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VARIABLE SPEED BOOSTER
SYSTEMS

BTW SERIES

60 HZ



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BTW3018T-255R-80 TRIPLEX VARIABLE SPEED BOOSTER PUMP SYSTEM



The **BTW3018T.255R.80 Triplex Booster Pump System** is equipped with centrifugal pumps regulated by variable frequency drives that control the pump operation to maintain constant pressure regardless of varying demand or fluctuation in incoming pressure.

System is built on a STRUT / POLY frame for ease of transport and installation.

VFD drives will ALTERNATE lead pump every 24 hours of run time. 2nd and 3rd pumps will remain in standby until needed.

Lead-Free (Wetted) components:

- Pumps: Cast Iron & SS
- Relief valves: LF Brass
- Pressure Gauges: Stainless Steel
- Transducers: Stainless Steel
- Check valves: LF Brass
- Ball Valves: LF Brass
- Manifolds: Type L Copper
- Fittings: LF Brass or SS

* All lead-free brass shall contain <.25% Pb

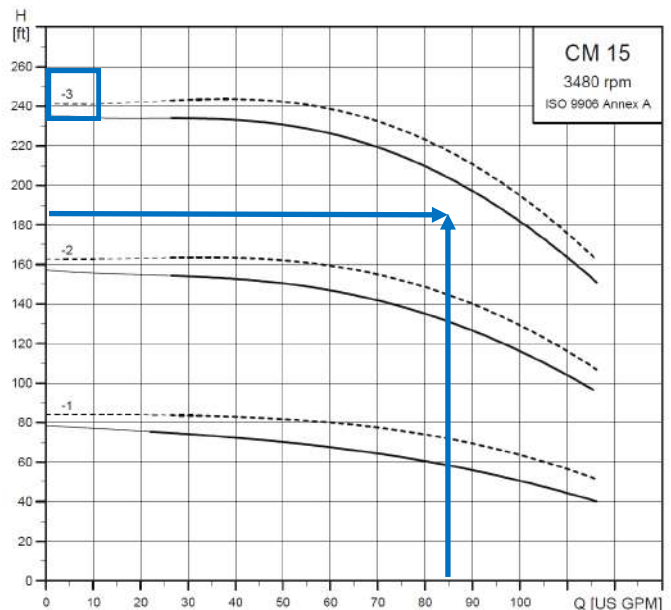


*All parts shown included
Actual system components may vary
Some assembly required*

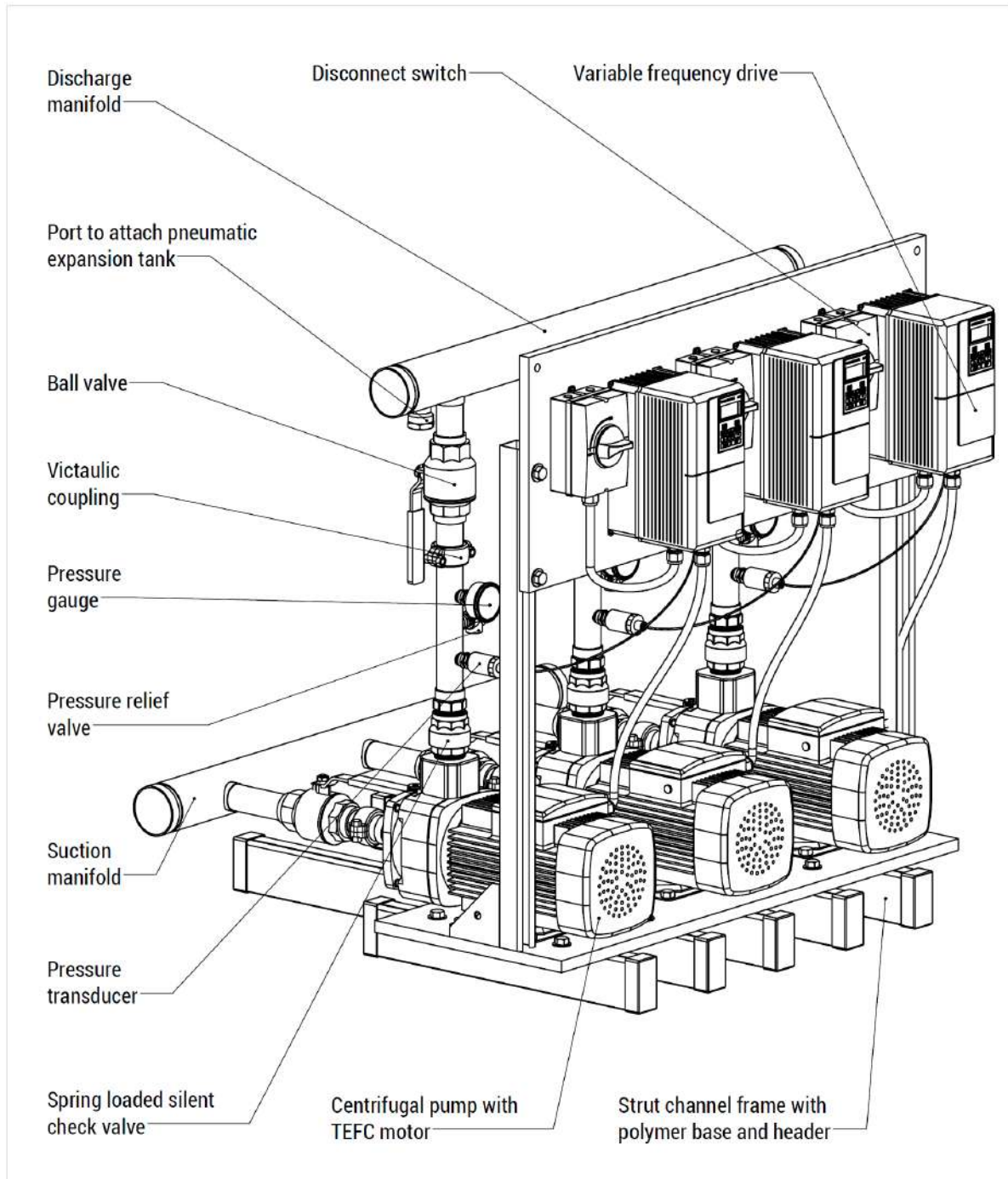
Technical Specifications:

