION	DD/MM/YY
1	Revised logo	18/06/18
0	First issue	21/11/16 CDL

Drawing number

GPD-LY700 /E

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Diesel Engine Fire Pump Controller
12VDC or 24VDC Negative Ground

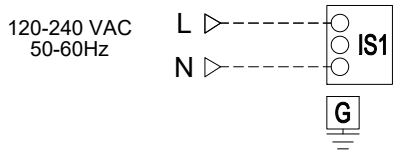
Model: GPD

Terminal Diagram

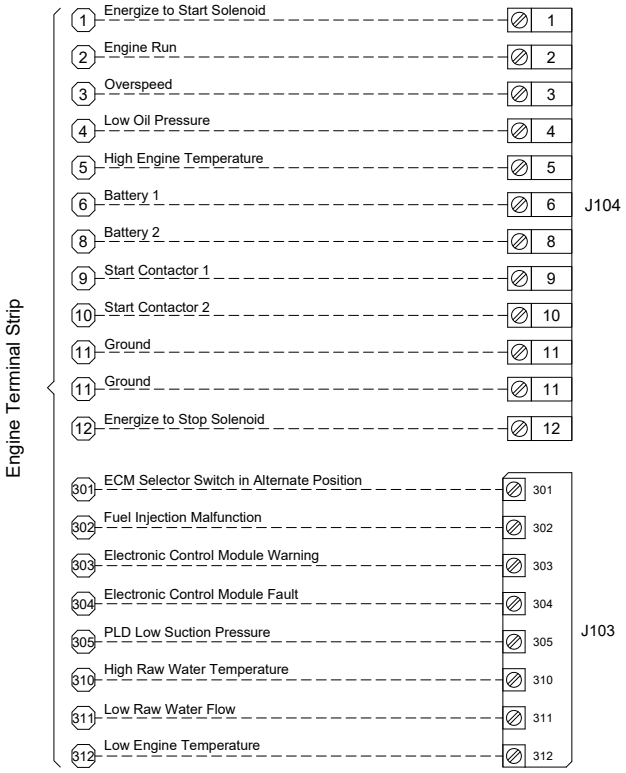
Built to the latest edition of the NFPA 20 standard

Power Supply

Terminals Wire Size:
14 - 6 AWG
3.9 Nm

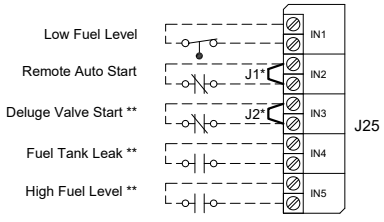


Engine Connections (DB1)



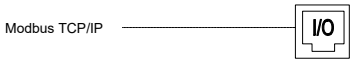
Field Connections (DB1)

Terminals Wire Size:
24 - 12 AWG
0.5 Nm



Network Connection (VMB1)

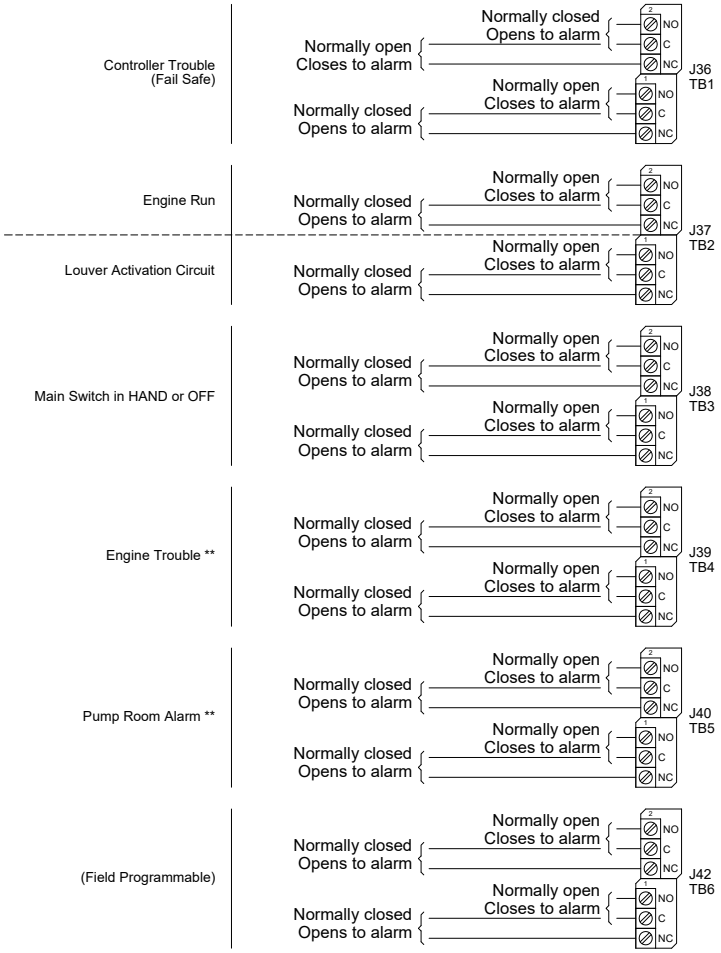
Shielded Female Connector RJ45



* Remove jumper to use this feature
** Re-assignable

Remote Alarm Terminals (DB1)

Terminals Wire Size:
24 - 12 AWG
0.5 Nm



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.

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

TORNATECH

SEISMIC COMPLIANT

c UL us

FM APPROVED

NYC Dpt of Building Approved

REV.	DESCRIPTION	DD/MM/YY	Drawing number
			GPD-TD700 /E
1	Revised logo	18/06/18	
0	First issue	10/11/16	CDL

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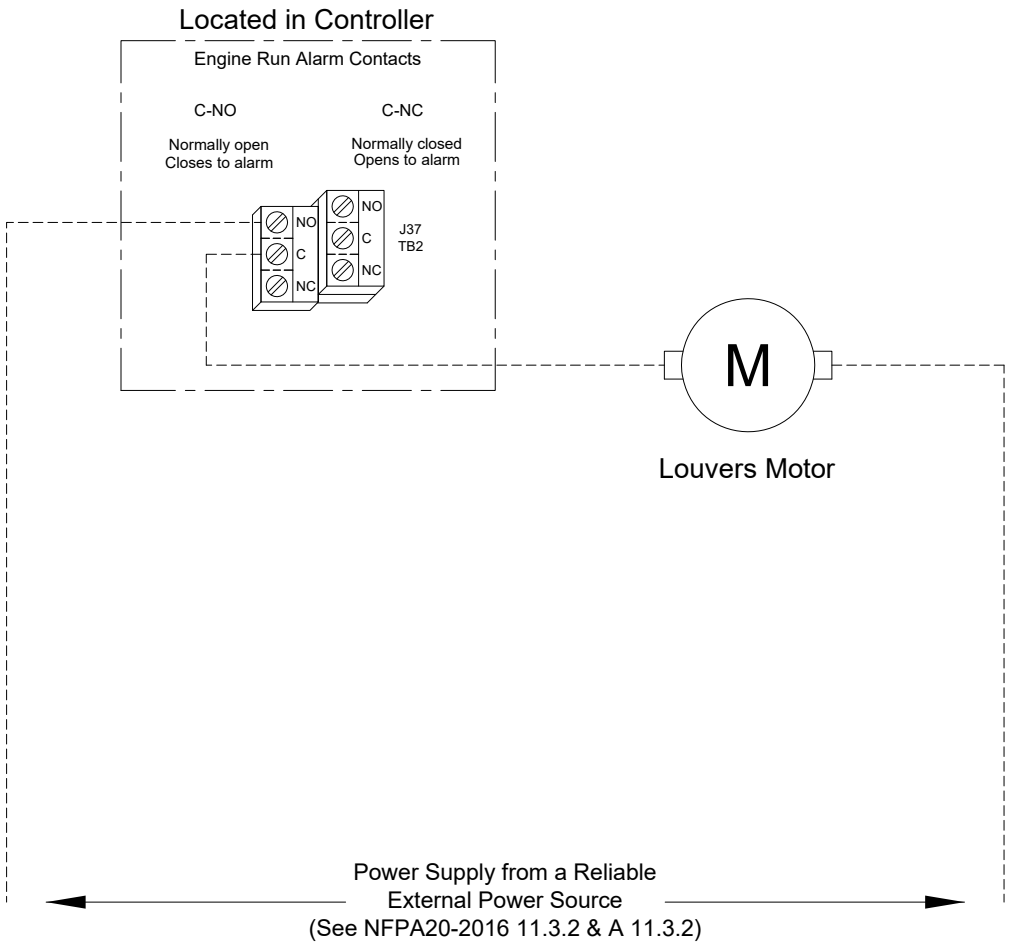
Diesel Engine Fire Pump Controller

12VDC or 24VDC Negative Ground

Louver Connection

Model: GPD

Built to the latest edition of the NFPA 20 standard



REV.	DESCRIPTION	DD/MM/YY	Drawing number
			GPD-TD701 /E
1	Revised logo	18/06/18	
0	First issue	10/11/16	

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ELECTRIC FIRE PUMP DATA SHEET AND CURVE

Fire Fighting Solutions Provider

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BRISTOL

FIRE PUMPS

HORIZONTAL SPLIT CASE, END SUCTION, VERTICAL TURBINE,

CONTAINERIZED PUMP, PACKEGED FIRE PUMP, FUEL TANK & ANTI-VORTEX PLATE

Issue 6.0 Version1

END SUCTION TYPE

FM APPROVED

UL LISTED

Description

Are designed according to NFPA 20 for firefighting applications. This pump is designed with latest technology and has premium components for easy maintenance and absolute efficiency .

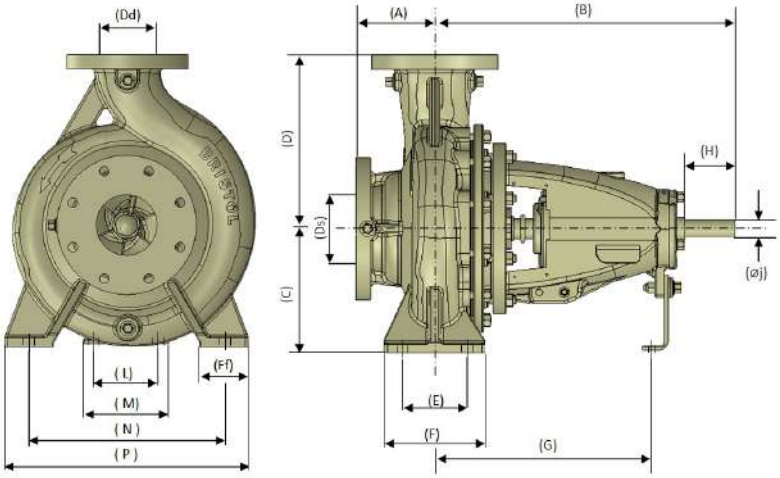
Features

- Available in electric motor driven or engine driven configuration
- UL File No. : EX16459
- Dynamically balanced impellers

Performance Range

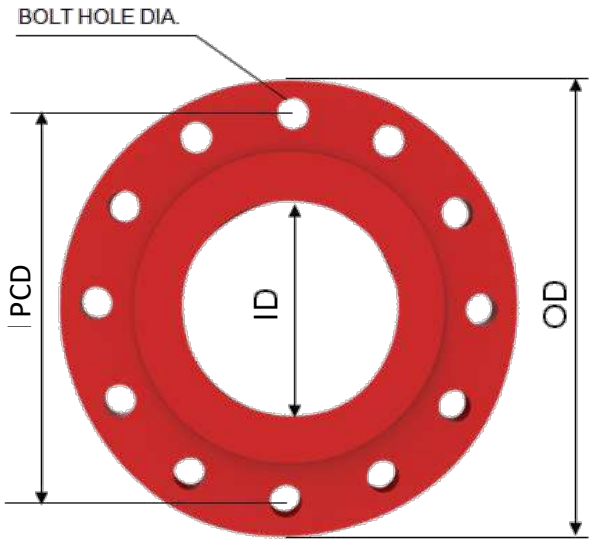
- Capacity : From 50 GPM up to 1000 GPM
- Head : From 50 MTR up to 209 MTR

Pump Dimensions



MODEL	A	B	C	D	E	F	Ff	G	H	L	M	N	P	Ø j	keyway
IS32 - 200	80	360	160	183.5	70	100	50	267	49	110	140	190	240	22.2	4.7X4.7X32 Form A
IS32 - 260	100	360	180	228	95	125	65	267	49	110	140	250	320	22.2	4.7X4.7X32 Form A
IS50 - 320H	125	470	225	285.6	95	125	65	342	79.4	110	140	280	345	28.5	6.35X6.35X44.5 Form A
IS65 - 320H	125	470	225	280	120	160	80	342	79.4	110	140	315	400	28.5	6.35X6.35X44.5 Form A
IS80 - 260	125	470	200	280	120	160	80	342	79.4	110	140	315	400	28.5	6.35X6.35X44.5 Form A
IS80 - 320H	125	470	250	317.4	120	160	80	342	79.4	110	140	315	400	28.5	6.35X6.35X44.5 Form A
IS100 - 260	140	470	225	280	120	160	80	342	79.4	110	140	315	400	28.5	6.35X6.35X44.5 Form A
IS100 - 320H	142	470	250	316	120	160	80	342	79.4	110	140	315	400	28.5	6.35X6.35X44.5 Form A
BEP 3X2.5LP	105	465	180	225	95	125	65	337	80	110	140	250	320	32	6X6X35 Form A
BEP 4X3LP	125	470	180	250	95	125	65	342	80	110	140	280	345	32	8X8X56 Form A
BEP 5X4 HH	140	529	250	315	120	160	80	369	97	110	160	315	400	42	12X8X80 Form C

End Suction Pump
Flange Details

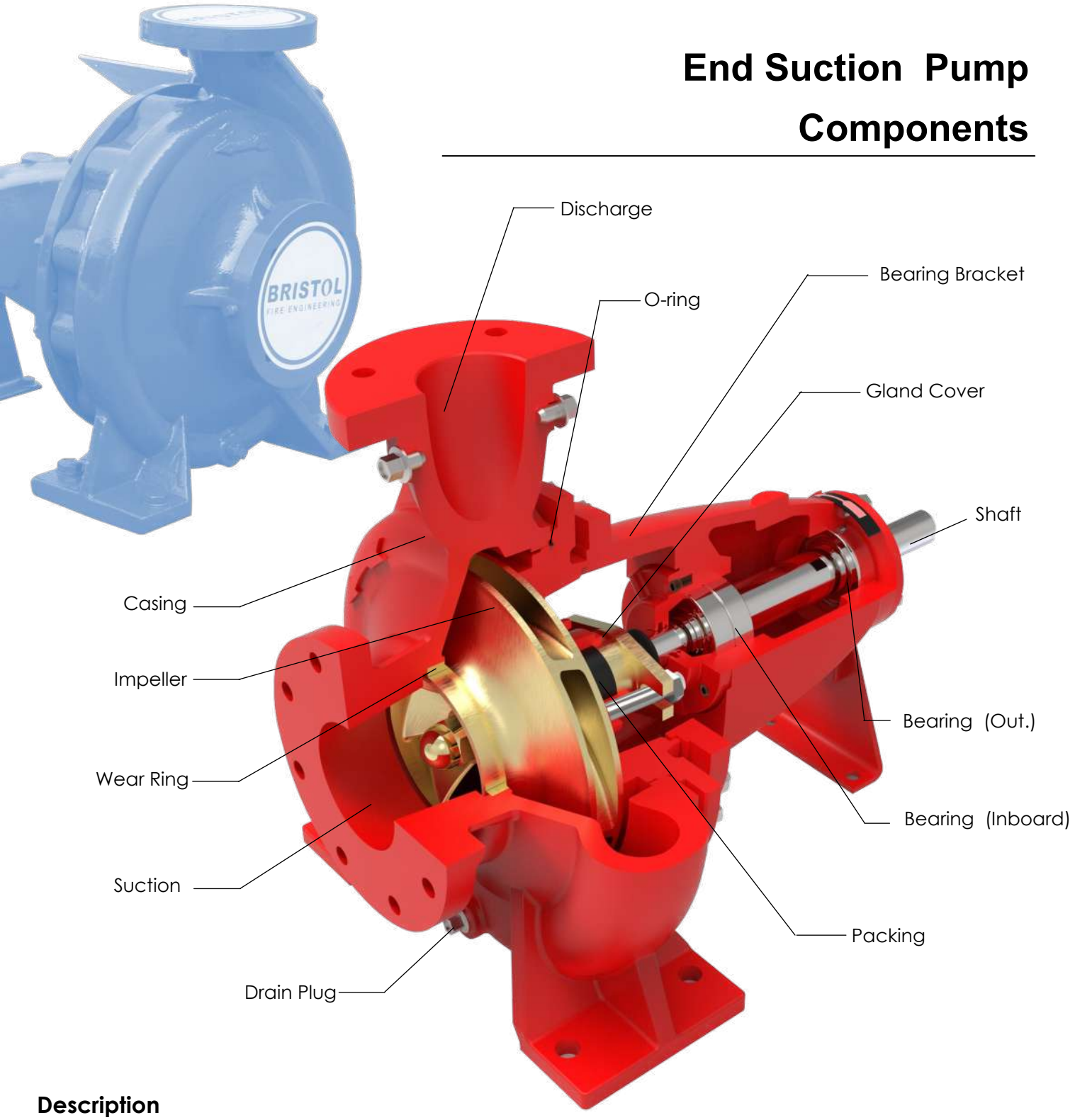


Model	Suction Flange					Discharge Flange				
	ID	OD	No. of Holes	Bolt Hole DIA	PCD	ID	OD	No. of Holes	Bolt Hole DIA	PCD
IS32-200	50	165	4	5/8"-11UNC-2B	120.7	32	140	4	1/2"-13UNC-2B	88.9
IS32-260	50	165	4	5/8"-11UNC-2B	120.7	32	140	4	1/2"-13UNC-2B	88.9
IS50-320H	65	185	4	5/8"-11UNC-2B	139.7	50	165	4	5/8"-11UNC-2B	120.7
IS65-320H	80	200	4	5/8"-11UNC-2B	152.4	65	185	4	5/8"-11UNC-2B	139.7
IS80-260	100	229	8	5/8"-11UNC-2B	190.5	80	200	4	5/8"-11UNC-2B	152.4
IS80-320H	100	229	8	5/8"-11UNC-2B	190.5	80	200	4	5/8"-11UNC-2B	152.4
IS100-260	125	254	8	3/4"-10UNC-2B	215.9	100	229	8	5/8"-11UNC-2B	190.5
IS100-320H	125	254	8	3/4"-10UNC-2B	215.9	100	229	8	5/8"-11UNC-2B	190.5
BEP 3X2.5LP	80	200	8	18	158.75	65	190.5	4	18	150
BEP 4X3LP	100	220	8	18	181	80	200	8	18	158.75
BEP 5X4 HH	125	255	8	22	216	100	230	8	19	190.5

* *Standard for Cast Iron Flanged Fittings : ANSI / ASME B16.1*

* *Standard for Ductile Iron Flanged Fittings : ANSI/ASME B16.42*

End Suction Pump Components



Description

Casing - Ductile Iron 65-45-12 - Heavy-duty power frame

Impeller - Bronze / Stainless Steel

Wear Ring - Bronze is standard for the certified ANSI pumps radially split casing with flange connection

Suction - Horizontal End Suction ANSI 150# or 300# flange drilling is available based on material selection

Discharge - Vertical Centreline Discharge

Bearing Bracket - Ductile Iron 65-45-12 - Heavy-duty power frame

Gland Cover - Bronze - to house a gland seal

Shaft - Stainless Steel - Sleeve shaft as standard for extended seal life

Bearing (Out.) - Deep Grooved Ball Bearing

Bearing (Inb.) - Deep Grooved Ball Bearing

End Suction Pump Selection Chart

FM APPROVED

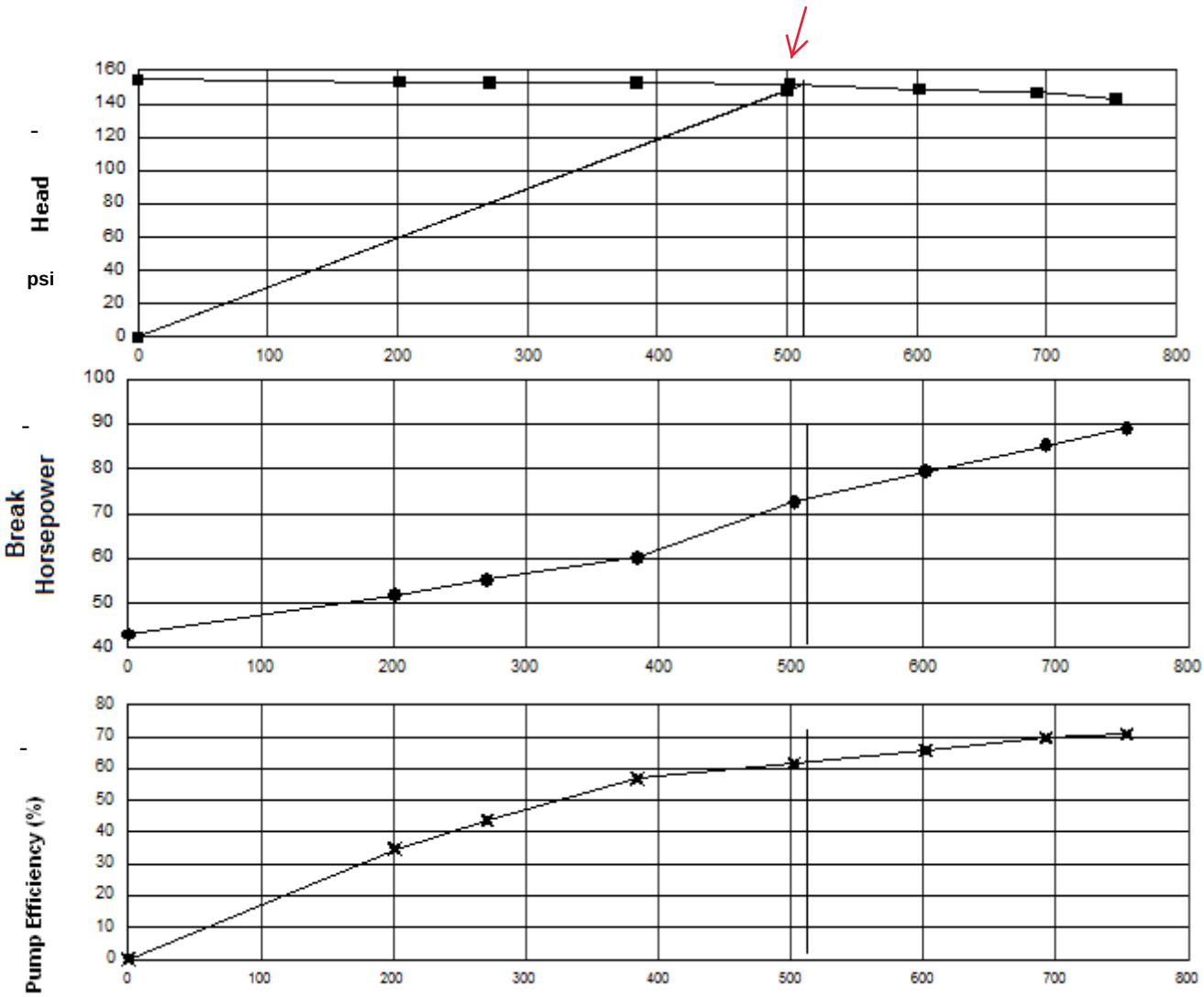
UL LISTED

Model	Rated Capacity (GPM)	Size (In)	UL Listed Pressure (PSI)	FM Approved Pressure (PSI)	Rated Speed (RPM)
IS32 – 200	50	2 x 1 ¼	62-95		2950
IS32 – 200	50	2 x 1 ¼	55-85		2800
IS32 – 260	50	2 x 1 ¼	113 - 130		2950
IS50 – 320H	50	2½ x 2	103-167		2600
IS50 – 320H	50	2½ x 2	88-142		2400
IS32 – 260	100	2 x 1 ¼	103 - 125		2950
IS50 – 320H	100	2½ x 2	178-298		3500
IS50 – 320H	100	2½ x 2	132-210		2950
IS50 – 320H	100	2½ x 2	119-189		2800
IS50 – 320H	100	2½ x 2	102-166		2600
IS50 – 320H	100	2½ x 2	87-141		2400
BEP 3X2.5 LP	100	3 x 2½	60-92		2950
BEP 3X2.5 LP	100	3 x 2½	62-95		3000
BEP 3X2.5 LP	100	3 x 2½	87-134		3550
IS50 – 320H	150	2½ x 2	177-296		3500
IS50 – 320H	150	2½ x 2	132-209		2950
IS50 – 320H	150	2½ x 2	118-188		2800
IS50 – 320H	150	2½ x 2	99-165		2600
IS50 – 320H	150	2½ x 2	84-140		2400
BEP 3X2.5 LP	150	3 x 2½	59-91		2950
BEP 3X2.5 LP	150	3 x 2½	61-94		3000
BEP 3X2.5 LP	150	3 x 2½	86-132		3550
BEP 3X2.5 LP	200	3 x 2½	58-90		2950
BEP 3X2.5 LP	200	3 x 2½	60-93		3000
BEP 3X2.5 LP	200	3 x 2½	85-130		3550
IS50 – 320H	200	2½ x 2	173-296		3500
IS50 – 320H	200	2½ x 2	127-209		2950
IS50 – 320H	200	2½ x 2	113-188		2800
IS65 – 320H	200	3 x 2½	159-290		3500
IS65 – 320H	200	3 x 2½	108-201		2950
IS65 – 320H	200	3 x 2½	97-181		2800
IS65 – 320H	200	3 x 2½	104-158		2600
IS65 – 320H	200	3 x 2½	88-133		2400
IS80 – 260	200	4 x 3		111-151	2950
IS80 – 260	200	4 x 3		115-157	3000
IS65 – 320H	250	3 x 2½	157-290		3500
IS65 – 320H	250	3 x 2½	107-201		2950
IS65 – 320H	250	3 x 2½	97-181		2800
IS65 – 320H	250	3 x 2½	102-155		2600
IS65 – 320H	250	3 x 2½	85-131		2400
BEP 3X2.5 LP	250	3 x 2½	55-88		2950
BEP 3X2.5 LP	250	3 x 2½	57-91		3000
BEP 3X2.5 LP	250	3 x 2½	83-129		3550
BEP 3X2.5 LP	300	3 x 2½	52-85		2950
BEP 3X2.5 LP	300	3 x 2½	80-126		3550
IS65 – 320H	300	3 x 2½	155-289		3500
IS65 – 320H	300	3 x 2½	107-201		2950
IS65 – 320H	300	3 x 2½	97-181		2800
IS65 – 320H	300	3 x 2½	98-152		2600
IS65 – 320H	300	3 x 2½	82-128		2400
IS80 – 260	300	4 x 3		111-150	2950
IS80 – 260	300	4 x 3	167-222	153-206	3550
IS80 – 260	300	4 x 3		115-156	3000
IS80 – 320H	300	4 x 3	159-203		2950
IS80 – 320H	300	4 x 3	143-183		2800

Model	Rated Capacity (GPM)	Size (In)	UL Listed Pressure (PSI)	FM Approved Pressure (PSI)	Rated Speed (RPM)
BEP 3x2.5 LP	300	3 x 2½	54-88		3000
BEP 4x3 LP	300	4 x 3	55-89		2950
BEP 4x3 LP	300	4 x 3	57-92		3000
BEP 4x3 LP	300	4 x 3	82-130		3550
IS80 – 260	400	4 x 3	165-222	152-206	3550
IS80 – 260	400	4 x 3	105-139	110-149	2950
IS80 – 320H	400	4 x 3	158-203		2950
IS80 – 320H	400	4 x 3	142-183		2800
IS100 – 320H	400	5 x 4	123-158	122-236	2950
IS100 – 320H	400	5 x 4	110-142		2800
IS100 – 320H	400	5 x 4	98-172	118-168	2600
IS100 – 320H	400	5 x 4	83-147		2400
BEP 4X3 LP	400	4 x 3	54-87		2950
BEP 4X3 LP	400	4 x 3	56-90		3000
BEP 4X3 LP	400	4 x 3	79-127		3550
IS80 – 260	400	4 x 3	109-144	114-154	3000
IS100 – 320H	400	5 x 4	133-163	126-244	3000
BEP 4X3 LP	450	4 x 3	53-85		2950
BEP 4X3 LP	450	4 x 3	55-88		3000
BEP 4X3 LP	450	4 x 3	78-126		3550
IS80 – 320H	450	4 x 3	157-203		2950
IS80 – 320H	450	4 x 3	140-182		2800
IS100 – 320H	450	5 x 4	122-158		2950
IS100 – 320H	450	5 x 4	110-142		2800
IS100 – 320H	450	5 x 4	98-172		2600
IS100 – 320H	450	5 x 4	83-147		2400
IS100 – 320H	450	5 x 4	133-164		3000
IS80 – 260	500	4 x 3	101-137	108-146	2950
IS80 – 260	500	4 x 3	163-220	150-204	3550
IS80 – 320H	500	4 x 3	155-202		2950
IS80 – 320H	500	4 x 3	136-182		2800
IS100 – 260	500	5 x 4	144-212	134-197	3550
IS100 – 320H	500	5 x 4	122-226	121-235	2950
IS100 – 320H	500	5 x 4	110-142		2800
IS100 – 320H	500	5 x 4	97-172	116-168	2600
IS100 – 320H	500	5 x 4	82-147		2400
BEP 4X3 LP	500	4 x 3	51-84		2950
BEP 4X3 LP	500	4 x 3	53-87		3000
BEP 4X3 LP	500	4 x 3	78-125		3550
IS80 – 260	500	4 x 3	106-142	112-152	3000
IS100 – 320H	500	5 x 4	124-234	125-244	3000
BEP 5X4 HH	500	5 x 4	155-244		2950
IS100 – 320H	750	5 x 4	119-224	119-233	2950
IS100 – 320H	750	5 x 4	104-131		2800
IS100 – 320H	750	5 x 4	89-166	111-166	2600
IS100 – 260	750	5 x 4	113-139	111-143	2950
IS100 – 260	750	5 x 4	140-212	134-195	3550
IS100 – 320H	750	5 x 4	119-232	123-241	3000
IS100 – 260	750	5 x 4	118-144	115-149	3000
BEP 5X4 HH	750	5 x 4	149-239		2950
IS100 – 260	1000	5 x 4	104-131	109-141	2950
IS100 – 260	1000	5 x 4	132 - 208	130-194	3550
IS100 – 260	1000	5 x 4	109-137	113-146	3000
BEP 5X4 HH	1000	5 x 4	140-231		2950

BRISTOL

Model/Stage	IS 100-320H	Design Pressure/Head	145.00	psi
		Design Flow	500.00	GPM
		Rated Speed	2,950	rpm



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ELECTRIC FIRE PUMP MOTOR DATA

ص.ب: ٧٤٥٨٢ . دبي الامارات العربية المتحدة تيلفون : ٣٤٧٧٠٧٣ / ٣٤٧٢٤٢٦ ٤ ٩٧١+ فاكس : ٣٤٧٢٣٦٣ ٤ ٩٧١+

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Horizontal A.C. Motors
Open Dripproof Enclosure Fire Pump Motors

Horsepower: 1 – 500 HP

Speed Range: 1800 – 3600 RPM

Rated Voltages: 200 through 575 Voltage

Frame Sizes: 143T – 5012

Insulation: Class F insulation with Class B temperature rise at service factor

Enclosure: Open Dripproof (ODP)

Efficiency Level: Energy Efficient (IE2) and NEMA Premium®† Efficient (IE3)

For fire pump applications per NFPA®† 20 where contaminants are minimal

Product Overview and Options

On January 1, 1998, all fire pump manufacturers were required to have motors UL Listed specifically for Fire Pump applications. At that time, we released the UL Listed Fire Pump Motor line. Fire Pump Motors were designed per UL-1004A (currently UL-1004-5) and met the NFPA 20 “Standard for the Installation of Stationary Pumps for Fire Protection.”

U.S. MOTORS® brand ODP fire pump products are fully compliant with federal motor efficiency requirements as described in the Energy Independence and Security Act of 2007 also known as EISA. All fire pump motors provide necessary identifying nameplate data.

On May 14, 2013, Nidec Motor Corporation expanded its UL Listed Fire Pump Motor file (EX5189) to include inverter duty (10:1 variable torque), 500HP or less, and frame sizes 143-5012.

For Nidec Motor Corporation to be able to apply the UL Listed Fire Pump label, motors must meet the following requirements:

- Designed to meet NEMA®† Design "B" parameters per NEMA®† MG1-2014
- Calculated Safe Stall Time must exceed 12 seconds (cold) / 8 seconds (hot)
- Motors designated for Canada must meet CSA-390 Table 2 efficiency values
- 600V or less
- 500HP and lower
- 5012 frame and smaller
- 1.15 service factor (max)

NFPA®†: National Fire Protection Association

A worldwide leader in providing fire, electrical, and life safety to the public since 1986, the mission of the international nonprofit NFPA®† is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating scientifically-based consensus codes and standards, research, training and education. NFPA®† membership totals more than 75,000 individuals from around the world and more than 80 national trade and professional organizations.

For more information, go to www.nfpa.org

Product Overview and Options *(continued)*

Standard Features:

- 1.15 service factor
- Class F insulation, Class B temperature rise at 1.15 service factor (60Hz)
- 40°C Ambient, NEMA®† Design B performance on 60Hz Sine Wave Power
- Rolled steel frame 143-320, Cast iron frame 360-5012
- Aluminum end shields 143-250, Cast iron end shields 320-5012
- Premasked Mylar nameplate 143-320, Stainless steel 360-5012
- Regreaseable bearings 180 Frame & Larger
- Double shielded bearings 140-400, Open On 440 Frame & larger
- Internal bearing caps 400 Frame & Up
- Lifting provisions 210 Frame & Larger
- Catalog models suitable for Wye-Delta Start 250-445 Frame
- Dual voltage catalog models suitable for Part Winding Start (PWS) on low voltage
- 230/460 & 575 Volt catalog models comply with NRCan Standards
- 230/460V catalog models dual nameplated for 190/380V 50Hz, Next lower horsepower
- Oversized connection diagram, Catalog models “CE” Mark on nameplate
- Vertical “JP” closed coupled pump catalog models (140-365) with drip cover

Options and Accessories:

Nidec Motor Corporation offers the following custom-design options on the U.S. MOTORS® brand ODP Fire Pump motor:

- Inverter duty 10:1 variable torque
- 50 Hertz voltages
- 50°C ambient
- C and D flanges
- Special paint
- Space heater
- Winding and bearing thermal protection

Warranty Information

Refer to the U.S. MOTORS® website (usmotors.com) for the most up-to-date warranty information.

All Nidec Motor Corporation products shall carry the limited warranty of 12 months from the date of installation, not to exceed 18 months from date of manufacture as specified in Section 5 of Nidec Motor Corporation’s Terms and Conditions of Sale except those specifically listed below, or noted within individual product family pages within this catalog.

	Installed / Manufactured	Installed / Manufactured
ODP Motors 140 - 449 NEMA Frames	**Sine Wave Power**	**VFD Power**
Epact	18 / 24 months	12 / 18 months
Premium Efficient & NEMA Premium®†	36 / 42 months	24 / 30 months
Inverter Duty	36 / 42 months	36 / 42 months
TITAN® ODP Motors - 5000 Frame and Larger	**Sine Wave Power**	**VFD Power**
Standard Efficient & Energy Efficient	12 / 18 months	12 / 18 months
Premium Efficient	24 / 30 months	18 / 24 months
Inverter Duty	24 / 30 months	24 / 30 months

For additional information, please refer to our Full Line Standard Motor Catalog (FL600) or contact your Nidec Motor Corporation representative.

† All marks shown within this document are properties of their respective owners.

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marathon® Motors

FIRE PUMP MOTORS

BROCHURE

REGAL®

MARATHON®

In 1913, the founders of a new motor company that they named Marathon Electric had a simple vision:

- Serve our customers according to their needs
- Produce the most efficient and long-lasting motors
- Commit to new technology and research
- Expand and diversify into new markets

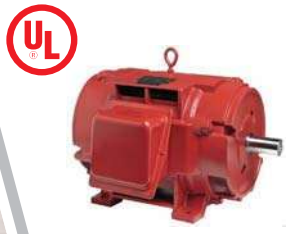
The company was located in the heartland of America, Wausau, Wisconsin, where it remains today, over one hundred years later. The company continues to be one of the innovators in the motor industry, built on a history of industry first! Marathon engineered, designed, and built the first fire pump motor and we continue to lead the life safety industry with Marine Duty UL fire pump motors, medium voltage, vertical hollow shaft UL fire pump motors, and specialty UL Fire Pump motors.

When a fireman needs a trusted friend in an emergency, he knows Marathon will do the job, offering protection, high performance, and reliability as we have for over one hundred years … that's a legacy!

PRODUCT LINE

ODP

- Available in NEMA or IEC construction these motors are ideal for in-door applications. Lower cost and longer product life due to lower temperature windings make these a best value option.
- These motors are available from 25-500HP, 2 and 4 poles, Epact Efficiency. All motors are 12 leads for wye-delta or across-the-line start, part winding start is available in single voltage or at lower voltage for dual voltage motors. All motors have 1.15 service factor for all voltages.



TEFC

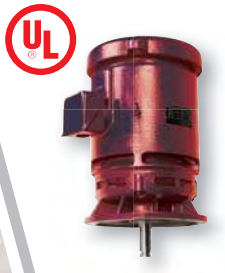
- Available in NEMA or IEC construction, TEFC motors are ideal for applications in tough environments.
- These motors are available from 25-500HP, 2 and 4 poles, Epact Efficiency. All motors are 12 leads for wye-delta or across the line start, part winding start is available in single voltage or at lower voltage for duo voltage motors. All motors have 1.15 service factor for all voltages.

CLOSE COUPLED PUMP

- Available as JP or JM constructions, these motors are ideal when space is an issue. This integrated design enables a lower system cost.
- 2 and 4 poles, Epact Efficiency. Horizontal or vertical ODP construction.
- All motors have 1.15 service factor for all voltages.

VSS AND VHS

- Vertical solid shaft and hollow shaft constructions are ideal for deep well applications with turbine pumps. These motors are designed to handle the highest thrust loads of this system.
- VSS motors are available from 3-400 HP, 2 to 8 poles and are designed for normal and medium thrust, Epact Efficiency.
- All motors are 12 leads for wye-delta or across the line start, part winding start is available in single voltage or at lower voltage for duo voltage motors. All motors have 1.15 service factor for all voltages.
- VHS motors are available from 7.5HP to 300HP, 2 and 4 poles, WP1, Epact Efficiency.
- All motors are 12 leads for wye-delta or across-the-line start, part winding start is available in single voltage or at lower voltage for dual voltage motors. All motors have 1.15 service factor for all voltages.



MEDIUM VOLTAGE

- Regal also offers Medium Voltage products in NEMA and IEC constructions designed specifically for Fire Pump Applications.
- NEMA Construction, from 200 to 700HP, 2300V & 4000V 50/60HZ, 2 and 4 poles, IP22, 1.15 service factor. IEC Construction, from 185kW to 2800kW, 3kV through 10kV 50HZ & 4kV through 13.8kV 60HZ, 4 poles, IP23.

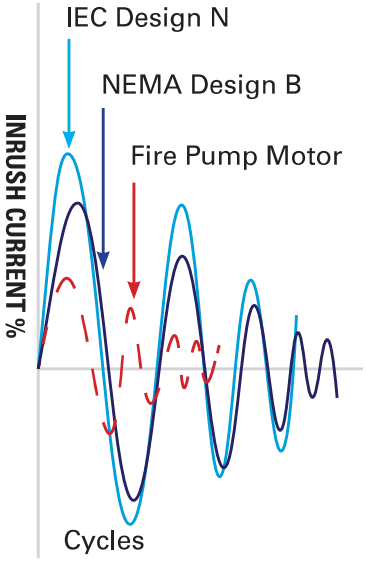
Scan the QR code for more information on Marathon® Fire Pump Motors

UL LISTED MOTORS

NAMEPLATES

- Fire pump motors have two nameplates, the normal nameplate with UL label and special fire pump nameplate with the UL listing for fire pumps.

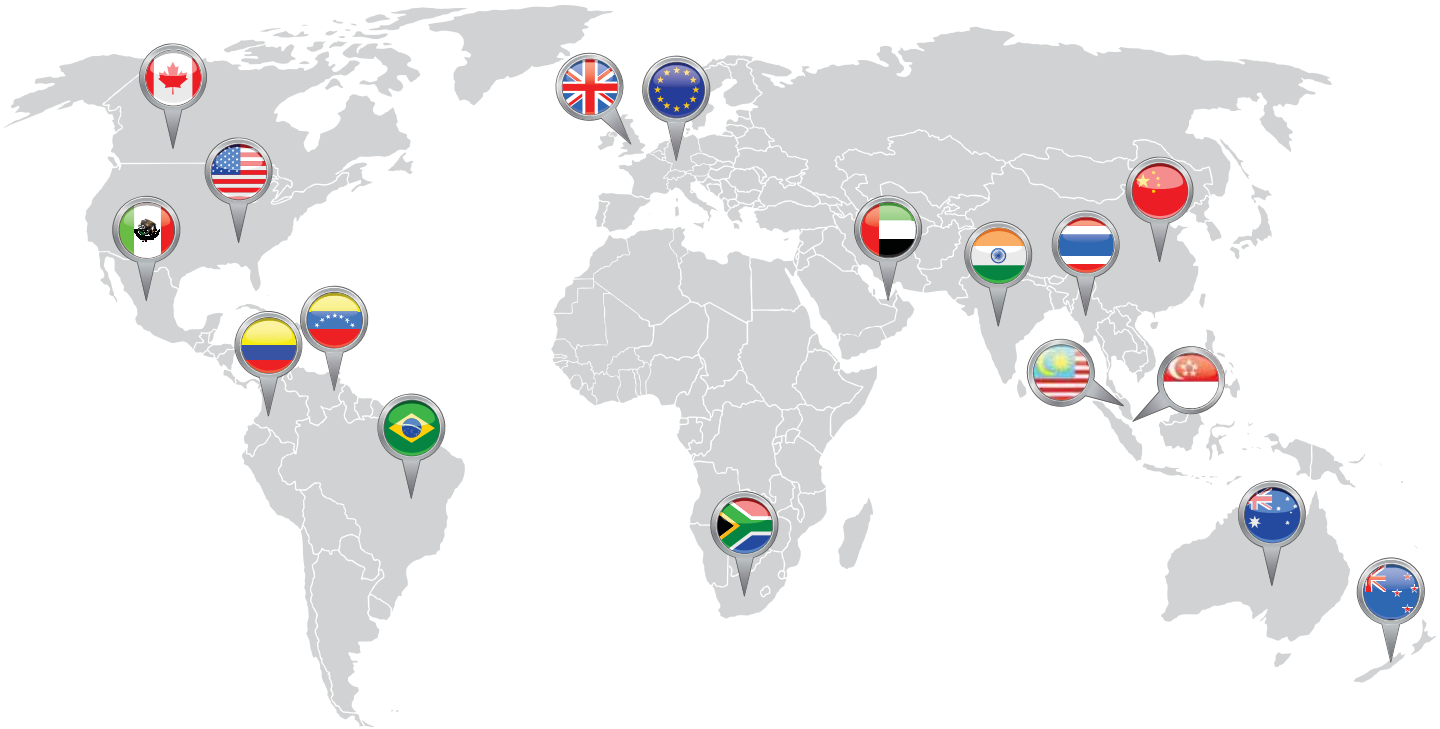
FIRE PUMP MOTOR INRUSH CURRENTS



Classification	Locked-Rotor Torque (% Rated-Load Torque)	Breakdown Torque (% Rated-Load Torque)	Locked-Rotor Current (% Rated-Load Current)
UL Fire Pump Motor	70-275*	175-300*	300-600
Design B – Normal locked-rotor torque and normal locked-rotor current	70-275*	175-300*	600-700
IEC 34-12 Design N locked-rotor torques and currents	75-190*	160-200*	800-1000

*Higher values are for motors having lower horsepower ratings.