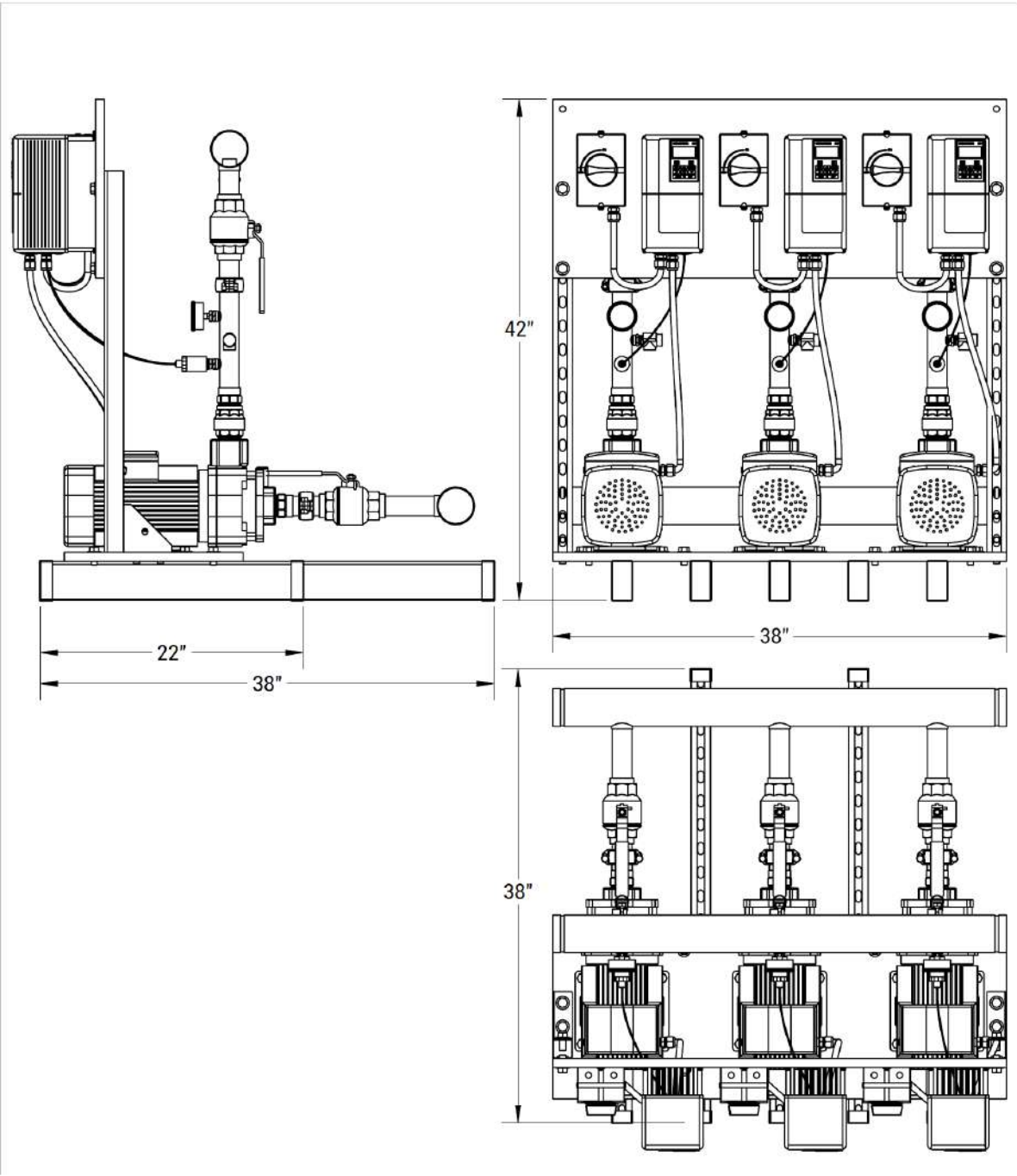
- Pumps:** Grundfos [CM15-3]
- Horse Power:** 8.4 HP per pump
- Controllers:** Yaskawa
- Flow Rate:** 255 GPM (85 GPM per pump)
- Incoming:** 30 PSI
- Boost:** 80 PSI (185' tdh)
- Set Pressure:** 110 PSI
- Manifolds:** 4 inch
- Tank:** 32 Gallon
- Frame Size:** 38" W x 38" H x 36" D
- Power:** 208-220V / 3PH
Three independent circuits required