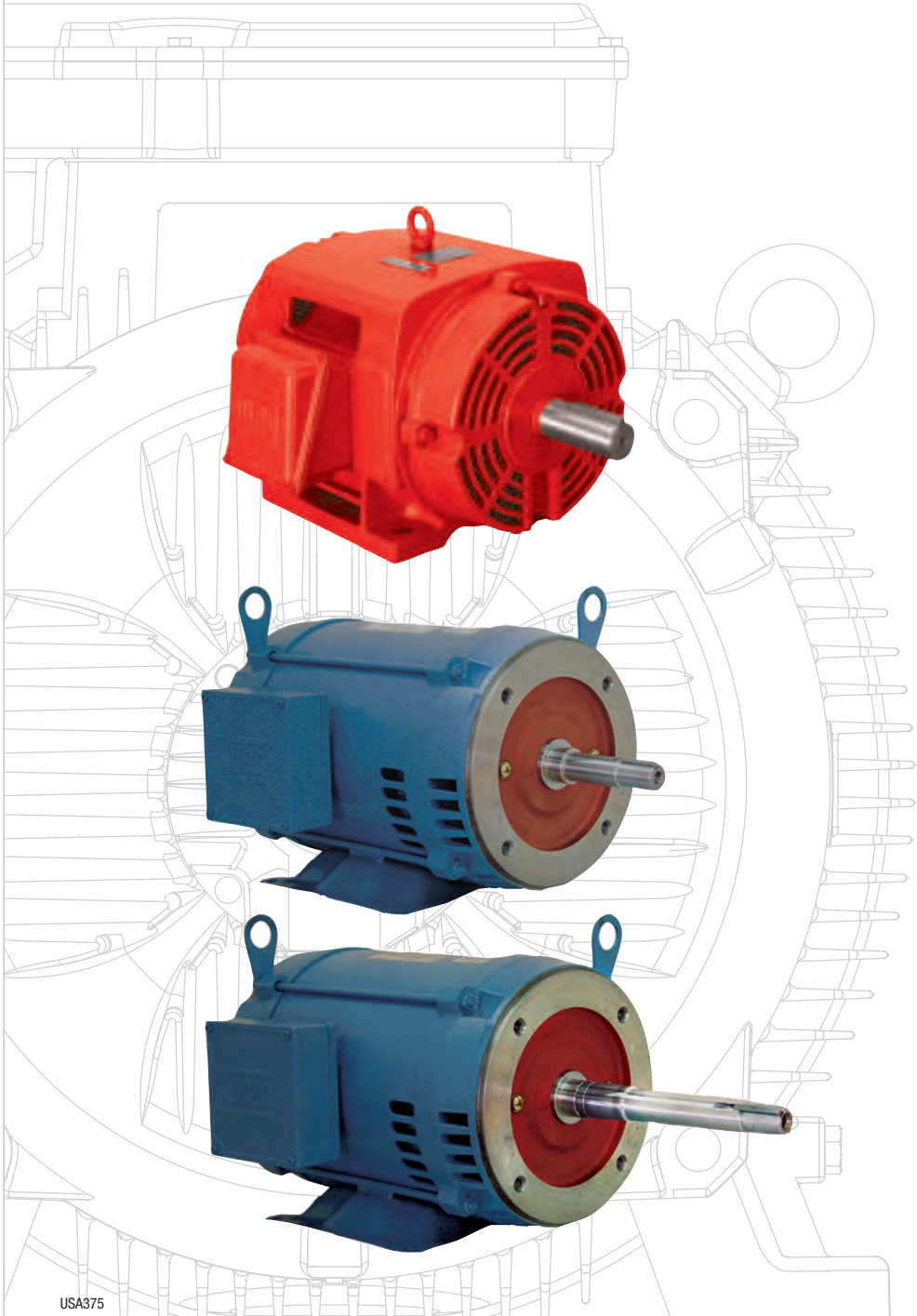
REGAL WORLD FOOTPRINT *The motor you want, where you are, when you need.*



Fire Pump

Motor

- UL Listed
- 50Hz capable



USA375

UL Listed

Fire Pump Motors – ODP
Three Phase – Foot Mount and Flange Mount

WEG High Efficiency motors are specifically designed to meet or exceed all EISA 2007 requirements for energy efficiency. They are certified by the Department of Energy with our Certificate of Compliance number CC029A.

These Fire Pump Duty (ODP) motors are designed for environments where dirt and moisture are minimal and provide maximum ventilation and heat dissipation. Design B torque and high efficiency design from 143T through 449T frames.

STANDARD FEATURES

- Efficiency Certification number CC029A according to US Department of Energy Regulations for EISA2007 Efficiency levels
- 2, 4 and 6 pole, 60Hz
- Voltage: 230/460V, 200/400V, 460V or 575V
- Open Drip Proof (ODP)
- NEMA Dimensions
- NEMA design 'B' ratings
- Service Factor: 1.15
- Class 'F' insulation for all frames, Class B rise
- Continuous Duty (S1)
- 104ºF (40ºC) ambient temperature
- 1045 heat treated and stress relieved carbon steel shaft (4140 for roller bearing motors)
- Motors are supplied with ball bearings as standard.
- F1 mount (also available flanged motors)
- Paint: Enamel alkyd resin base
- Color: Red – RAL3002
- NPT threaded terminal box
- Stainless steel nameplate – laser etched
- 460V Nameplate includes 380V 50Hz 1.15SF @ unless otherwise noted.

OPTIONAL FEATURES

- 50ºC ambient
- Cable glands
- Special voltags
- Cast iron NEMA C-Flange or D-Flange (D-Flange ony for frames 254T and up)
- Specially designed shaft
- Second shaft end
- Thermistors, thermostats or RTD's (PT100)
- Roller bearings on drive end
- IEC metric frames (on request) for frame 160T up to 280T

Frame – Specific Features

For Frame 143/5T only
- Welded steel plate frames (welded feet)
- Cast iron endshields fixed with through bolt construction
- 'ZZ' bearings (double shielded)
- Degree of protection : IP21

182/4T and 213/5T Frames only
- Aluminum endshields and terminal box
- Cooling system with finned rotor

For Frame 254/6T and Up
- Cast iron frames
- Cast iron endshields and terminal box
- Cooling system with finned rotor
- Regreasable bearings positive pressure lubrication system
- Degree of protection : IP23

Note: All motors are tested according to IEEE 112 std. - Method 'B' or C390 CSA. All WEG motors are energy efficiency verified by UL in addition to the DOE.

APPROVED BY E 104590

APPROVED BY LR 38324

Fire Pump Motors

UL File number
EX5990
located on Fire Pump Label

WEG's Fire Pump motors are UL listed (UL 1004A) for Fire Pump applications in accordanc with NFPA 20. In addition, they feature a Class F insulation system and 1.15 service factor.

SUITABLE FOR FIRE PUMP APPLICATIONS DRIVEN BY VFD'S 10:1 SPEED RANGE (6 TO 60HZ) AND SF 1.15 FIRE PUMP MOTOR

USA375

Please contact your authorized distributor:

WEG Electric Corp.
6655 Sugarloaf Parkway
Duluth, GA 30096
Phone: 1-800-ASK-4WEG (275-4934)
web: www.weg.net

ELECTRIC FIRE PUMP CONTROLLER DATA

ص.ب: ٧٤٥٨٢ , دبي الامارات العربية المتحدة تيلفون : ٣٤٧٧٠٧٣ / ٣٤٧٢٤٢٦ ٤ ٩٧١+ فاكس : ٣٤٧٢٣٦٣ ٤ ٩٧١+

P.O.Box:74582,Dubai, UAE. Tel:+971 4 3472426 / 3477073 Fax:+971 4 3472363 E-mail:sales@bristol-fire.com www.bristol-fire.com

TORNATECH

Project: _____

Customer: _____

Engineer: _____

Pump Manufacturer: _____

Technical Data
Submittal Document

Model GPY

Full Service Reduced Voltage
Wye-delta Open
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 OPTIONAL SEISMIC COMPLIANT

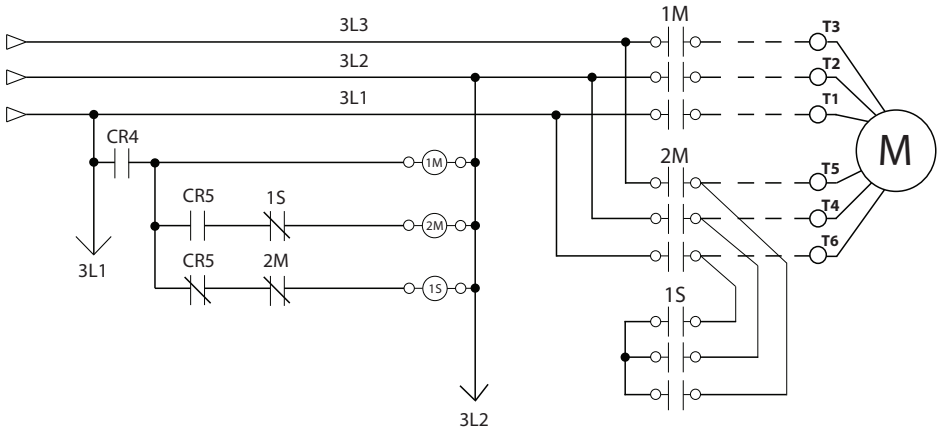
February 2019

TORNATECH

Technical Data

Model GPY Electric Fire Pump Controller

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 • CSA C22.2 No. 14 Industrial Control Equipment
	FM Global	Class 1321/1323
	New York City	Accepted for use in the City of New York by the Department of Buildings
	Seismic Certification	See page 7 for details
	Optional	
	☐ CE Mark	Various EN, IEC & CEE directives and standards
Enclosure	**Protection Rating** ☑ Standard: NEMA 2 (IP31)	
	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 ☐ IP54 ☐ IP55 ☐ IP65 ☐ 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 416V 50 Hz / 60Hz**	**440V to 480V 60Hz**	**575V to 600V 60Hz**
	HP (kw)				
☐ **Standard 100kA**	5-150 (3.7 - 110)	5-200 (3.7 - 147)	5-300 (3.7 - 220)	5-400 (3.7 - 335)	n/a
☐ **Optional 150kA**					
☐ **Standard 50kA**	200 (147)	250 (184)	350 - 450 (257 - 335)	450-500 (373)	5-500 (3.7- 373)
☐ **Optional 100kA**	n/a	n/a	n/a	450-500	

*Please see Disconnecting Means details on page 3

Technical Data

Model GPY Electric Fire Pump Controller

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

This is a Marketing document. Please consult factory if additional information is required.
Manufacturer reserves the right to modify this information without notice

Audible Alarm	4” 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 Audible and visual • 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.

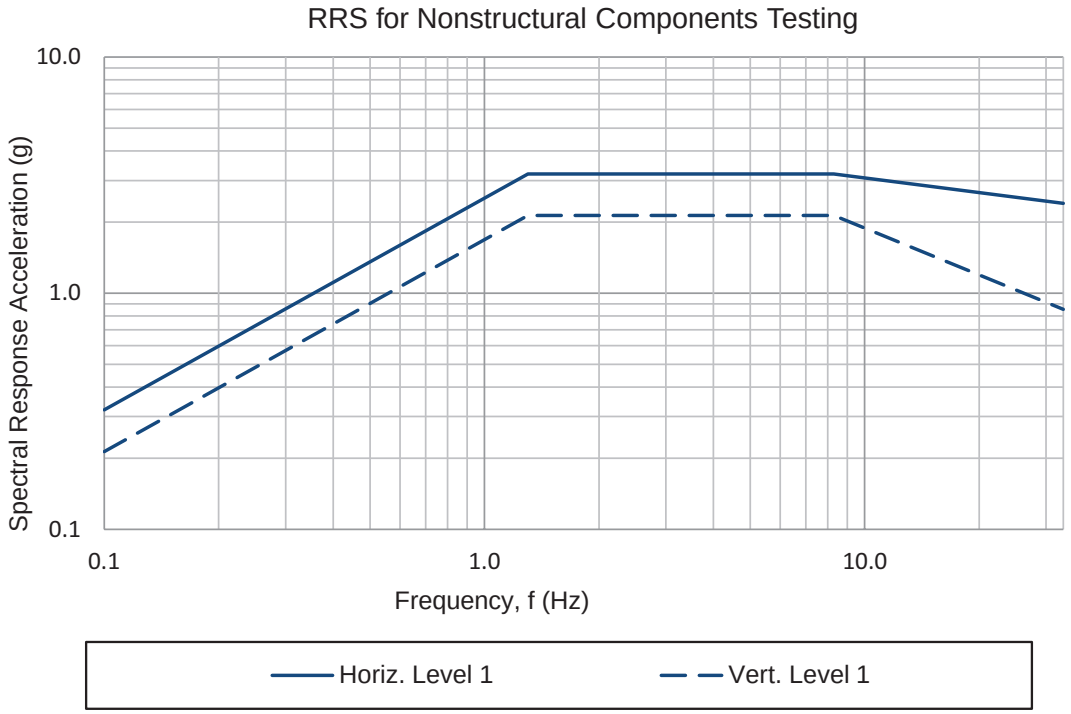
This is a Marketing document. Please consult factory if additional information is required.
Manufacturer reserves the right to modify this information without notice

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

This is a Marketing document. Please consult factory if additional information is required.
Manufacturer reserves the right to modify this information without notice

Seismic Certification	Seismic Certification Company	TRU Compliance, LLC A Tobalski Watkins Affiliate						TWEI Project No.: 15014			
	Mounting details	Rigid base and 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)

This is a Marketing document. Please consult factory if additional information is required.
Manufacturer reserves the right to modify this information without notice

☐ 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 (normal power section) • 208V to 480V = 150kA • 600V = 100kA
☐ D14	Anti-condensation heater & thermostat
☐ D14A	Anti-condensation heater & humidistat
☐ D14B	Anti-condensation heater & thermostat & humidistat
☐ 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)

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

This is a Marketing document. Please consult factory if additional information is required.
Manufacturer reserves the right to modify this information without notice

☐	D28	Customized drawing set
☐	D34A	Field programmable I/O board - 5 Input / 5 output

☐	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.

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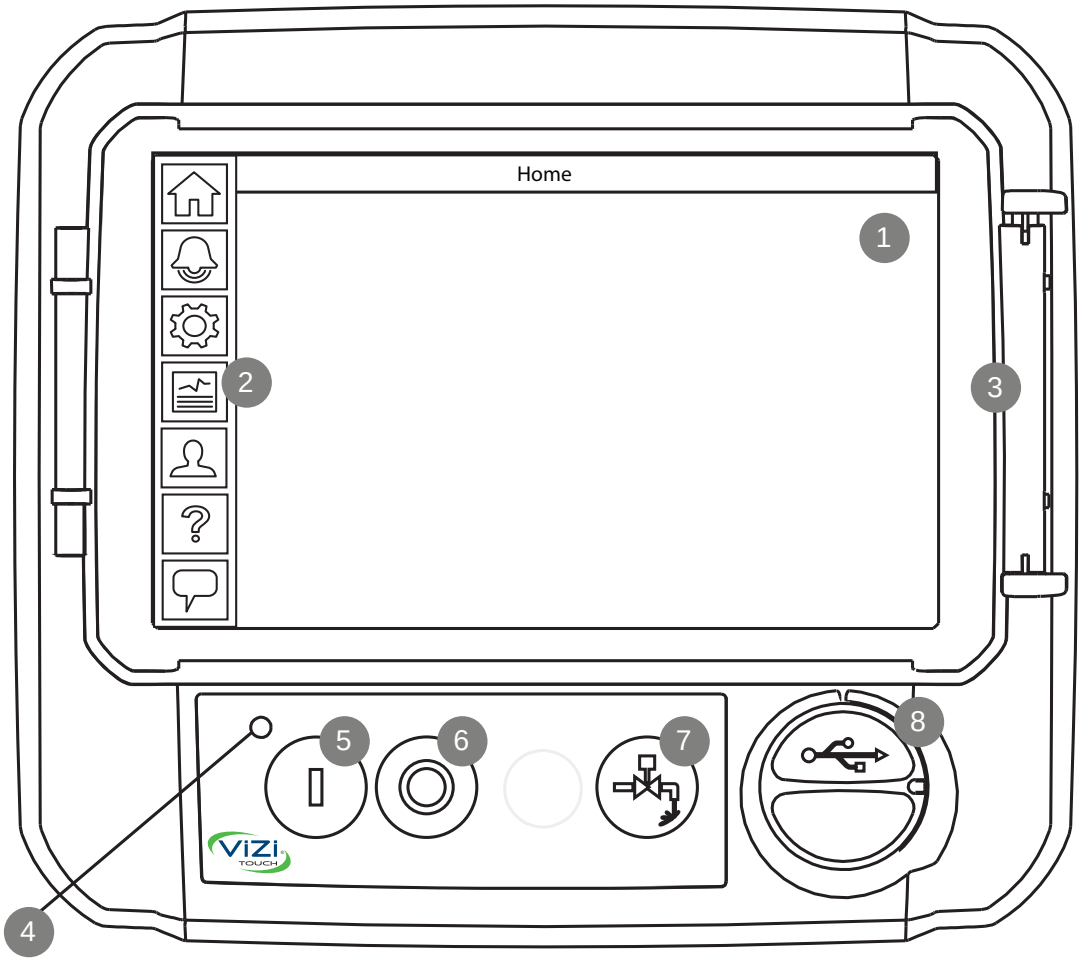
ViZiTouch V2 Operator Interface



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

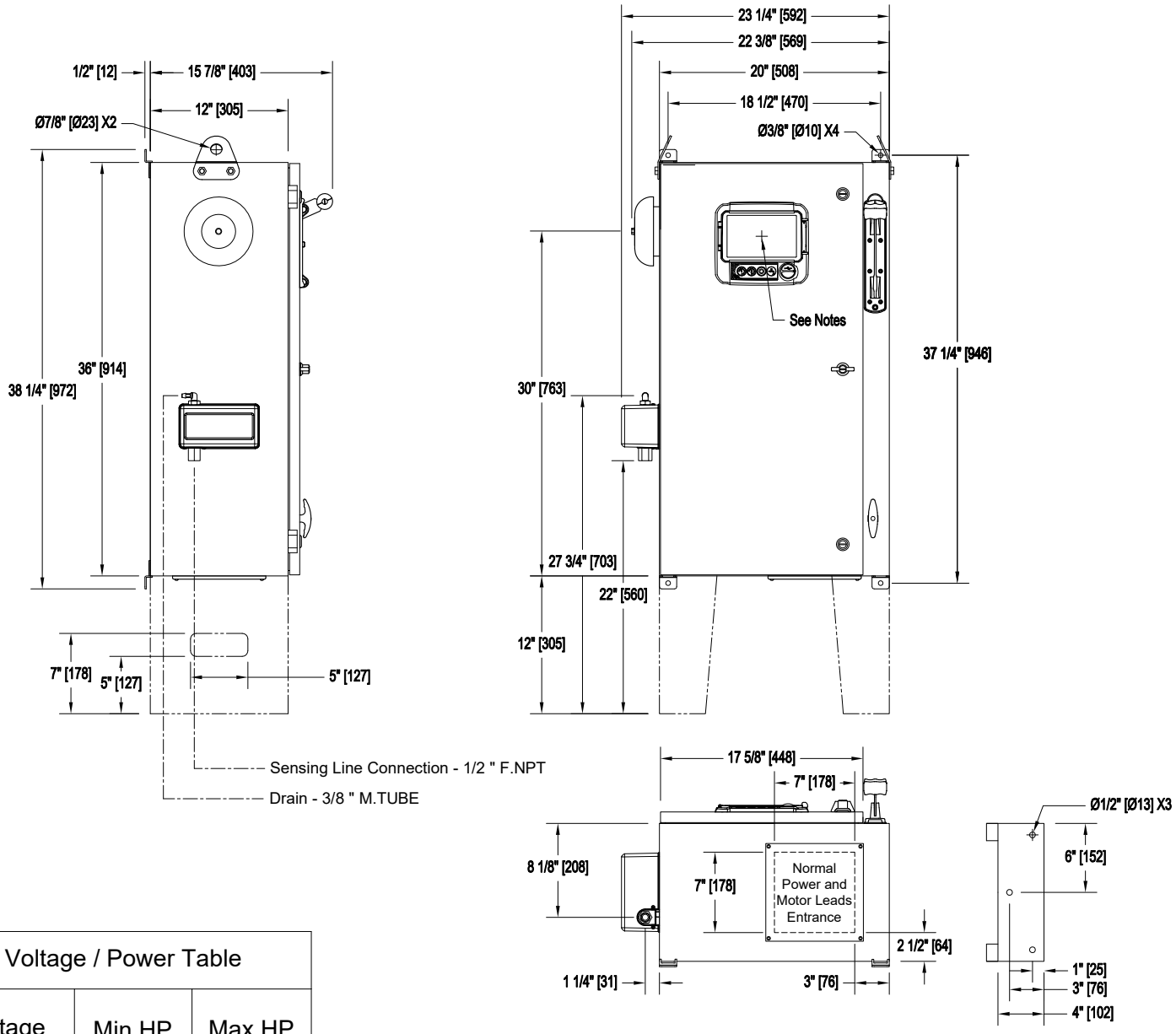
This is a Marketing document. Please consult factory if additional information is required.
Manufacturer reserves the right to modify this information without notice

Electric Fire Pump Controller

Model: GPA/GPP/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.
- Seismic mounting to be rigid wall and base only.

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

Projection

TORNATECH

SEISMIC COMPLIANT

c UL us

FM APPROVED

NYC Dpt of Building Approved

REV.	DESCRIPTION	DD/MM/YY	Drawing number
2.	Revised logo	18/06/18	
1.	Valve Change	21/11/17	GPX-DI161 /E
0.	First issue	16/11/16 CDL	

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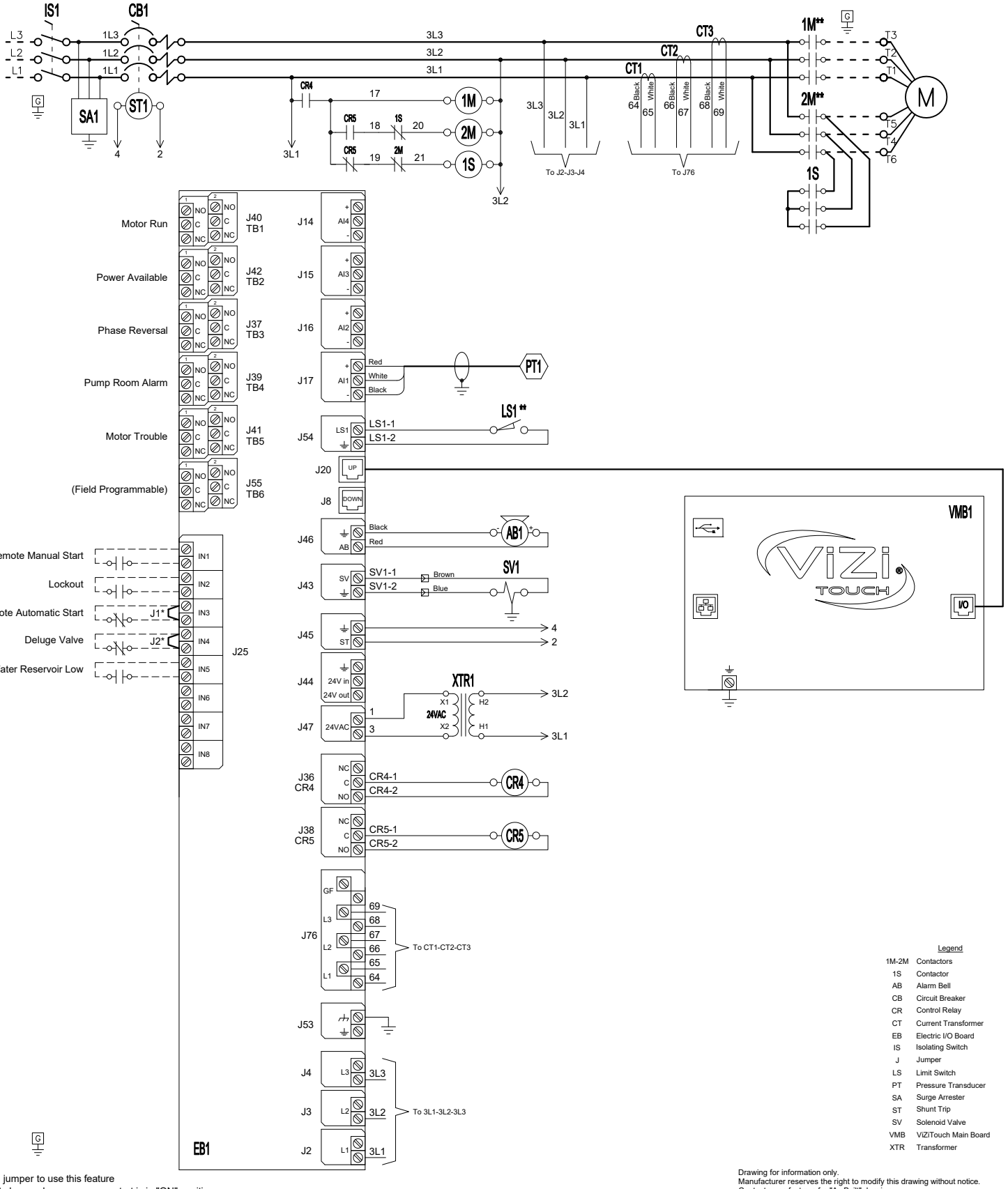
Electric Fire Pump Controller
Reduced Voltage / Wye-Delta (Open Transition)

Model: GPY

Wiring schematic

Built to the latest edition of the NFPA 20 standard



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

* Remove jumper to use this feature

** Contact closes when emergency start is in "ON" position

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

TORNATECH

SEISMIC COMPLIANT

c UL us

FM APPROVED

NYC Dpt of Building Approved

REV.	DESCRIPTION	DD/MM/YY	Drawing number
2	Update Logo	23/04/18	GPY-WS600 /E
1	Removed (fail safe) text from Power Available relay	20/02/17	
0	First issue	10/11/16	CDL

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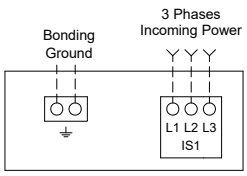
Electric Fire Pump Controller

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 250)	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 250)	1x (2/0 to 250)	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	1x (300 to 500)	1x (500)	2x (4/0 to 500)	2x (250 to 500)	2x (400 to 600)	--------	--------	--------	--------	--------	--------
220 to 240	1x (250 to 500)	1x (350 to 500)	2x (3/0 to 500)	2x (4/0 to 500)	2x (350 to 500)	2x (500 to 600)	--------	--------	--------	--------	--------
380 to 416	1x (1/0 to 250)	1x (3/0 to 250)	1x (250)	1x (300 to 500)	2x (3/0 to 250)	2x (4/0 to 500)	2x (300 to 500)	2x (400 to 600) / 2x (400 to 500)	2x (500 to 600)	2x (600)	--------
440 to 480	1x (1 to 250)	1x (2/0 to 250)	1x (3/0 to 250)	1x (4/0 to 250)	1x (350 to 500)	2x (3/0 to 250)	2x (4/0 to 500)	2x (300 to 500)	2x (350 to 500)	2x (400 to 600)	2x (500 to 600)
600	1x (3 to 1/0)	1x (1 to 250)	1x (2/0 to 250)	1x (3/0 to 250)	1x (250 to 500)	1x (350 to 500)	2x (3/0 to 250)	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 to 250)	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 250)	1x (4/0 to 250)	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	1x (400 to 500)	1x(500) 90°C or 2x(4/0 to 250) **	2x (300 to 500)	2x (350 to 500)	2x (600)	--------	--------	--------	--------	--------	--------
220 to 240	1x (350 to 500)	1x (500)	2x (250 to 500)	2x (300 to 500)	2x (500)	2x (600) 90°C *	--------	--------	--------	--------	--------
380 to 416	1x (3/0 to 250)	1x (250)	1x (350) ** N/A **	1x (400 to 500)	2x (4/0 to 250)	2x (300 to 500)	2x (400 to 500)	2x (500 to 600) / 2x (500)	2x (600) 90°C *	2x (600) 90°C *	--------
440 to 480	1x (1/0 to 250)	1x (3/0 to 250)	1x (250)	1x (300) ** or 1x (250) 90°C *	1x (500)	2x (250)	2x (300 to 500)	2x (400 to 500)	2x (500)	2x (600)	2x (600) 90°C *
600	1x (1 to 1/0)	1x (2/0 to 250)	1x (3/0 to 250)	1x (4/0 to 250)	1x (350 to 500)	1x (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

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REV.	DESCRIPTION	DD/MM/YY	Drawing number
2	Revised logo	18/06/18	GPX-TD602 1/2 /E
1	General Revision (added AL coverage)	10/07/17	
0	First issue	16/03/17 CDL	

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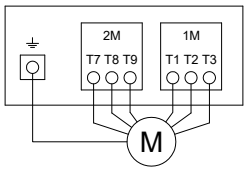
Electric Fire Pump Controller

Model: GPX

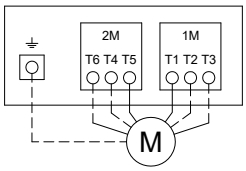
Terminal Diagram and Sizing For GPP,GPY & GPW

Built to the latest edition of the NFPA 20 standard

Motor Terminals



Model : GPP



Models : GPW & GPY

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

COPPER CONDUCTORS for Motor Connection (1M-2M).
Field Wiring According to Bending Space (AWG or MCM). Terminals T1-T2-T3-T4-T5-T6-T7-T8-T9

HP / Voltage	5	7.5	10	15	20	25	30	40	50	60
208	1x (14 to 10)	1x (12 to 10)	1x (10)	1x (8 to 2)	1x (8 to 2)	1x (6 to 2)	1x (6 to 1/0)	1x (4 to 2/0)	1x (2 to 3/0)	1x (1 to 2/0)
220 to 240	1x (14 to 10)	1x (12 to 10)	1x (10)	1x (8 to 2)	1x (8 to 2)	1x (6 to 2)	1x (6 to 1/0)	1x (4 to 2/0)	1x (3 to 2/0)	1x (2 to 2/0)
380 to 416	1x (14 to 10)	1x (14 to 10)	1x (14 to 10)	1x (12 to 10)	1x (10)	1x (10)	1x (8 to 2)	1x (6 to 2)	1x (6 to 2)	1x (4 to 1/0)
440 to 480	1x (14 to 10)	1x (14 to 10)	1x (14 to 10)	1x (12 to 10)	1x (12 to 10)	1x (10)	1x (10 to 2)	1x (8 to 2)	1x (6 to 2)	1x (6 to 2)
600	1x (14 to 10)	1x (14 to 10)	1x (14 to 10)	1x (14 to 10)	1x (12 to 10)	1x (12 to 10)	1x (10)	1x (10 to 2)	1x (8 to 2)	1x (8 to 2)

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

ALUMINUM CONDUCTORS for Contactor (1M-2M).
Field Wiring According to Bending Space (AWG or MCM). Terminals T1-T2-T3-T4-T5-T6-T7-T8-T9

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

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

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

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REV.	DESCRIPTION	DD/MM/YY	Drawing number
2	Revised logo	18/06/18	GPX-TD602 2/2 /E
1	General Revision (added AL coverage)	10/07/17	
0	First issue	16/03/17 CDL	

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JOCKEY PUMP DATA

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2013
.08

RV,RVA

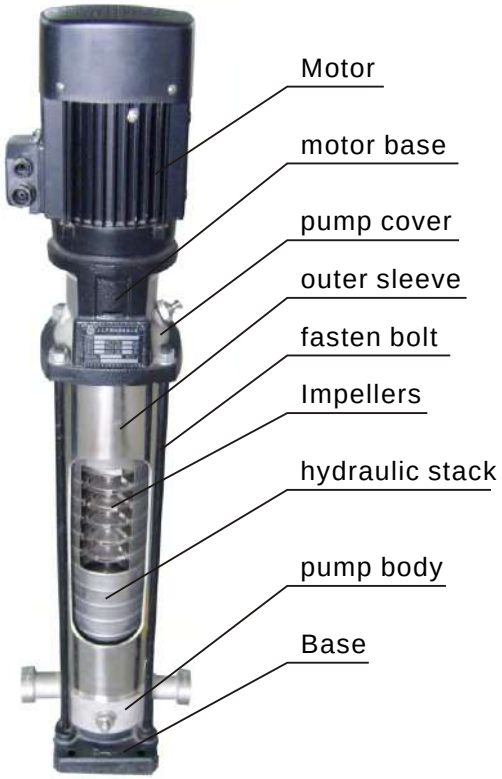
Vertical Multistage Centrifugal Pump

50Hz

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.

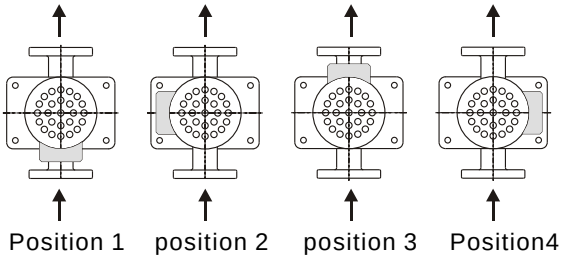
Terminal box positions

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.

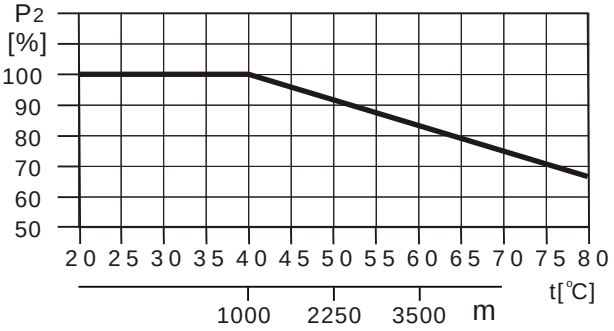
Fig2. Terminal box positions



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, contact.

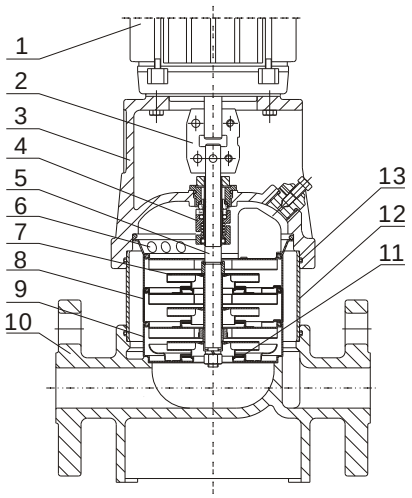
Fig.3 Relationship between motor output (P2) and temperature



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%.

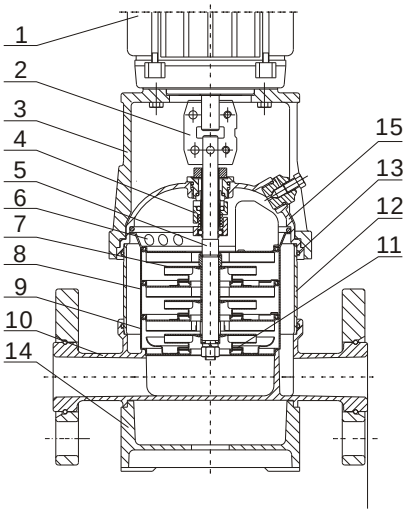
RV1,2,3,4,5

Sectional drawing



RVA1,2,3,4,5

Sectional drawing



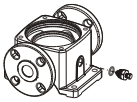
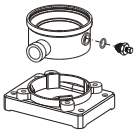
Material RV

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

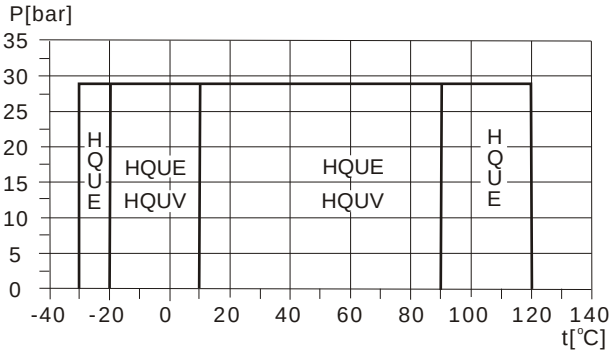
Maximum operating pressure and temperature range

	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



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.

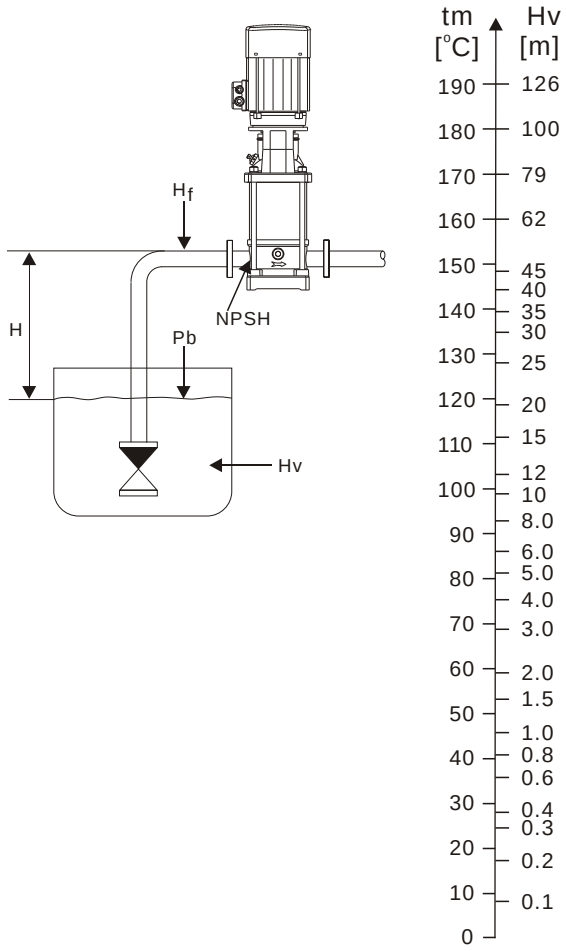
Example:

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



Zirantec

Vertical Multistage Pumps

GENERAL

FV SERIES - 50 Hz

ZIRANTEC VERTICAL MULTISTAGE PUMPS - FV SERIES

The ZIRANTEC vertical multistage centrifugal pumps are non-self- priming with inline suction and discharge ports on the same level. The inline construction provides a smooth flow of liquid through the entire system. The vertical inline pump is ideal for applications where space is an issue as its horizontal alternative can take up to 2-3 times more space. These pumps are specially designed for high pressure applications where no suction lift is required. All wetted parts are made of corrosion resistant stainless steel which offers best hydraulic efficiency and durability. All pumps are fitted with maintenance free cartridge mechanical seal for safe handling, easy service and access. ZIRANTEC pumps have wider choice to suit any kind of high pressure requirements in its category. These pumps are being supplied with DIN flanges(Round and PJE) as standard option and other type also can be supplied against specific requirement.

The ZIRANTEC vertical multistage pumps are offered with ZIRANTEC energy efficient motors to give better efficiency and life. All single phase motors are fitted with thermal overload protector to safe guard the winding while overloading and extreme operating conditions. These pumps are supplied with high efficient IE2 motors in 3 Phase; IE3 motors also can be supplied on request.

The ZIRANTEC can also offer complete pressure boosting system with single or multiple pumps, VFD controller, manifold, pressure gauge, pressure switch, pressure tank etc with single and multi-pump options.

FEATURES

- Mechanical seal can be replaced in the installed position without removing pump from the system
- Different type of flange options against specific requirement
- Optional customized pressure boosting systems
- Inbuilt thermal overload protector for single phase motors

APPLICATIONS

- Pressure boosting systems
- Fire fighting systems
- Industrial washing systems
- Sprinkler irrigation systems
- High pressure pumping application in water treatment plant and boiler plant
- Utility water supply in industries

PERFORMANCE CURVE CONDITIONS

- The conditions below apply to the curves shown on this entire catalogue.
- Curve tolerance are according to ISO 9906, Grade 2B.
- The performance are taken at rated voltage & speed that are only indicative.
- Actual discharge depends on availability of water in well / tank, height of water column from the suction pipe end.
- The measurements were made with airless water at 20°C. When pumping liquids with a density higher than of water, motors with correspondingly higher outputs must be used.
- The bold curves indicate the recommended performance range.
- Pipe friction losses have not been included in the performance curves & performance tables.

Zirantec

IMPORTANT NOTES

| Read our operator's manual carefully before installation | Pump should not be operated dry | Install dry run preventer to protect the pumpset from dry running | Use appropriate size, good quality cable and starter / protection devices | Use low friction good quality pipes | The pipe diameters must never be smaller than the pump connections | Install pump according to our recommended Head range | Reduce number of bends, elbows, T-bends as much as possible in the pipe line | All pumpsets employ a prime mover motor of suitable size | Avoid fatal electrical shock or injury by disconnecting power before working on or around the pumping system | Only technically qualified personnel must perform the works complying with local electricity rules and regulations | To reduce the risk of electrical shock during operation, an appropriate earthing is mandatory | Maximum permissible supply voltage should lie between ±10% of the rated voltage | The performance data and curves are at rated voltage and only indicative | Product pictures shown are only for illustration purpose and the actual product may vary than they appear in picture | Standard pump supply is made for the maximum flange pressure rating mentioned in the dimensional drawing | Pipe sizes mentioned in inches are nominal pipe sizes and are nearest conversion of mm.

MODEL IDENTIFICATION CODE

F V X XXX - XX (X) (X) X (X) (X)

F — **ZIRANTEC CENTRIFUGAL PUMP**

V — VERTICAL MULTISTAGE

X — TYPE OF MATERIALS OF CONSTRUCTION (M.O.C)
Pump outershell / Impeller / Pump base/Suc.&Del. Ports
S = SS 304/SS 304/SS 304/SS 304
N = SS 316/SS 316/SS 316/SS 316
C = SS 304/SS 304/Cast Iron/Cast Iron

XXX — NOMINAL FLOW RATE (m³/h)

XX — NUMBER OF IMPELLERS

(X) — NUMBER OF TRIMMED IMPELLERS (This digit is applicable only for pumps with trimmed impellers)
A = 1 Trimmed impeller
B = 2 Trimmed impellers
R = 1 Further Reduced impeller
P = 2 Further Reduced impeller

(X) — TYPE OF PORT CONNECTION (This digit is appliable only for PJE coupling)
P = PJE coupling

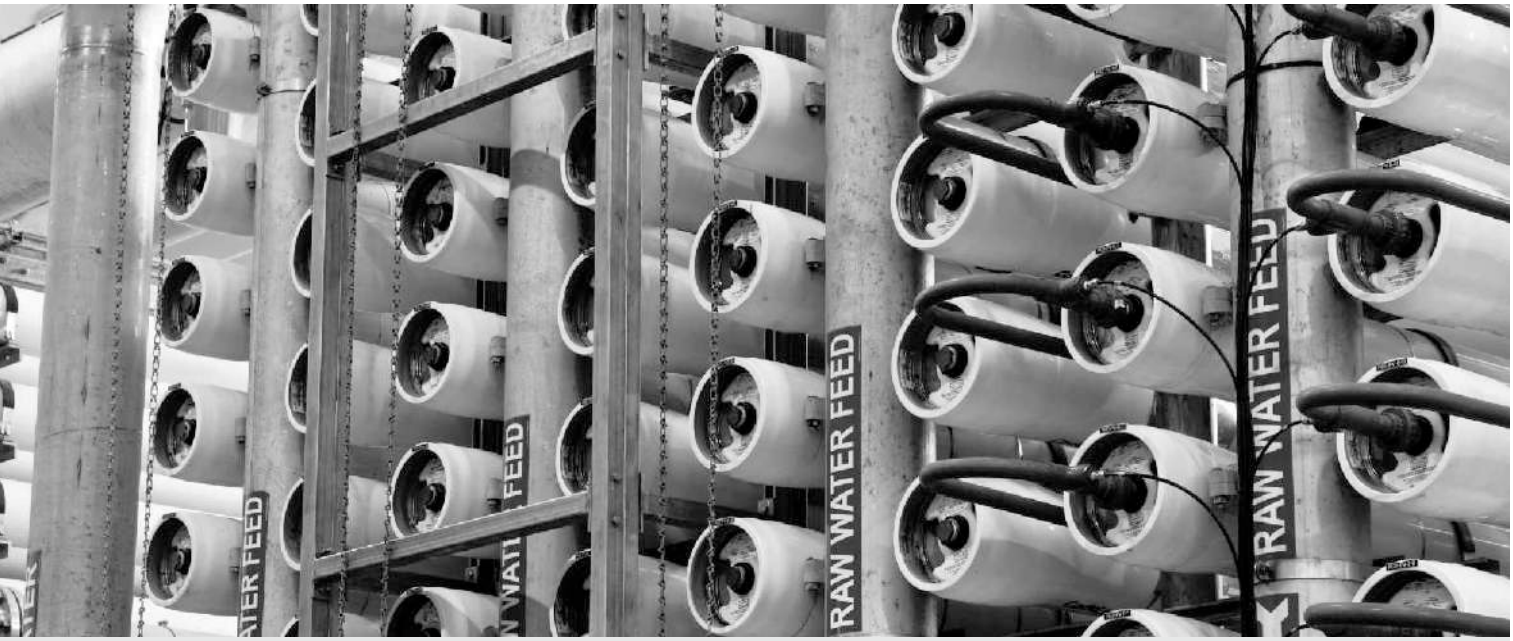
X — Phase / Connection / Control box / Frequency
M = 1P/PSC/50Hz
S = 1P/CSCR/50Hz
T = 3P/D.O.L/50Hz
D = 3P/S.D/50Hz

(X) — VOLTAGE (This digit is applicable except 230V 1Ph & 380-415V 3Ph)

(X) — HIGH EFF. MOTOR (applicable only when supplied with IE2 & IE3 motors)
2 for IE2 & 3 for IE3

VERTICAL MULTISTAGE PUMP SET

PUMP MODEL	/	CODE
F V X XXX - XX X	/	FVS05-02T



TECHNICAL SPECIFICATIONS

Power Range	0,5 to 150 HP
Speed	2900 rpm
Degree of protection	IP 55 (Optional IP44 / IP54)
Insulation class	'F' (Optional 'B')
Versions	Single Phase 230V, 50Hz, A.C. Supply (0,37 - 2,2kW) (Permanent Split Capacitor-PSC & CSCR) Incorporated with thermal over load protector. Three Phase 380-415V, 50Hz, A.C. Supply (0,37 - 110kW)
Sealing	Mechanical seal - Cartridge type
Direction of rotation	Anti-clockwise viewed from driving end
Type of Duty	S1 (continuous)
Flange type	Round / PJE
Flange Standard	DIN
Pipe Connection	DN 25, DN 32, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125 & DN 150

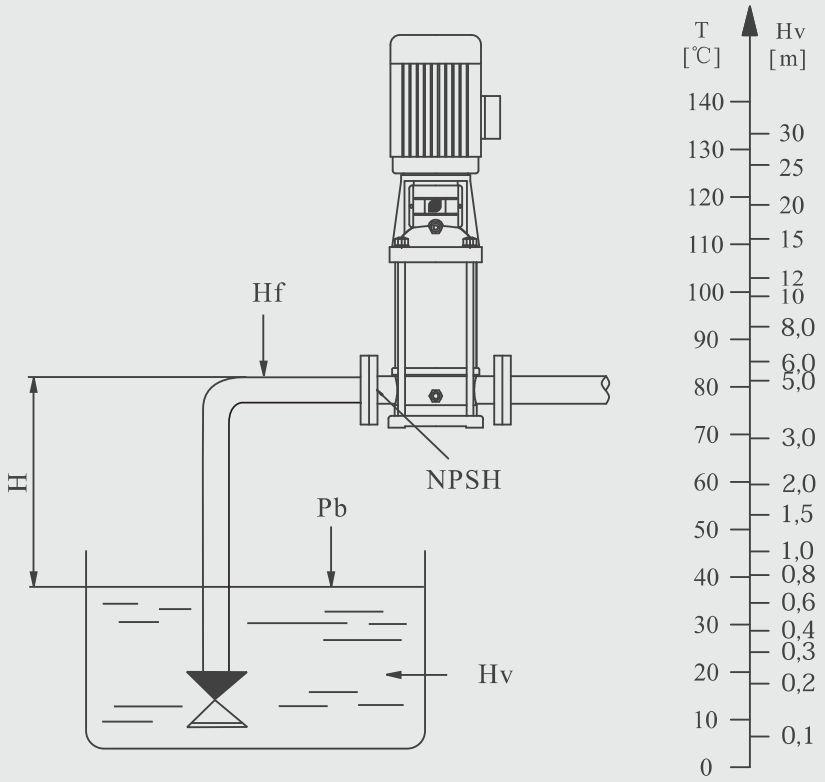
OPERATION LIMITS

Maximum Suction Lift	upto 3 m
Maximum Liquid Temperature	- 15°C to + 120°C
Maximum Ambient Temperature	40°C
Maximum Operating Pressure Range	32 Bar

PERFORMANCE RANGE

Maximum Nominal Flow	200 m³/h
Maximum Head	320 m

INLET PRESSURE



MAXIMUM INLET PRESSURE

The actual inlet pressure plus the Shutt off Pressure (Head) should always be lower than the "maximum operating pressure".

MINIMUM INLET PRESSURE

In case that the pressure in pump is lower that steam pressure used to convey liquid, the cavitations will occur. To avoid the cavitations, and lessen the vibration and noise, you are suggested to adopt NPSH to make sure that the pump are under optimal operation condition.

The following formula can be used for calculation of minimum inlet pressure :

H = Pb x 10,2 - NPSH - Hf - Hv - Hs

H : Maximum suction head (m)

Pb : Atmosphere pressure (bar)

In a closed system, Pb means system pressure (bar)

NPSH : Net positive suction head (m)

It can be read from the point of Max.flow rate shown on NPSH curve.

Hf : Pipeline loss at the inlet (m)

It is in accordance with pipeline possible Max.flow.

Hv : Stream pressure (m)

It depends on liquid temperature and system pressure value.

Hs : Safety margin (m)

Minimum 0,5m delivery head

If the calculated result H is negative, the pump may run under the Max. suction head H. In case the calculated result H is negative, a delivery head if Min.inlet pressure is necessary.

NOTE : Normally, the above calculation will not be done. H is calculated in the following conditions:

1. The liquid temperature is comparatively higher.
2. Liquid flow exceeds rated value.
3. Suction head is comparatively large or inlet pipeline long.
4. System pressure is too low.
5. Bad inlet condition.

MATERIALS OF CONTRUCTION

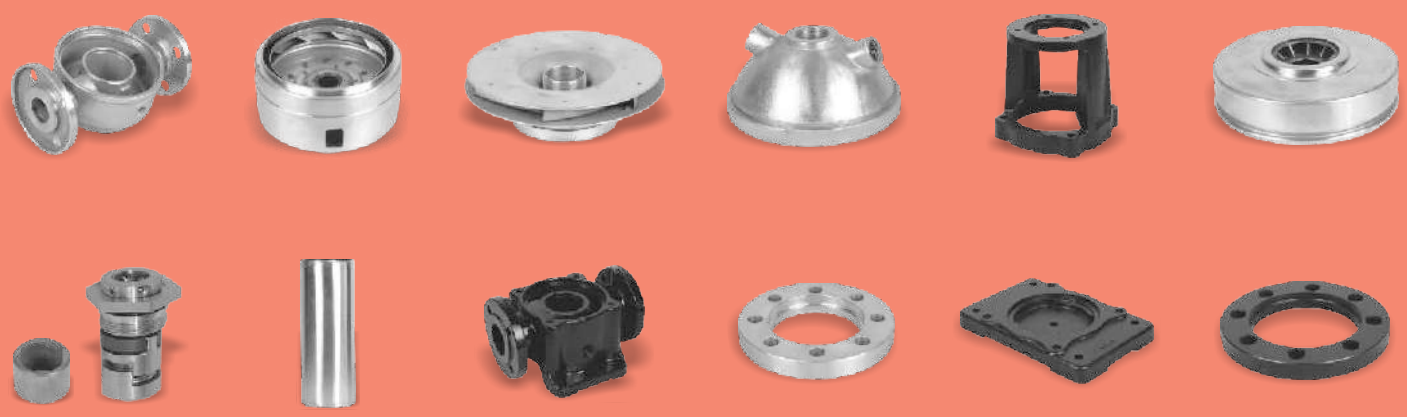
Part Name	Part No.	Type - C	Type - S	Type - N
Pump Outer Shell	29,06	SS 304	SS 304	SS 316
Pump Head	30,00	C.I	Upto 16m³/h - C.I Above 32m³/h - SS 304	Upto 16m³/h - C.I Above 32m³/h - SS 316
Pump Head Cover	30,07	NA	SS 304*	SS 316*
Pump Head Stool (Only for 32m³/h & above)	30,01	C.I / D.I	C.I / D.I	C.I / D.I
Pump Base	29,01	C.I / D.I	SS 304	SS 316
Base Plate	24,03	NA	C.I / D.I	C.I / D.I
Impeller	19,00	SS 304	SS 304	SS 316
** Mechanical Seal	16,00	SiC / SiC / FKM	SiC / SiC / FKM	SiC / SiC / FKM
*** Bush	12,03	SiC / SiC	SiC / SiC	SiC / SiC
Diffuser (Chamber)	18,07	SS 304	SS 304	SS 316
Pump Shaft	22,00	SS 304 / 431	SS 304 / 431	SS 316/329
Wearing Ring	17,01	Teflon	Teflon	Teflon
Flange	29,04	C.I	SS 304	SS 316
Neck Ring	19,01	SS 304	SS 304	SS 316
"O" Ring	32,09	EPDM / FKM	EPDM / FKM	EPDM / FKM
Coupling	22,01	M.S / C.I / D.I	M.S / C.I / D.I	M.S / C.I / D.I
Split Cone	19,02	SS 304	SS 304	SS 316
Split Cone Nut	19,03	SS 304	SS 304	SS 316

* Provided only upto 16m³/h

** Optional Mechanical Seal MOCs
TC / TC / FKM
SiC / SiC / EPDM
TC / CARBON / EPDM
TC / TC / EPDM

*** Optional Bush MOC
TC / TC
Applicable for 120m³/hr and above

SiC - Silicon Carbide, TC - Tungsten Carbide, FKM - Fluoroelaromer (VITON), EPDM - Ethylene Propylene Diene Monomer



JOCKEY PUMP CONTROLLER DATA

ص.ب: ٧٤٥٨٢ , دبي الامارات العربية المتحدة تيلفون : ٣٤٧٧٠٧٣ / ٣٤٧٢٤٢٦ ٤ ٩٧١+ فاكس : ٣٤٧٢٣٦٣ ٤ ٩٧١+
P.O.Box:74582,Dubai, UAE. Tel:+971 4 3472426 / 3477073 Fax:+971 4 3472363 E-mail:sales@bristol-fire.com www.bristol-fire.com

TORNATECH

Project: _____

Customer: _____

Engineer: _____

Pump Manufacturer: _____

Technical Data
Submittal Document

Model JP3

Across the Line Start
Jockey Pump Controller

Contents:

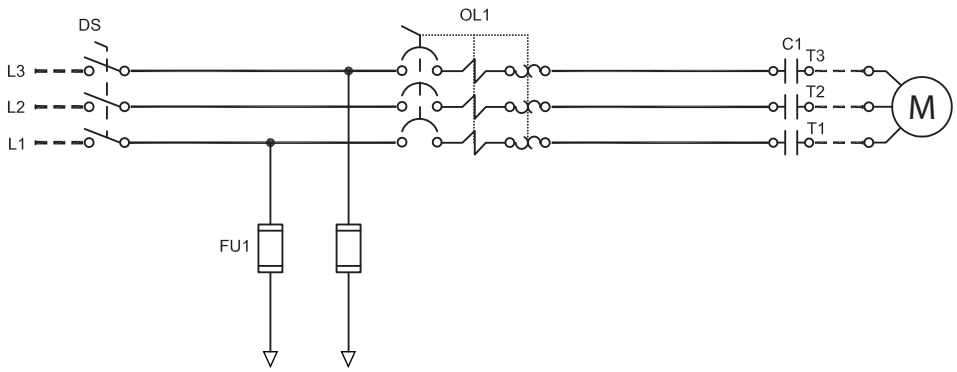
Note: The drawings included in this package are for controllers covered under our standard offering. Actual AS BUILT drawings may differ from what is shown in this package.

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

August 2018

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 (IP31) **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

This is a Marketing document. Please consult factory for more information.
Manufacturer reserves the right to modify this information without notice

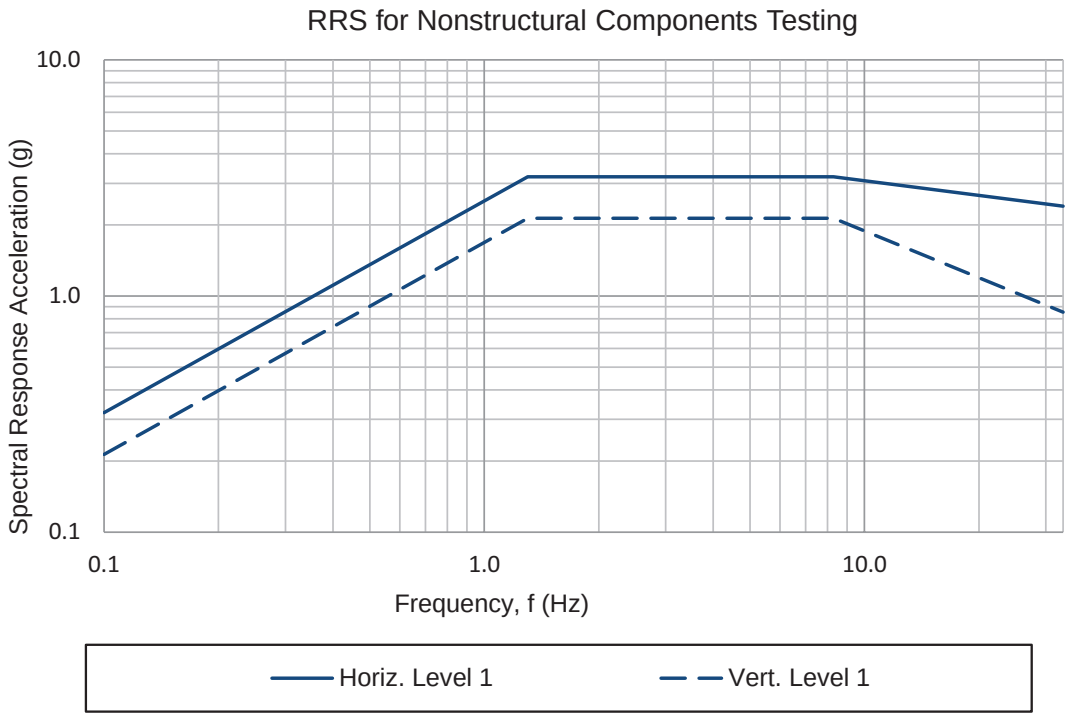
Fuseless Motor Starter	• Main disconnect – padlockable – rotary type handle – door interlocked • Thermo-magnetic motor protector • Contactor		
Control Circuit	• 24V.AC		
***iPD*+ Operator Interface**	• Solid state controls • All adjustments on door front • Navigation pushbuttons		
Pressure Sensing	• Pressure transducer for fresh water application 316 stainless steel construction • Rated for 0-600psi working pressure • Pressure sensing line connection ¼" 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)

This is a Marketing document. Please consult factory for more information.
Manufacturer reserves the right to modify this information without notice

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)

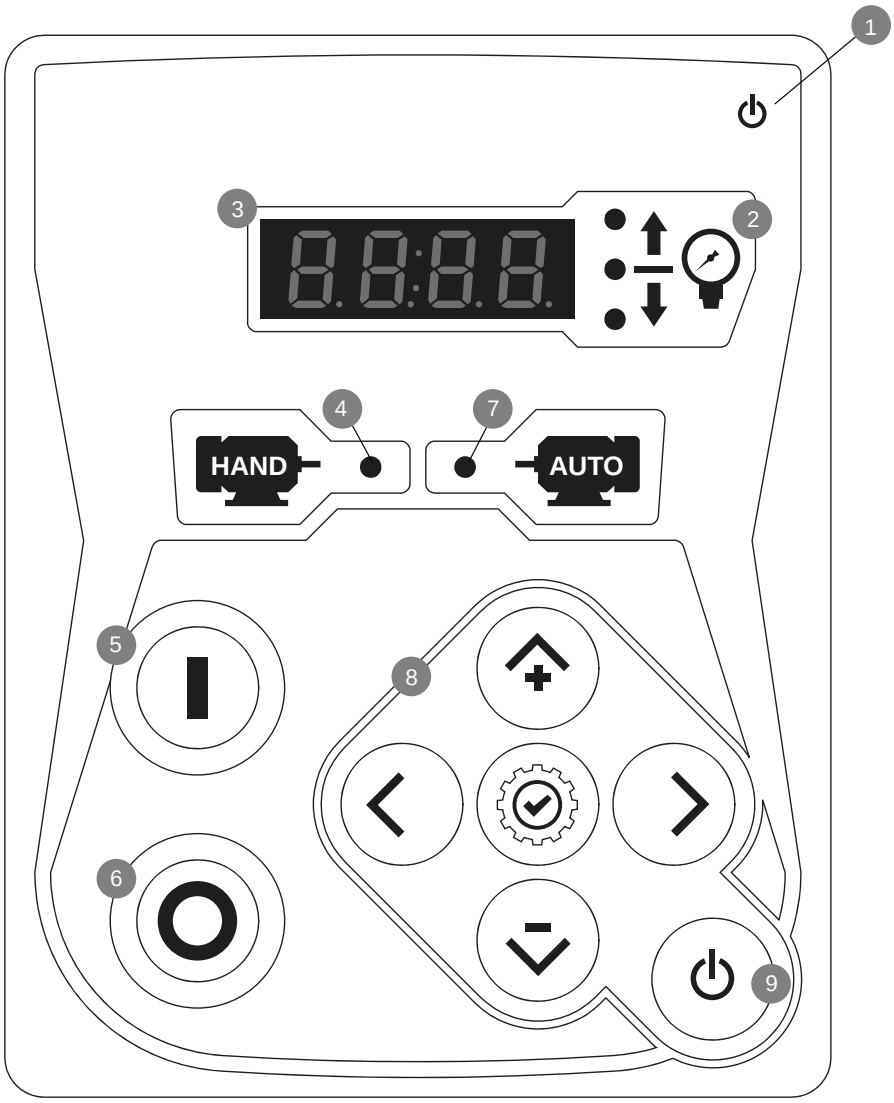
This is a Marketing document. Please consult factory for more information.
Manufacturer reserves the right to modify this information without notice

	A4	Elapsed time meter (time totalizer)
	A5	Motor run alarm contact
	A6	Loss of power alarm contact
	A7	Overload or short circuit alarm contact
	D12	CE Mark c/w externally mounted wetted parts
	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

This is a Marketing document. Please consult factory for more information.
Manufacturer reserves the right to modify this information without notice

Jockey Pump Controller

Across the Line / 3 Phase

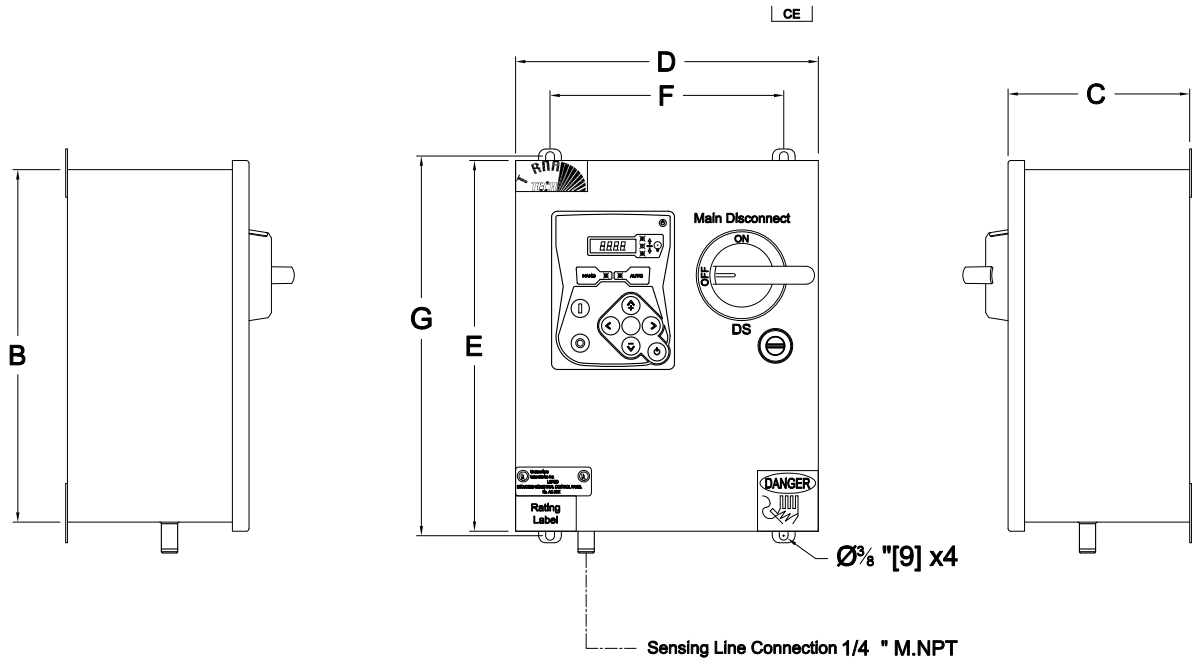
Dimensions

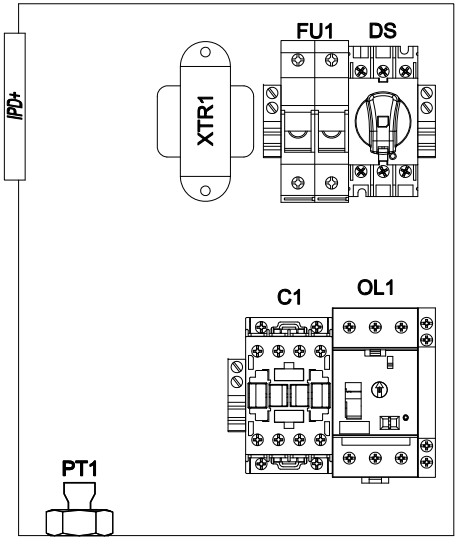
Model:JP3

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

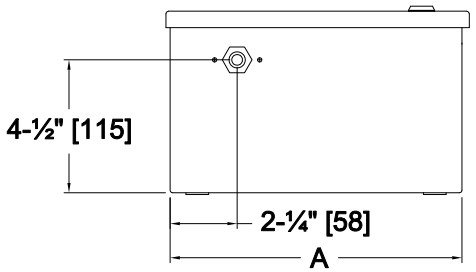
PER QUOTE DRAWING No.		
REV.	DESCRIPTION	DD/MM/YY
5	Modified Tornatech & Seismic Logo	14/04/16
6	Modified J19 Outputs ID	10/06/16
7	Revised logo	18/06/18

Drawing No.: JP3-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

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Jockey Pump Controller

Across the Line / 3 Phase

Wiring schematic

Model:JP3

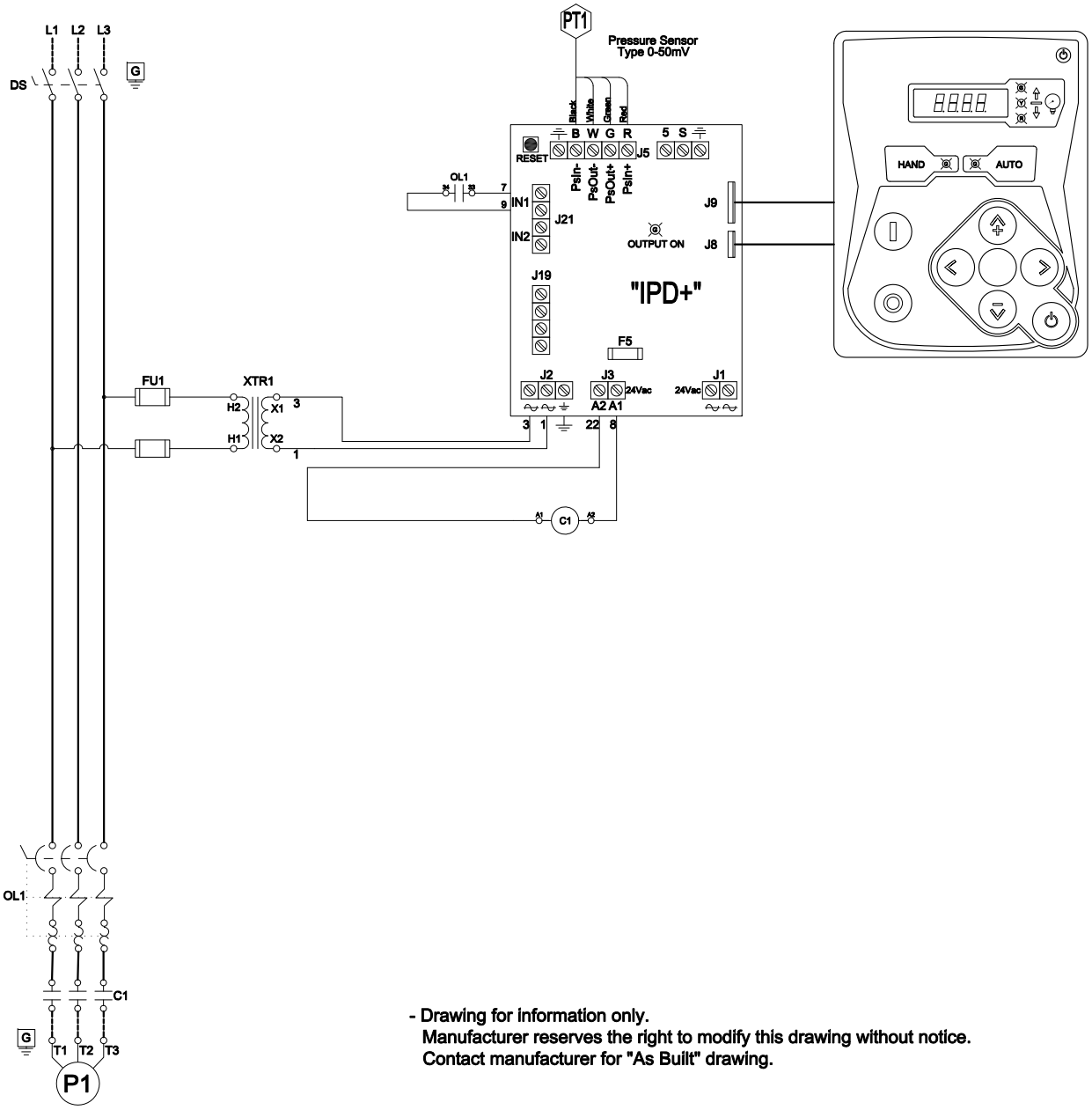
Built to the latest edition of the UL 508A & CSA C22.2 No.14 standard

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



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

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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

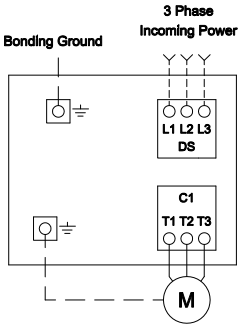
PER QUOTE DRAWING No.

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

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ACCESSORIES

Bourdon Tube Pressure Gauges

Black Polycarbonate Case
Copper Alloy Wetted Parts
UL Listed / FM Approved
Sprinkler Gauges • Type 111.10SP

Pressure Gauges

Application
Fluid medium which does not clog connection port or corrode copper alloy. Specifically designed for the fire sprinkler industry.

Sizes
4" (100 mm)

Accuracy
± 3/2/3% of span (ASME B40.1 Grade B)

Ranges
0/80 PSI retard to 250 PSI (Air)
0/300 PSI (Water)

Working Range
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: max. 140°F (+60°C)

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

Standard Features

Connection
Material: copper alloy
Lower mount (LM)
1/4" NPT limited to wrench flat area

Bourdon Tube
Material: copper alloy
C-type

Movement
Copper alloy

Dial
White aluminum with stop pin. Black and red markings

Pointer
Black aluminum- non- adjustable

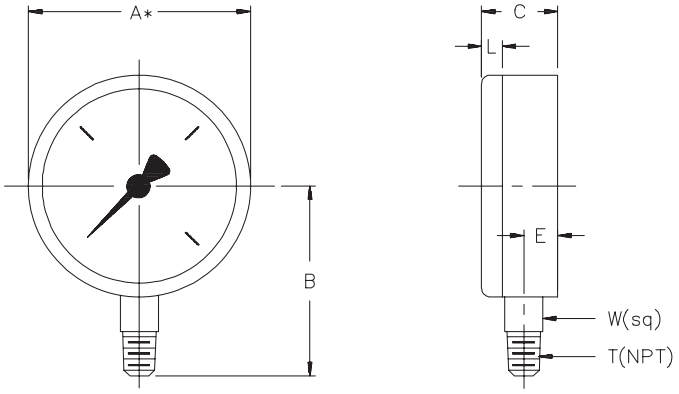
Case
Black polycarbonate

Window
Snap-in clear polycarbonate

Approvals
UL Listed (UL-393)
Factory Mutual Approved

Order Options (not all options are UL or FM approved)
Brass threaded or press fit restrictor
Cover ring
Glass window
Black painted steel case
Stainless steel case
Special case colors
Special connections limited to wrench flat area
Nickel plated connection
Custom dial layout
Other pressure scales available:
Bar, kPa, MPa, Kg/cm^2 and dual scales
DIN standards

Dimensions:



A* NOMINAL SIZE

111.10SP 4" LM	WEIGHT	KEY	A*	B	C	E	L	T	W
	0.35 lbs.	mm	100	83.5	30	11.5	3.75	--	14
		in	4.0	3.29	1.18	0.45	0.15	1/4	0.55

THE MEASURE OF
Total Performance™

Ordering Information:
State computer part number (if available) / type number / size / range / connection size and location / options required.

Specifications given in this price list represent the state of engineering at the time of printing.
Modifications may take place and the specified materials may change without prior notice

05/01

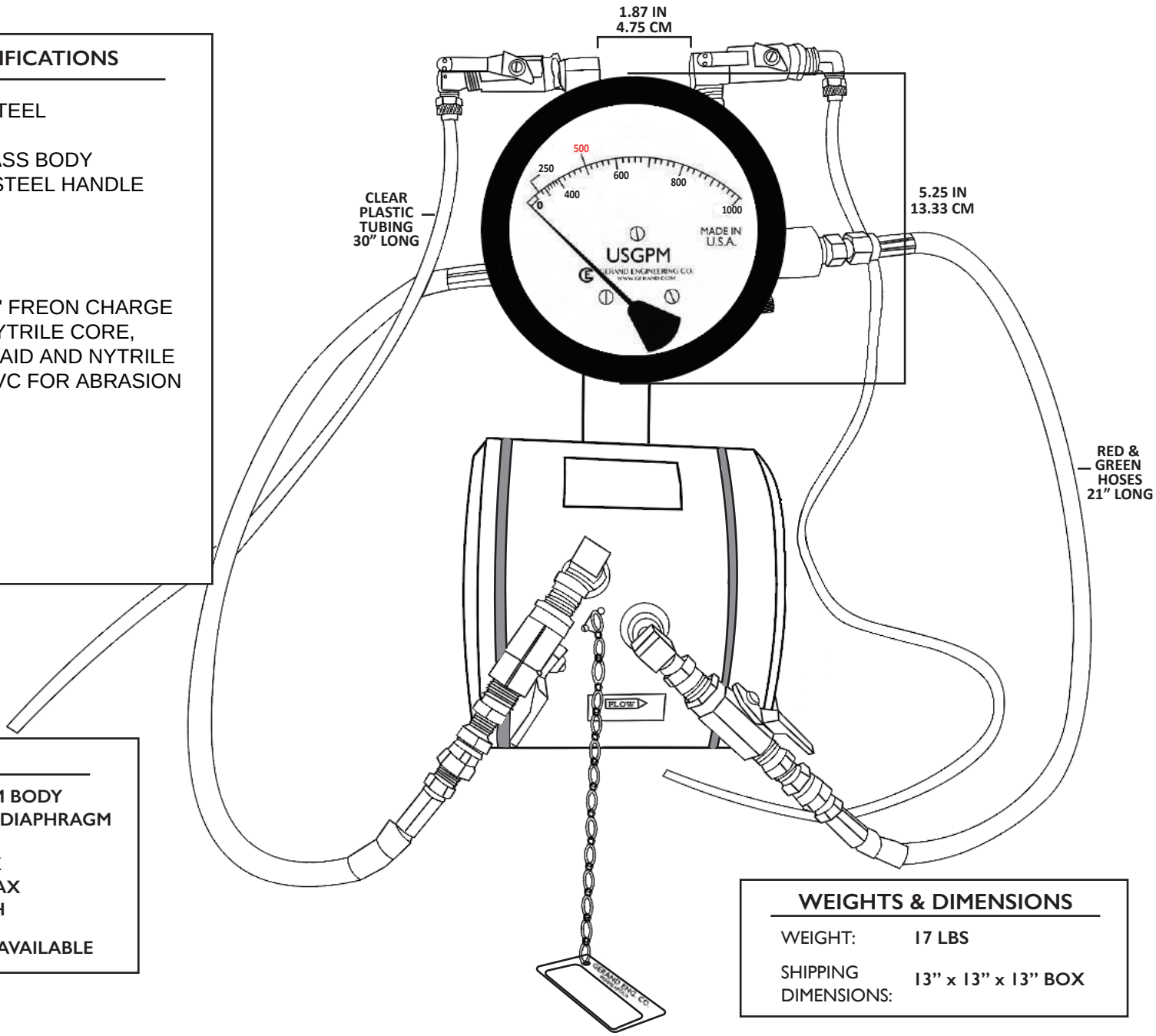
WIKA Instrument Corporation
1000 Wiegand Boulevard
Lawrenceville, Georgia 30043-5868
Tel: 770-513-8200 Fax: 770-338-5118
http://www.wika.com e-mail: info@wika.com

GERAND ENGINEERING
11504 K-TEL DRIVE, MINNETONKA MN 55343
952.374.1320 WWW.GERAND.COM

FIRE PUMP TEST METER
G-500-6

CONSTRUCTION & SPECIFICATIONS

VENTURI:	ZINC PLATED STEEL
VALVES:	ONE PIECE BRASS BODY ZINC DIECAST STEEL HANDLE
ID TAG:	Chain: brass Tag: Aluminum
HOSES:	GOODYEAR 3/6" FREON CHARGE HOSES WITH NYTRILE CORE, POLYESTER BRAID AND NYTRILE COVER WITH PVC FOR ABRASION RESISTANCE



METER DATA

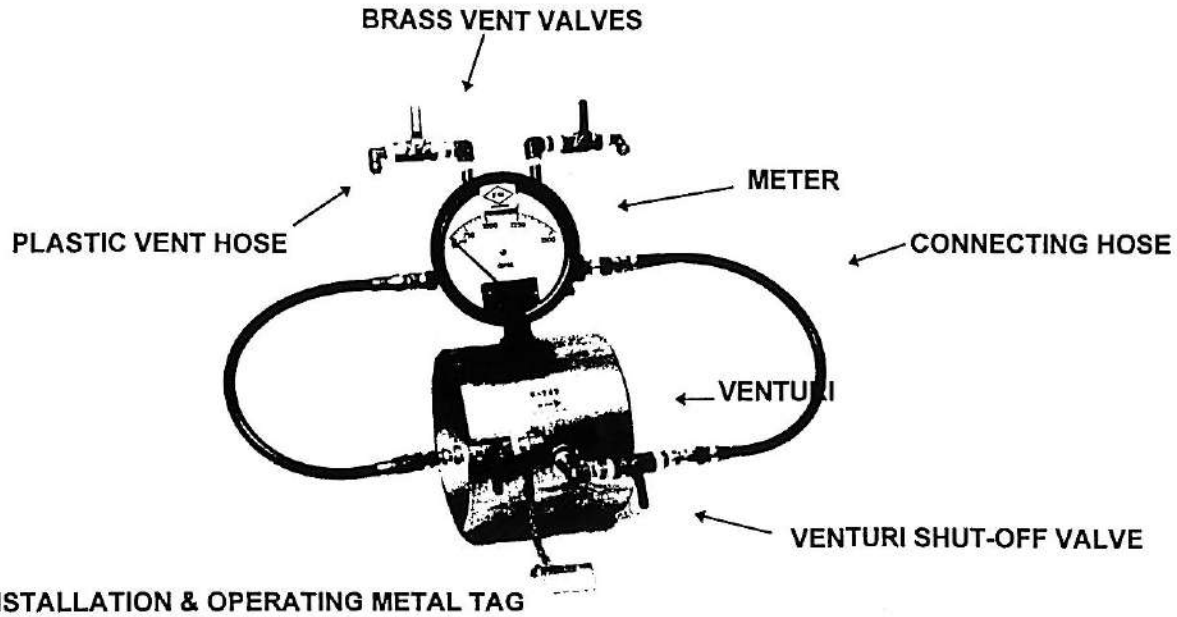
CONSTRUCTION:	**ALUMINUM BODY**
OPERATION:	**BUNA "N" DIAPHRAGM**
ACCURACY:	**±2.0%**
TEMPERATURE:	**200° F MAX**
PRESSURE:	**1500 PSI MAX**
APPROX. WEIGHT:	**3 LBS/EACH**

4 1/2" DIAL STANDARD - 6" AVAILABLE

WEIGHTS & DIMENSIONS

WEIGHT:	**17 LBS**
SHIPPING DIMENSIONS:	**13" x 13" x 13" BOX**

FIRE PUMP TEST METER INSTRUCTIONS



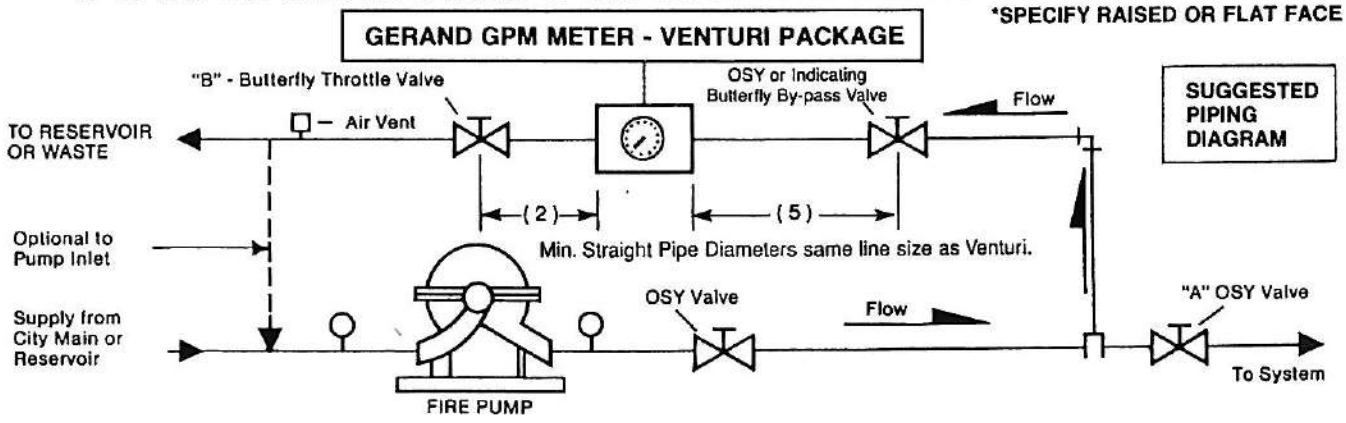
INSTALLATION & OPERATING METAL TAG NOT SHOWN THOUGH IS PERMANENTLY ATTACHED

OPERATING INSTRUCTIONS:

ATTACHED TO THE METER WITH A BRASS CHAIN IS AN OBLONG METAL TAG WITH THE SUGGESTED PIPING DIAGRAM OF THE SYSTEM ON ONE SIDE AND THE FOLLOWING OPERATING INSTRUCTIONS ON THE REVERSE SIDE.

1. CLOSE SYSTEM OSY VALVE "A".
2.. OPEN BY-PASS VALVE AND "B" BUTTERFLY THROTTLE VALVE.
3. PURGE METER LOCATED ON VENTURI AS FOLLOWS:
   OPEN STATION SHUT-OFF VALVES ON VENTURI AND VENT VALVES ATTACHED TO METER. WHEN A STEADY STREAM OF WATER WITHOUT AIR BUBBLES PASSES THROUGH THE CLEAR PLASTIC HOSES, THE METER IS PURGED OF AIR. 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.

*SPECIFY RAISED OR FLAT FACE



GERAND ENGINEERING CO.

11504 K-TEL DRIVE •MINNETONKA, MN 55343 USA •PHONE: 952-374-1320 FAX: 952-374-1758

GERAND ENGINEERING CO.

11504 K-TEL DRIVE
MINNETONKA, MN 55343

TELEPHONE: 952-374-1320
FAX: 952-374-1758

DETAILS OF PARTS AND INSTALLATION OF THE GERAND FIRE PUMP TEST METERS

MATERIALS SHIPPED WILL BE AS FOLLOWS:

One factory calibrated direct reading GPM meter with vent valves and clear hoses assembled and attached to the meter. The lens of the meter has a metal meter tag with the Gerand model number and maximum rated PSI and serial number.

One calibrated Gerand venturi with an attached metal tag listing the venturi size, the pump GPM, the meter range and the PSI rating.
Adhered to the venturi is a "flow sticker" with an arrow showing the direction of the flow and the suggested minimum straight upstream and downstream pipe diameters to be the same size as the venturi.

One set of 500 PSI hoses with color code ends and brass fittings to connect meter to the venturi.

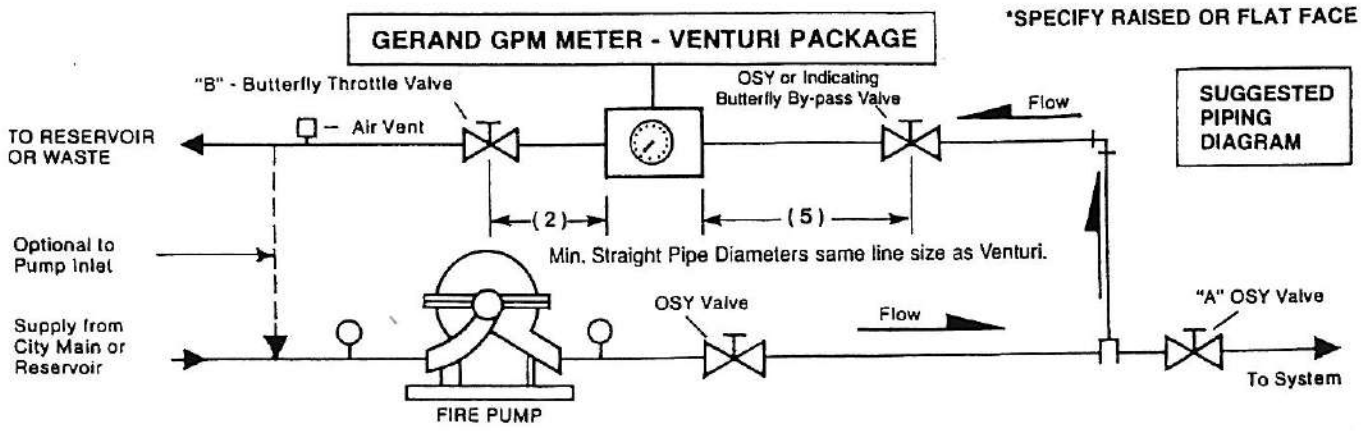
One metal installation/operation tag permanently attached to meter via brass chain.

INSTALLATION INSTRUCTIONS ARE AS FOLLOWS:

The venturi must be installed in the line with the flow in the system going in the same direction as the arrow shown on the venturi and with a minimum of (5) straight pipe diameters upstream and (2) straight pipe diameters downstream of the venturi. If the system has been piped with many elbows either in the same or in different planes, we suggest longer straight runs upstream and downstream. These pipe diameters must also be the same pipe size as the venturi.

The meter is then attached via the screws to the welded bracket on the venturi.

Once the meter has been secured to the venturi, screw the valveless end on the hoses into the meter (red to red and green to green) and the valve fitted ends into the venturi (red to red and green to green).

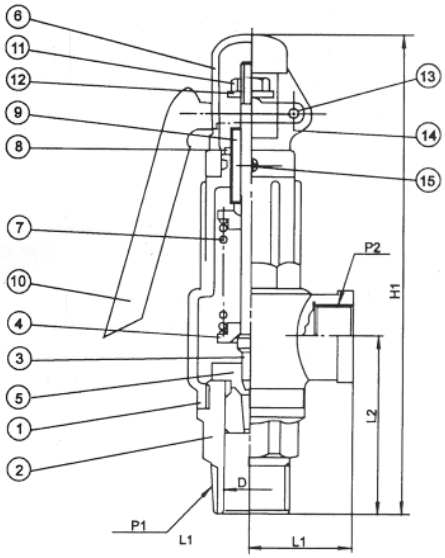


BRONZE SAFETY RELIEF VALVES (Lift = D/25)

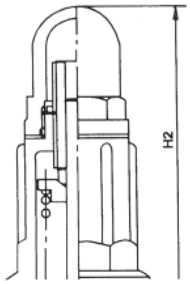
S10L
Bronze Safety Valve with Lever
1/2" - 2"

S10
Bronze Safety Valve with Sealing Cap
1/2" - 2"

S10L



S10



General material

Valve Body	ASTM-B584-C83600
Valve Seat	ASTM-B124-C37700
Spindle	ASTM-B16-C36000
Spring Seat	ASTM-B16-C36000
Disc	ASTM-B124-C37700
Spring	Steel or Stainless Steel
Cap	ASTM-B584-C83600 or ASTM-B124-C37700

Working Pressure : 0.3 – 10 kg/cm^2 (Steam)
0.3 – 10 kg/cm^2 (W.O.G.)
Working Temp. : - 45°C – 185°C
Working Fluid (S10): Non Corrosive Gas
Steam
Hot Water
Non Corrosive Liquid
Working Fluid (S10L): Non Corrosive Gas
Steam

Dimension.

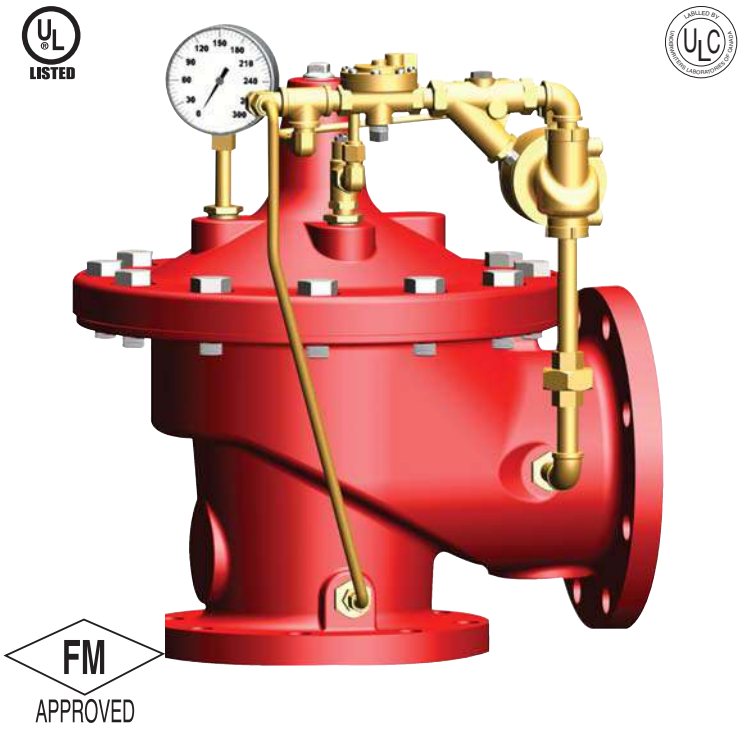
Size	P1 (Inlet)	D (Seat dia.)	P2 Outlet	Lift	L1	L2	H1	H2	Weight(kg)	
									S10	S10L
1/2”	RC(1/2)	13	G(1/2)	0.52	32	52	162	140	0.51	0.58
3/4”	RC(3/4)	19	G(3/4)	0.76	36	58	172	150	0.63	0.73
1”	RC(1)	25	G(1)	1.00	40	71	204	185	1.14	1.29
1-1/4”	RC(1-1/4)	32	G(1-1/4)	1.28	52	83	223	208	2.03	2.03
1-1/2”	RC(1-1/2)	38	G(1-1/2)	1.52	58	96	252	236	2.6	2.61
2”	RC(2)	50	G(2)	2.00	65	103	287	265	3.84	4.1

CLA-VAL™

MODEL

50B-4KG1 Globe
2050B-4KG1 Angle

Listed/Approved Fire Protection Pressure Relief Valve



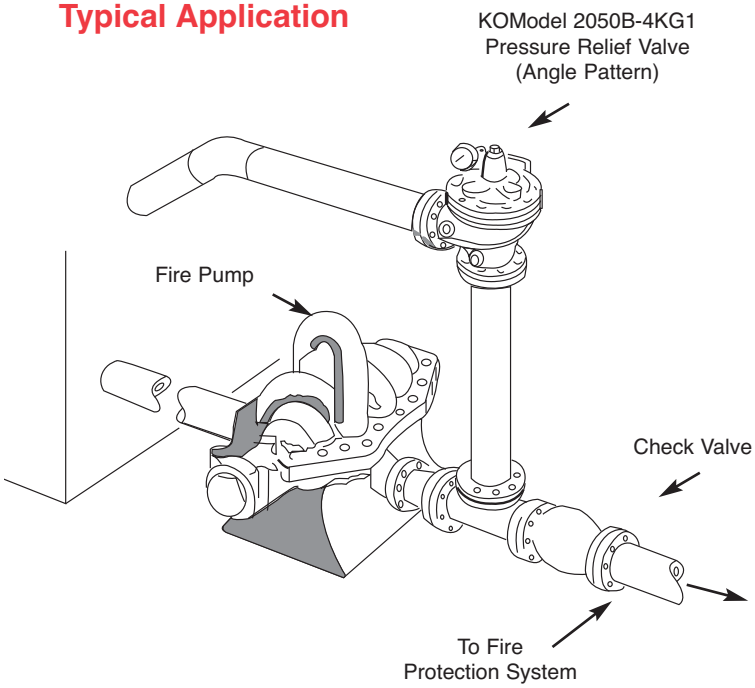
2050B-4KG1 (Angle)

- **U.L. Listed / U.L.C. Listed**
- **Factory Mutual Approved**
- **Fast Opening to Maintain Steady Line Pressure**
- **Accommodates Wide Range of Flow Rates**
- **Closes Gradually for Surge-Free Operation**
- **Adjustable Pressure Settings, Not Affected by Pressure At Valve Discharge**

The Cla-Val Model 50B-4KG1 Globe / 2050B-4KG1 Angle Pressure Relief Valve is designed specifically to automatically relieve excess pressure in fire protection pumping systems. Pilot controlled, it maintains constant system pressure at the pump discharge within very close limits as demands change. The 50B-4KG1 and 2050B-4KG1 can be supplied with optional internal and external epoxy coating of the main valve wetted surfaces.

U.L. Listed.....Sizes 3" thru 8"
F.M. Approved.....Sizes 3" thru 8"
U.L.C. Listed.....Sizes 2" thru 10"

Typical Application



"Fluid Control at It's Best"

Operation Sequence

At pump start, Cla-Val Relief Valve modulates to relieve excess pump capacity, maintaining positive system pressure at the pump discharge.

When fire demand slows or ceases, Cla-Val Model 50B-4KG1 opens, diverting entire pump output to discharge, allowing fire pump to be stopped without causing surging in the lines.

(Please note that if the Model 50B-4KG1 is to be used on a continuous duty basis to maintain fire-system pressure, suitable back pressure must be provided on the valve to prevent cavitation damage. Consult the factory for details.)

Optional UL Listed Materials for Seawater and Severe Service Applications:

- Nickel Aluminum Bronze (NAB) - ASTM B148 Alloy C95800
- Monel - QQ-N-288 Comp B - ASTM A494 Grade M30H
- Cast Steel - ASTM A216 Grade WCB
- 316 Stainless Steel - ASTM A743 Grades CF3M and CFM8
- Super Austenitic Stainless Steel - ASTM A351 Grade CK3MCuN (SMO 254)
- Super Duplex Stainless Steel - ASTM A890 Grade 5A (CE3MN)

Specifications

Sizes *Globe:* 2" - 10" flanged
Angle: 2" - 10" flanged

End Details 150 and 300 ANSI B16.42

Pressure Ratings Class 150 - 250 psi Max.
Class 300 - 400 psi Max

Water, to 180°F Max.

Standard Materials

Main Valve Body & Cover
Ductile Iron ASTM A536 Grade 65-45-12
Standard Main Valve Trim:
Bronze Seat, Teflon Coated
Stainless Steel Stem, Dura-Kleen Stem
Standard Pilot Control System:
Cast Bronze with
Stainless Steel trim

Adjustment Range Available in the following relief pressure ranges:
20-200 psi (150 Class)
100-300 psi (300 Class)

Optional Protective epoxy resin coating of wetted surfaces of main valve cast iron components (UL listed HNFX EX2855)

Purchase Specifications

The Fire Pump Pressure Relief Valve shall modulate to relieve excess pressure in a fire protection system. It shall maintain constant pressure in the system regardless of demand changes. It shall be pilot controlled and back pressure shall not affect its set point. It shall be actuated by line pressure through a pilot control system and open fast in order to maintain steady system pressure as system demand decreases. It shall close gradually to control surges and shall re-seat drip-tight within 5% of its pressure setting. The main valve shall be of the hydraulically-operated, pilot-controlled, diaphragm-type, globe or angle valve. It shall have a single, removable, teflon-coated seat, a grooved stem guided at both ends, and a resilient disc with a rectangular cross section, being contained on 3 1/2 sides. No external packing glands shall be permitted and the diaphragm shall not be used as a seating surface. The pilot control shall be a direct-acting, adjustable, spring-loaded, diaphragm-type valve designed for modulating service to permit flow when controlling pressure exceeds spring setting. This valve shall be UL Listed and Factory Mutual approved. It shall be the Model 50B-4KG1 (globe) or Model 2050B-4KG1 (angle) Pressure Relief Valve as manufactured by Cla-Val Newport Beach, California.

***Special Note:**

The Model 50B-4KG1 Pressure Relief Valve is available with 300# ANSI inlet flange and 150# ANSI outlet flange. This valve is used on higher pressure systems where 300# flange connections are required, and allows for adapting of a discharge cone (generally supplied with 150# flange) to accommodate "atmospheric break" at relief valve discharge. This relief valve, with 300# / 150# flanges is available on special order, and is UNDERWRITERS LABORATORIES LISTED AND FACTORY MUTUAL APPROVED.

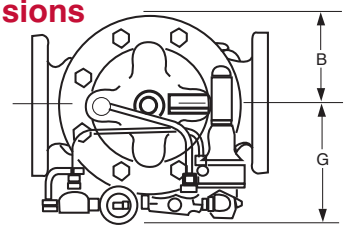
Specifications: Seawater Service Option

Sizes *Globe:* 2" - 8" flanged
Angle: 2" - 8" flanged

Consult factory for flange ratings.

See page 1 for seawater service materials options.

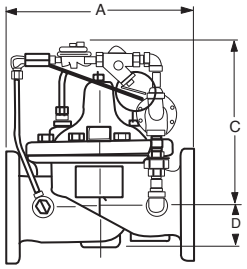
Dimensions



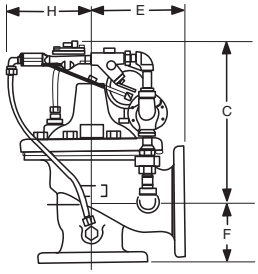
= U.L., F.M. and ULC sizes

= ULC sizes only

Model 50B-4KG1 Globe



Model 2050B-4KG1 Angle



We recommend providing adequate space around valve for maintenance work.

Valve Size (inches)	2"	2-1/2"	3"	4"	6"	8"	10"
Threaded Ends	9.38	11.00	12.50	- - -	- - -	- - -	- - -
A 150 Flanged	9.38	11.00	12.00	15.00	20.00	25.38	29.75
300 Flanged	10.00	11.62	13.25	15.62	21.00	26.38	31.12
300 X 150			12.88	15.31	20.56	25.88	30.44
B	3.31	4.00	4.56	5.75	7.88	10.00	11.81
C	12.00	12.25	12.50	13.00	14.31	16.31	18.00
D	1.50	1.69	2.66	3.19	4.31	5.31	9.25
Threaded Ends	4.75	5.50	6.25	- - -	- - -	- - -	- - -
E 150 Flanged	4.75	5.50	6.00	7.50	10.00	12.75	14.88
300 Flanged	5.00	5.88	6.38	7.88	10.50	13.25	15.56
Threaded Ends	3.25	4.00	4.50	- - -	- - -	- - -	- - -
F 150 Flanged	3.25	4.00	4.00	5.00	6.00	8.00	8.62
300 Flanged	3.50	4.31	4.38	5.31	6.50	8.50	9.31
G & H	6.00	6.69	7.75	7.88	8.50	9.75	13.25

Valve Size (mm)	50	65	80	100	150	200	250
Threaded Ends	238	279	318	- - -	- - -	- - -	- - -
A 150 Flanged	234	279	305	381	508	645	756
300 Flanged	254	295	337	397	533	670	790
300 X 150	- - -	- - -	327	389	522	657	773
B	84	102	116	146	200	254	300
C	305	311	1318	330	363	414	457
D	38	43	65	81	109	135	235
Threaded Ends	121	140	159	- - -	- - -	- - -	- - -
E 150 Flanged	121	140	152	191	254	324	378
300 Flanged	127	149	162	200	267	337	395
Threaded Ends	83	102	114	- - -	- - -	- - -	- - -
F 150 Flanged	83	102	102	127	152	203	219
300 Flanged	89	109	111	135	165	216	236
G & H	152	170	197	200	216	248	337

Valve Capacity

Valve Sizes in Inches:	2"	2 1/2"	3"	4"	6"	8"	10"
NFPA 20 Maximum							
Recommended GPM	208	300	500	1000	2500	5000	11000

CLA-VAL
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Lausanne, Switzerland
Phone: 41-21-643-15-55
Fax: 41-21-643-15-50
E-Mail: cla-val@cla-val.ch

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GB - Tunbridge Wells
Kent TN1 2 DH England
Phone: 44-1892-514-400
Fax: 44-1892-543-423
E-Mail: info@cla-val.co.uk

Represented By:

E-50B-4KG1/2050B-4KGL1 (R-02/2015)

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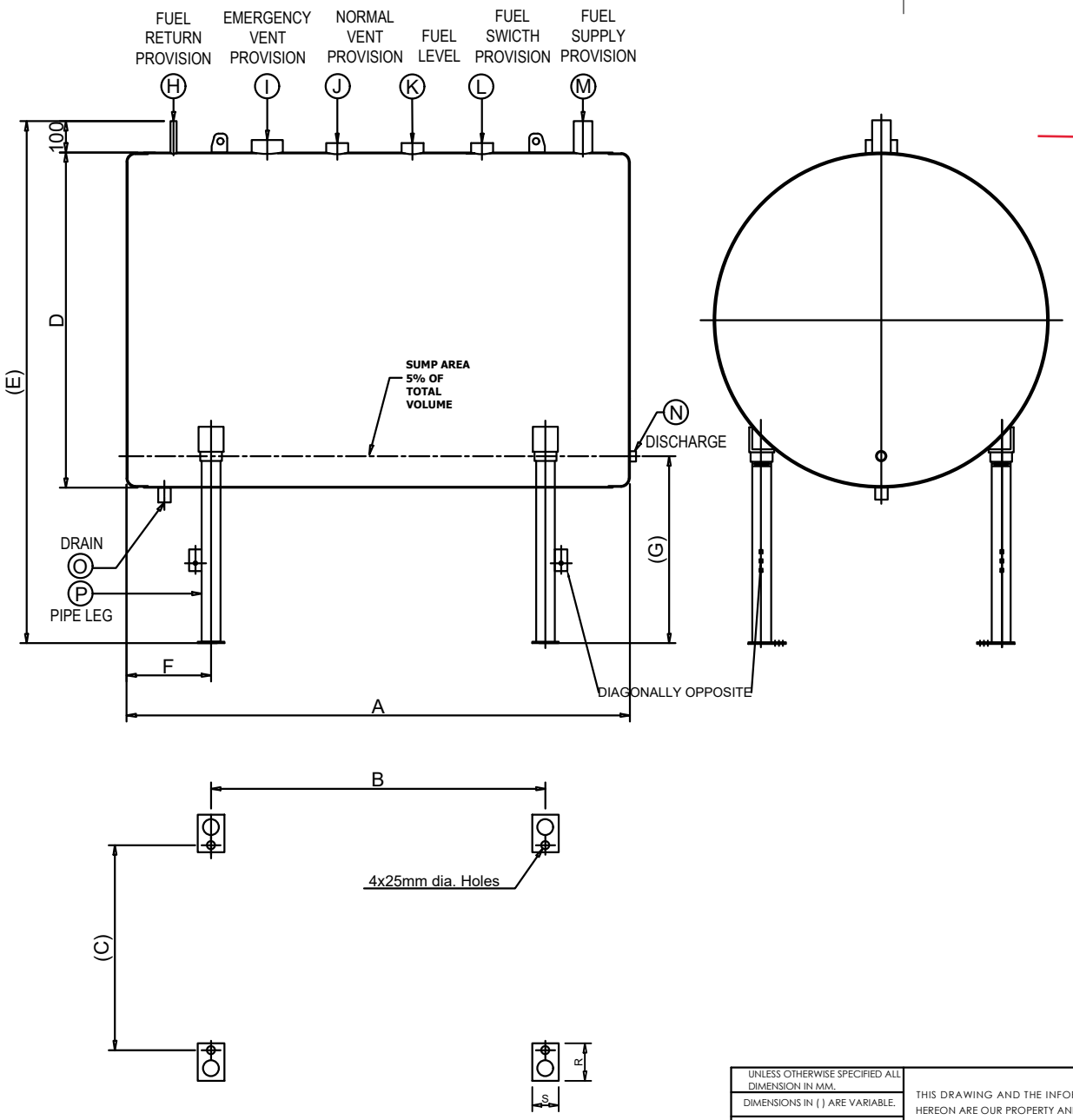

ITEM	CAPACITY (US GAL.)	A	B	C	D	E	F	G	R	S
1	70	1160	880	289	565	1238	140	630	120	85
2	120	1110	730	433	768	1445	190	647	120	85
3	180	1608	1228	433	768	1445	190	647	120	85
4	280	1310	770	655	1073	1670	270	602	120	85
5	360	1610	1070	655	1073	1670	270	602	120	85

ITEM	CAPACITY (US GAL.)	H	I	J	K	L	M	N	O	P
1	70	1"	3"	2"	2"	2"	2"	1 ¼"	1 ¼"	2"
2	120	1"	3"	2"	2"	2"	2"	1 ¼"	1 ¼"	2"
3	180	1"	3"	2"	2"	2"	2"	1 ¼"	1 ¼"	2"
4	280	1"	3"	2"	2"	2"	2"	1 ¼"	1 ¼"	2"
5	360	1"	4"	2"	2"	2"	2"	1 ¼"	1 ¼"	2"

NOTE:-

1. 3MM THICK MS SHEET END CAP
2. 3MM THICK MS SHEET SHELL
3. THE DIMENSION IN () ARE VARIABLE AS PER THE CONSTRUCTIONAL FEATURES
4. LIFTING TO BE DONE WITHOUT FUEL(EMPTY LIFTING)

Rev.	Revision Note	Drawn	Rev'd	App'd	Date
A	Initial release	VT	AL	NM	14.09.2022

UNLESS OTHERWISE SPECIFIED ALL DIMENSION IN MM.
DIMENSIONS IN ( ) ARE VARIABLE.

TOLERANCE EXCEPT WHERE OTHERWISE STATED ± (mm)

SHEET THICKNESS	±0.5 MM
100 AND UNDER	±4 MM
OVER 100 UP TO1000	±8 MM
OVER 1000	±12 MM
ANGULAR	±0.5°
HOLE POSITIONS	⌖ Ø 0.5

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BRISTOL

Item Ref:	DT-360
Drawn:	VT
Checked:	AL
Approved:	NM

YES NO CONTROLLED DRAWING

-DO NOT SCALE DRAWING-

Drg. No.: BFE-PU11-DSW-001	Rev.: A	Scale: NTS	
Tittle : GENERAL ASSEMBLY DRAWING FOR SINGLE WALL DIESEL TANK (LISTED)			
REFERENCE: –	Finished: –	Sheet: 1/1	

CERTIFICATE

ص.ب: ٧٤٥٨٢ ، دبي الامارات العربية المتحدة تيلفون : ٣٤٧٧٠٧٣ / ٣٤٧٢٤٢٦ ٤ ٩٧١+ فاكس : ٣٤٧٢٣٦٣ ٤ ٩٧١+
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ONLINE CERTIFICATIONS DIRECTORY

QWZU.EX16459
Centrifugal Fire Pumps, End Suction

Page Bottom

Centrifugal Fire Pumps, End Suction

See General Information for Centrifugal Fire Pumps, End Suction

BRISTOL FIRE ENGINEERING L L C EX16459
AL QUOZ INDUSTRIAL AREA 3
PO BOX 74582
DUBAI, UNITED ARAB EMIRATES

Rated Capacity GPM	Size In.	Model Dsg	Rated Net Pressure Range psi	Approx Speed RPM	Max Working Pressure psi
50	2 X 1 1/4	IS32-200	62-95	2950	230
50	2 X 1 1/4	IS32-200	55-85	2800	230
50	2 X 1 1/4	IS32-260	113-130	2950	230
100	2 X 1 1/4	IS32-260	103-125	2950	230
50	2 1/2 X 2	IS50-320H	103-167	2600	220
50	2 1/2 X 2	IS50-320H	88-142	2400	220
100	2 1/2 X 2	IS50-320H	178-298	3500	330
100	2 1/2 X 2	IS50-320H	132-210	2950	240
100	2 1/2 X 2	IS50-320H	119-189	2800	240
100	2 1/2 X 2	IS50-320H	102-166	2600	220
100	2 1/2 X 2	IS50-320H	87-141	2400	220
150	2 1/2 X 2	IS50-320H	177-296	3500	330
150	2 1/2 X 2	IS50-320H	132-209	2950	240
150	2 1/2 X 2	IS50-320H	118-188	2800	240
150	2 1/2 X 2	IS50-320H	99-165	2600	220
150	2 1/2 X 2	IS50-320H	84-140	2400	220
200	2 1/2 X 2	IS50-320H	173-296	3500	330
200	2 1/2 X 2	IS50-320H	127-209	2950	240
200	2 1/2 X 2	IS50-320H	113-188	2800	240
200	3 X 2 1/2	IS65-320H	159-290	3500	330
200	3 X 2 1/2	IS65-320H	108-201	2950	220
200	3 X 2 1/2	IS65-320H	97-181	2800	220
200	3 X 2 1/2	IS65-320H	104-158	2600	220
200	3 X 2 1/2	IS65-320H	88-133	2400	220
250	3 X 2 1/2	IS65-320H	157-290	3500	330
250	3 X 2 1/2	IS65-320H	107-201	2950	220
250	3 X 2 1/2	IS65-320H	97-181	2800	220
250	3 X 2 1/2	IS65-320H	102-155	2600	220
250	3 X 2 1/2	IS65-320H	85-131	2400	220
300	3 X 2 1/2	IS65-320H	155-289	3500	330
300	3 X 2 1/2	IS65-320H	107-201	2950	220

300	3 X 2 1/2	IS65-320H	97-181	2800	220
300	3 X 2 1/2	IS65-320H	98-152	2600	220
300	3 X 2 1/2	IS65-320H	82-128	2400	220
300	4 X 3	IS80-320H	159-203	2950	220
300	4 X 3	IS80-320H	143-183	2800	220
400	4 X 3	IS80-260	105-139	2950	230
400	4 X 3	IS80-320H	158-203	2950	220
400	4 X 3	IS80-320H	142-183	2800	220
400	5 x 4	IS100-320H	123-158	2950	220
400	5 x 4	IS100-320H	110-142	2800	220
400	5 x 4	IS100-320H	98-172	2600	220
400	5 x 4	IS100-320H	83-147	2400	220
450	4 X 3	IS80-320H	157-203	2950	220
450	4 X 3	IS80-320H	140-182	2800	220
450	5 x 4	IS100-320H	122-158	2950	220
450	5 x 4	IS100-320H	110-142	2800	220
450	5 x 4	IS100-320H	98-172	2600	220
450	5 x 4	IS100-320H	83-147	2400	220
500	4 X 3	IS80-260	101-137	2950	230
500	4 X 3	IS80-320H	155-202	2950	220
500	4 X 3	IS80-320H	136-182	2800	220
500	5 x 4	IS100-320H	122-158	2950	220
500	5 x 4	IS100-320H	110-142	2800	220
500	5 x 4	IS100-320H	97-172	2600	220
500	5 x 4	IS100-320H	82-147	2400	220
750	5 x 4	IS100-320H	119-147	2950	220
750	5 x 4	IS100-320H	104-131	2800	220
750	5 x 4	IS100-320H	89-166	2600	220
750	5 x 4	IS100-260	113-139	2950	230
1000	5 x 4	IS100-260	104-131	2950	230

Last Updated on 2014-06-27

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ONLINE CERTIFICATIONS DIRECTORY

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: Model 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, -100,	208; 240	25000; 42,000
-160, -250		
MZMH6-63, -100,	480	65,000
160, -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.

Model 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
-100, -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

Model ATG or VPG. 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:	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, GPL:	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, GLU:	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.

Battery chargers, BCE10, followed by 12 or 24, followed by 120 or 220.

Fire pump controllers, Models GPA, GPP, GPR, GPS, GPV, GPY and GPW.

Transfer switch, Model GPU.

Last Updated on 2013-01-03

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UL Product iQ™

QYLU.EX6155 - 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

CLARKE FIRE PROTECTION PRODUCTS LTD EX6155
GRANGE WORKS
LOMOND RD
COATBRIDGE, ML5 2NN UNITED KINGDOM

DIESEL ENGINES RATED AT SPECIFIC SPEEDS

Model	No. of Cylinders	Rated HP	Rated Speed (rpm)
JU4H-UF04	4	50	2350
	4	55	2600
	4	60	2800
	4	60	3000
JU4H-UF10	4	41	1760
	4	51	2100
	4	55	2350
JU4H-UF12	4	55	2350
	4	59	2600
JU4H-UF14	4	55	2350
	4	59	2600
	4	70	2800
	4	71	3000
JU4H-UF20	4	60	1760
	4	67	2100
	4	72	2350
JU4H-UF22	4	72	2350

	4	75	2600
JU4H-UF24	4	72	2350
	4	75	2600
	4	80	2800
	4	83	3000
JU4H-UF30	4	64	1760
	4	79	2100
	4	85	2350
JU4H-UF32	4	85	2350
	4	85	2600
JU4H-UF34	4	85	2350
	4	85	2600
	4	104	2800
	4	115	3000
JU4H-UFH8	4	63	1470
	4	73	1760
JU4H-UFH0	4	73	1760
	4	88	2100
	4	98	2350
JU4H-UFH2	4	98	2350
	4	99	2600
JU4H-UF40	4	94	1760
	4	105	2100
	4	106	2350
JU4H-UF42	4	106	2350
	4	106	2600
JU4H-UF50	4	79	1470
	4	110	1760
	4	130	2100
	4	127	2350
JU4H-UF52	4	127	2350

JU6R-UFKA49	6	1760	180	2100	205
	6	2100	205	2350	200
JU6R-UFKA51	6	2350	200	2600	201
JU6R-UFKA53	6	2800	204	2960	202
	6	2960	202	3000	202
DS0H-UFKAN0	10	1760	542	1900	575
	10	1900	575	2100	575
DP6H-UFKA70	6	2100	312	2350	316
JU6R-UFKA67	6	1470	170	1760	195
JU6R-UFKA59	6	1760	195	2100	232
	6	2100	232	2350	228
JU6R-UFKA61	6	2350	228	2600	226
JU6R-UFKA83	6	2800	239	3000	260
DS0H-UFKAN0	10	1760	542	1900	575
	10	1900	575	2100	575
JU6H-UFKAT8	6	1760	265	1900	273
JU6H-UFKAT0	6	2100	293	2350	295
JU6H-UFKAT2	6	2350	295	2600	291
JU6H-UF94	6	2800	295	3000	300

Last Updated on 2020-11-16

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ONLINE CERTIFICATIONS DIRECTORY

QXZF.EX5189
Fire Pump Motors

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Fire Pump Motors

See General Information for Fire Pump Motors

NIDEC MOTOR CORP EX5189
8050 W FLORISSANT AVE
SAINT LOUIS, MO 63136-1414 USA

Model No.	Output	Volts	FL Amps	Service Factor	Poles	Number of Speeds	RPM	Phases	Ins Class	Prot. Type	Rated Ambient (°C)	CCN
Frame 182 thru 215 (v) (+)	15hp	190-660	-	1.15	-	-	-	3	F	-	50	QXZF
Frame 250 thru 286 (v) (+)	7.5-60hp	190-660	-	1.15	-	-	-	3	F	-	50	QXZF
Frame 320 thru 5012 (v) (+)	40-500hp	190-660	-	1.15	-	-	-	3	F	-	50	QXZF
Frame 56 thru 145 (v) (+)	3hp	190-660	-	1.15	-	-	-	3	F	-	40	QXZF

(+) - Motors have also been evaluated as inverter duty (PRHJ) motors.

(v) - Voltage range details: 190, 200, 208, 230, 380, 400, 415, 460, 575, 660 or 208-230/460.

Trademark and/or Tradename: "Nidec Motor Corporation"

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ONLINE CERTIFICATIONS DIRECTORY

QXZF.EX5990
Fire Pump Motors

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Fire Pump Motors

See General Information for Fire Pump Motors

WEG EQUIPAMENTOS ELETRICOS SA EX5990
AV PREF WALDEMAR GRUBBA 3000
89256-900 JARAGUA DO SUL, SC BRAZIL

Model No.	Output	Hz/DC	Volts	FL Amps	Service Factor	Poles	Number of Speeds	RPM	Phases	Ins Class	Prot. Type	Rated Ambient (°C)
(click on a model number to see complete product details)												
1 through 9; followed by U; followed by T; followed by 0 or E; followed by D, F, I, J, L, P, 2, ?,] or +; followed by C or F; followed by A, D, G, H, I, J, K, M, N, P, 3 or 4; followed by I or N; followed by M, P or X; followed by H, N, P, T, or X; followed by three digits; followed by 02, 04 or 06; may be followed by E, O, or P; may be followed by additional letters or numbers; may be followed by Z. (v)												
	1-500hp	50, 60, 50, 60, 50, 60	190-600	-	1.0-1.15	2, 2, 4, 4, 6, 6	1	3000, 3600, 1500, 1800, 1000, 1200	3	H	-	40
T; followed by O or E; followed by 0+, 0F, 0I, 0J, 0O, 0P; followed by C or F; followed by 04, 0D, 0G, 0H, 0I, 0J, 0K, 0L, 0M, 0N, 0P, 0Q, 0R, 0T, 0U or 0X; followed by 0A, 0C, 0D, 0E, 0F, 0H, 0I, 0J, 0K, 0L, 0M, 0N, 0P, 0R, 0S, 0T, 0W, or 0X; may be followed by 00001, 00003 or 00009; may be followed by 00001 through 99999. (v)												
	1-500hp	50, 60, 50, 60, 50, 50	190-600	-	1.0-1.15	2, 2, 4, 4, 6, 6	1	3000, 3600, 1500, 1800, 1000, 1200	3	H	-	40
T; followed by O; followed by 0+, 0I, 0J, 0O, 0P; followed by C or F; followed by 04, 0D, 0G, 0H, 0I, 0J, 0K, 0L, 0M, 0N, 0P, 0Q, 0R, 0T, 0U or 0X; followed by 0A, 0C, 0D, 0E, 0F, 0H, 0I, 0J, 0K, 0L, 0M, 0N, 0P, 0R, 0S, 0T, 0W, or 0X; may be followed by 00001, 00003 or 00009; may be followed by 00001 through 99999, may be followed by 50. (v)												
	1-450hp, 1.5-500hp, 1-350hp, 1-400hp, 1-250hp, 1-400hp	50, 60, 50, 60, 50, 60	190-600	-	1.15	2, 2, 4, 4, 6, 4	1	3000, 3600, 1500, 1800, 1000, 1800	3	F, H	-	50
	1-450hp, 1.5-500hp, 1-350hp, 1-400hp, 1-250hp, 1-300hp	50, 60, 50, 60, 50, 60	190-600	-	1.15	2, 2, 4, 4, 6, 6	1	3000, 3600, 1500, 1800, 1000, 1200	3	H	-	50
W21 Series, Motor Model T; followed by E; followed by 0+, 0F 0I, 0J, 0O, 0P; followed by C or F; followed by 04, 0D, 0G, 0H, 0I, 0J, 0K, 0L, 0M, 0N, 0P, 0Q, 0R, 0T, 0U or 0X; followed by 0A, 0C, 0D, 0E, 0F, 0H, 0I, 0J, 0K, 0L, 0M, 0N, 0P, 0R, 0S, 0T, 0W, or 0X; may be followed by 00001, 00003 or 00009; may be followed by 00001 through 99999, may be followed by 50. (v)												
	1-300hp, 1-350hp, 1-400hp, 1-500hp, 1-350hp,	50, 60, 50, 60, 50,	190-600	-	1.15	2, 2, 4, 4, 6,	1	3000, 3600, 1500, 1800, 1000,	3	H	-	50

	1-500hp	50				6		1200				
	1-350hp, 1-300hp, 1-400hp, 1-500hp, 1-350hp, 1-500hp	60, 50, 50, 60, 50, 60	190-600	-	-	2, 2, 4, 4, 6, 6	1	3600, 3000, 1500, 1800, 1000, 1200	3	F, H	-	50
W22 Series, Motor Model T; followed by E; followed by 1B, 1E, 1F, 1G, 1H, 1I, 1J; followed by C or F; followed by 04, 0D, 0G, 0H, 0I, 0J, 0K, 0L, 0M, 0N, 0P, 0Q, 0R, 0T, 0U or 0X; followed by 0A, 0C, 0D, 0E, 0F, 0H, 0I, 0J, 0K, 0L, 0M, 0N, 0P, 0R, 0S, 0T, 0W, or 0X; followed by 00001, 00003 or 00009; followed by 00001 through 99999, and may or may not be followed by 50. +(v)												
	1-300hp, 1-350hp, 1-400hp, 1-500hp, 1-350hp, 1-500hp, 40hp, 30W	50, 60, 50, 60, 50, 60, 60	190-600, 190-600, 190-600, 190-600, 190-600, 190-600, 480	, , , , , , 43.8	-	2, 2, 4, 4, 6, 6, 2	1	3000, 3600, 1500, 1800, 1000, 1200, 3600	3	F, H	-	50
W22 Series, Motor Model T; followed by E; followed by 1B, 1E, 1F, 1G, 1H, 1I, 1J; followed by C, F or A; followed by 04, 0D, 0G, 0H, 0I, 0J, 0K, 0L, 0M, 0N, 0P, 0Q, 0R, 0T, 0U or 0X; followed by 0A, 0C, 0D, 0E, 0F, 0H, 0I, 0J, 0K, 0L, 0M, 0N, 0P, 0R, 0S, 0T, 0W, or 0X; may be followed by 00001, 00003 or 00009; may be followed by 00001 through 99999, and may or may not be followed by 50. +(v)												
	1-300hp, 1-350hp, 1-400hp, 1-500hp, 1-350hp, 1-500hp	50, 60, 50, 60, 50, 60	190-600	-	1.15	2, 2, 4, 4, 6, 6	1	3000, 3600, 1500, 1800, 1000, 1200	3	H	-	50

(v) - Voltage range details: 190, 200, 208, 220, 230, 240, 380, 400, 415, 440, 460, 480, 525, 575, 600, 115/208-230, 208-230, 208-230/460, 190/380, 200/400, 230/460/380, 380-415/460, 220/380/440, 230/400, 220/380, 380/440//380-400-415, 380/440-460//380-400-415.

+ - The motor is also evaluated as Inverter Duty Motors.

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QXZF.EX5190
Fire Pump Motors

If you notice a change to your QXZF Listing Card, click here to learn more.

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Fire Pump Motors

See General Information for Fire Pump Motors

REGAL BELOIT AMERICA INC EX5190
1946 W Cook Rd
Fort Wayne, IN 46818 USA

Model No.	Output	Hz/DC	Volts	FL Amps	Service Factor	Poles	Number of Speeds	RPM	Phases	Ins Class	Prot. Type	Rated Ambient (°C)
(click on a model number to see complete product details)												
143T Frame ODP	0-5hp	60	0-600	-	1 - 1.15	4	-	3600	3	F	-	55
	0-5hp	50	0-600	-	1 - 1.15	4	-	3000	3	F	-	55
	0-5hp	60	0-600	-	1 - 1.15	2	-	1800	3	F	-	55
	0-5hp	50	0-600	-	1 - 1.15	2	-	1500	3	F	-	55
145T Frame ODP	0-5hp	60	0-600	-	1 - 1.15	4	-	3600	3	F	-	55
	0-5hp	50	0-600	-	1 - 1.15	4	-	3000	3	F	-	55
	0-5hp	60	0-600	-	1 - 1.15	2	-	1800	3	F	-	55
	0-5hp	50	0-600	-	1 - 1.15	2	-	1500	3	F	-	55
182T	2hp	50	190/380	6/3	-	2	-	3000	3	H	-	55
	3hp	60& 50	190/380	9/4.5	-	2	-	3600& 3000	3	H	-	55
	3hp	60& 50	200/400	8.6/4.3	-	2	-	3600& 3000	3	H	-	55
	3hp	60& 50	208/416& 208/415	8.2/4.1	-	2	-	3600& 3000	3	H	-	55
	3hp	60& 50	220/440	7.8/3.9	-	2	-	3600& 3000	3	H	-	55
	3hp	60& 50	220/380	9/4.5& 7.8/4.5	-	2	-	3600& 3000	3	H	-	55
	3hp	60& 50	230/460	7.4/3.7	-	2	-	3600& 3000	3	H	-	55
	3hp	60& 50	240/480	7/3.5& 7.2/3.6	-	2	-	3600& 3000	3	H	-	55
	3hp	60/50	575	3	-	2	-	3600/3000	3	H	-	55
	2hp	50/60	190/380	7.4/3.7	-	4	-	1500	3	H	-	55
	2hp	50	200/400	7.8/3.9	-	4	-	1500	3	H	-	55
	2hp	50	208/415	8.8/4.4	-	4	-	1500	3	H	-	55
	3hp	60& 50	190/380	10.4/5.2& 9.8/4.9	-	4	-	1800& 1500	3	H	-	55
	3hp	60& 50	200/400	9.8/4.9& 9.4/4.7	-	4	-	1800& 1500	3	H	-	55
	3hp	60& 50	208/416& 208/415	9.6/4.8& 9/4.5	-	4	-	1800& 1500	3	H	-	55
	3hp	60& 50	220/440	9/4.5& 8.4/4.2	-	4	-	1800& 1500	3	H	-	55
	3hp	60& 50	220/380	10.4/5.2& 8.5/4.9	-	4	-	1800& 1500	3	H	-	55

	408kW											
Model PRODUCT; followed by 0 through 9 or A through Z; followed by 0 through 9 or A through Z; followed by LM; followed by a five or six digit number; may or may not be followed by one or two letters A through ZZ; may or may not be followed by one or two letters A through Z; may or may not be followed by R; may or may not be followed by 0 through 999 or one or two letters A through Z; all followed by H.												
	0.75-408kW	50/60	220-690	-	1.15	2/4	1	-	3	F	-	55
Models 0 through 9 or any letter A through Z; followed by any Letter A through N; followed by 143T, 145T, 182T, 184T, 213T, 215T, 254T, 256T, 284T, 284TS, 286T, 286TS, 324T, 324TS, 326T, 326TS, 364T, 364TS, 365T, 365TS, 404T, 404TS, 405T, 405TS, 444T, 444TS, 445T, 445TS, 447T, 447TS, 449T or 449TS; followed by the Letter T; followed by the Letter F; followed by the Letter C; followed by the Letter D; followed by one to five Digits 0 through 99999; which may or may not be followed by any Letter A through Z; which may or may not be followed by Letter A through Z; which may or may not be followed by the letter R; followed by one to three digits 1 through 999; all followed by Letter H.												
	0.75-408kW	50/60	220-690	-	1.15	2/4	1	-	3	F	-	55
Models 0 through 9 or any letter A through Z; followed by any Letter A through N; followed by 143T, 145T, 182T, 184T, 213T, 215T, 254T, 256T, 284T, 284TS, 286T, 286TS, 324T, 324TS, 326T, 326TS, 364T, 364TS, 365T, 365TS, 404T, 404TS, 405T, 405TS, 444T, 444TS, 445T, 445TS, 447T, 447TS, 449T, or 449TS; followed by the Letter T; followed by the Letter F; followed by the Letter C; followed by Letter D; followed by one to five Digits 0 through 99999; which may or may not be followed by the addition of a dash followed by a one to six digit number; which may or may not be followed by any Letter A through Z; which may or may not be followed by Letter A through Z; all followed by letter H.												
	0.75-408kW	50/60	220-690	-	1.15	2/4	1	-	3	F	-	55
Models T; followed by letter C; followed by a letter A; followed by three digits or letter or combination of both; followed by one digit 0 through 9; followed by a letter A through D; followed by one digit 0 through 9 or any Letter A through Z; followed by one digit 1 through 5; followed by one digit 1 through 9; followed by one digit 1 through 3; followed by one digit 0 through 9 or one letter A through Z; followed by one digit 0 through 9 or one letter A through Z; followed by one digit 0 through 9 or one letter A through Z.												
	0.75-408kW	50/60	220-690	-	1.15	2/4	1	-	3	F	-	55

Click here to view the Colombia Market Access Certification

Trademark and/or Tradename: "2GREEN" , "Century" , "Century Electric" , "EX5190" , "EconoMaster" , "Fasco" , "Genteq" , "HeatMaster" , "LEESON" , "LEESON ELECTRIC" , "LEESON Electric" , "Lincoln Motors" , "Marathon" , "Marathon Electric" , "Marathon Generators" , "Marathon Motors" , "Morrill Motors" , "Regal" , "Sinya Motor" , "Source 1" , "Uppco" , "York" ,

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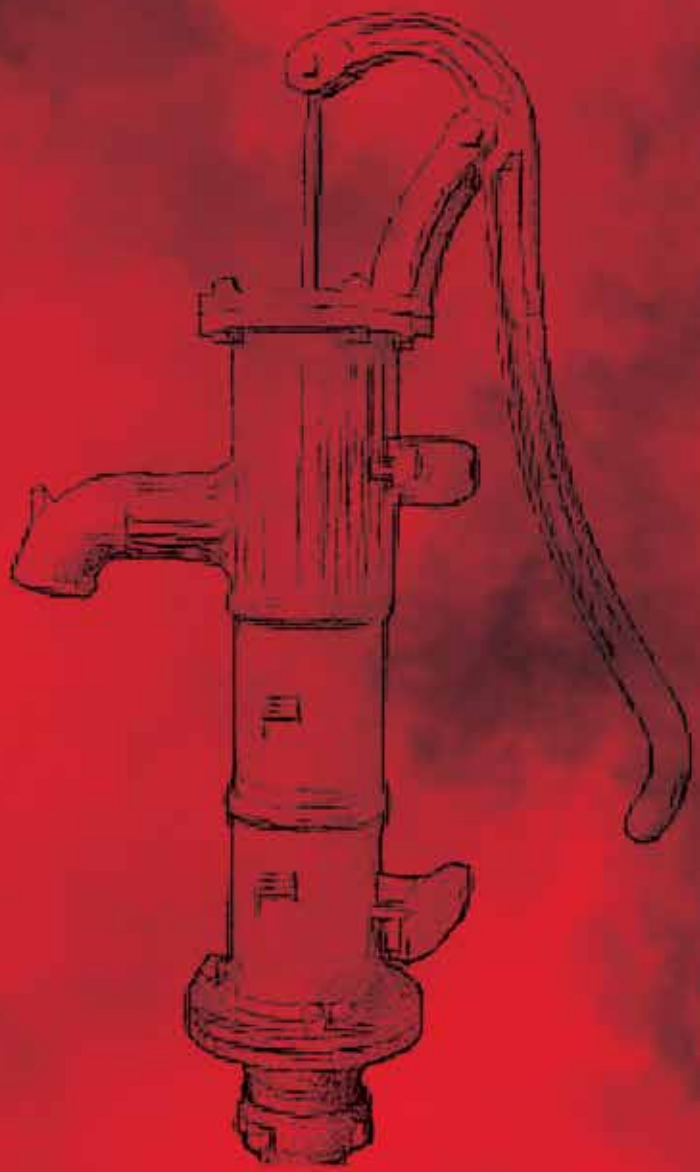
SUPPLIER COMPANY PROFILE

BRISTOL
FIRE ENGINEERING



Fire Pumps

Bristol: A History & Future.

In 1971, seven emirates joined forces to create the United Arab Emirates, with the goal of becoming a growing leader on an international scale. The UAE's focus has always been the safety of its land and people, BRISTOL was established in support of that same vision.

BRISTOL FIRE ENGINEERING, part of the Concorde – Corodex Group, is the leading fire-fighting and fire protection nmanufacturer in the Middle East and has been unsurpassed in innovative fire-fighting solutions for more than 44 years.

We have been steadfast in our developments and have grown to become pioneers in the industry for unmatched quality and dependability, longstanding commitment and unwavering dedication.

Our headquarters and manufacturing facility started in the UAE's Emirate of Dubai, producing world-class fire-fighting systems and equipment in cooperation with international know-how and technology with a grand vision to expand globally.

We strive to continue to adopt the highest international and national standards in line with the UAE's goal to become the safest country in the world.

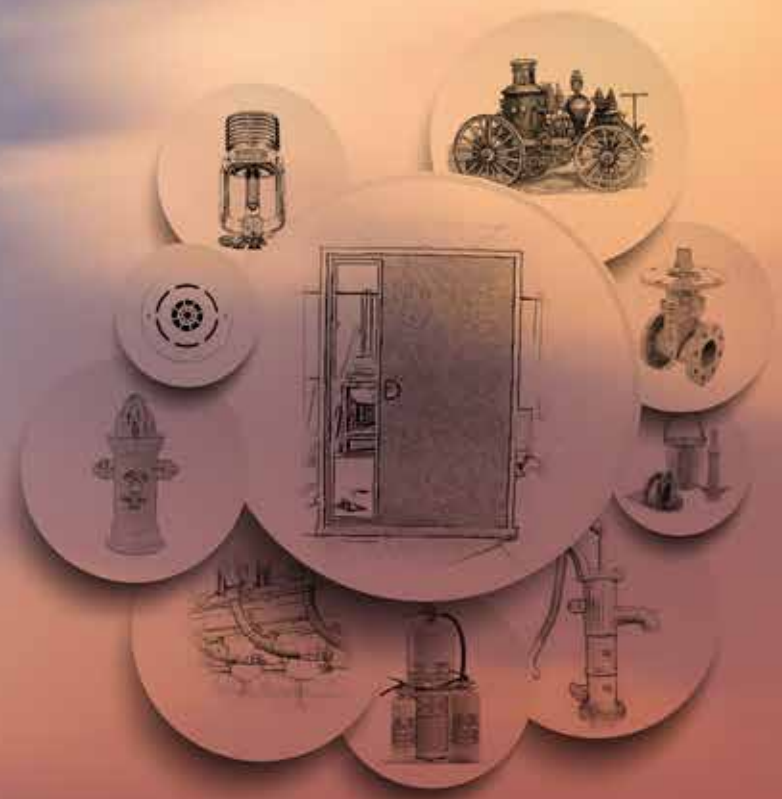
BRISTOL was one of the first fire-fighting companies in the Middle East to receive an ISO 9001 certification, placing great emphasis on achieving local and international approvals on product certifications such as Kite Mark, LPBC, UL listing, and FM approval. Moreover, Bristol is certified to of ISO 14001 and OHSAS 18001.

We focus on innovation by means of continual research and development of advanced fire-fighting solutions, ensuring we not only meet, but exceed the demands of our rapidly changing market.

For decades, we have been proudly supplying various government entities and sectors such as the oil and gas, commercial, and industrial industries across the globe with world-class equipment and services.

BRISTOL has been serving Middle Eastern, African, Asian, and European markets for more than three decades with a vision to expand further.

Paving the road towards safety for more than four decades, and counting: BRISTOL.



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Concorde Technical Company
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