Performance curve for each pump



* *Single Point Connection available*





Assembled Units:

- All “wetted surfaces” shall be lead free (<.25% Pb) in conformance with the 1/4/14 federal law
- Shall include a separate and independent variable frequency drive (VFD) for each pump with a pressure transducer, pressure gauge, and relief valve. Piping and frame shall not interfere with access to the controls
- Each pump shall include isolation valves on both the suction and discharge piping
- Each pump shall have a separate and independent disconnect box
- Shall be mounted on Strut / Poly frame for ease of transport and installation. The pump & drive wiring harness shall remain intact if manifolds and supports are split apart.

Variable frequency drive:

- Will ALTERNATE the lead pump every 24 hours (field adjustable) of run time. The lag pump shall be in standby
- Shall have hands-off automatic (HOA) capability
- Rated to operate using specified power requirement. The drive efficiency shall be 98% or better
- Have UL approval with all factory installed options and preset values and/or last saved data values will remain available to the operator after power outage
- Shall have at least NEMA 1 rated conduit enclosure
- The program will protect the pumps against damaging hydraulic conditions such as:
 - Motor overload, Pump overflow surges, Loss of prime due to incoming water supply interruption, Hunting
 - Protection from overload through frequency/current optimization
 - Protection from hydraulic damage by restricting the pumps to operate beyond their published end of curve
- Shall have the ability to automatically restart after an over-current, over-voltage, under-voltage or loss of input signal
- Shall have an operator control panel [keypad] for customization of parameters
- Shall include a feature to upload/download parameters into an external device to be used with another drive or the same drive
- Shall have a removable non-volatile memory device
- Shall be capable of accepting individual analog inputs from transducer. All transducer inputs must be wired to the variable frequency drive for continuous scan and comparison function
- Ladder logic program shall utilize a proportional - integral - derivative control function
- Shall display the following values:
 - Pump running/standby, Pump speed in Hz, User adjustable parameters such as PID set points, Motor frequency, Motor current, Threshold set points for PID error, Min operating frequency, Troubleshooting and diagnostics of faults

Transducer:

- The transducer shall be rated for required system pressure and shall be 4-20 mA analog
- Separate transducers shall be supplied for each variable frequency drive to ensure redundancy

Centrifugal pump:

- Shall have a cast iron casing and 304 stainless steel impellers.
- Shall have a 316 stainless steel shaft sleeve. Mechanical seal shall be rated to withstand pressure of up to 142 PSI
- Motor shall be to totally enclosed fan cooled (TEFC). and manufactured in compliance with CE, RoHS and CSA

Pneumatic expansion tank:

- Pneumatic expansion tank shall be rated for use with potable water with an operating pressure of a maximum 125 PSI
- Pre-charged to a pressure of 10 PSI below system operating pressure for system to run properly

Manifolds, valves and fittings:

- Manifolds will be built for right access
- Shall be sized appropriately to allow water velocity not exceeding 10 ft/sec, to minimize cavitation and turbulence
- Shall include Victaulic Couplings to allow the manifolds to be disassembled
- Standard NPT or SWT ball valves & shall be full port
- Check valves shall be silent and spring-loaded

Installation:

- Equipment shall be installed in accordance with applicable local building, electrical and plumbing codes
- Shall be installed indoors (unless otherwise specified) and protected from water spray

Electrical

Yaskawa VFD UL 508C Power Conversion
 CSA 22.2 Industrial Controls



CE

RoHS

Lovato Shut-off NEMA4



CE

RoHS
Pumps

Grundfos CM(I) SS Series NSF 61
 Grundfos CR(I) SS Series NSF 61
 Goulds 2MS Series NSF 61
 Walrus TPH Series NSF 372



CE



CE



CE

CE

RoHS
Plumbing

Bluefin BVT200 Ball Valves NSF 61
 Wilkins 375XL RPZ: NSF 61
 Watts LF777SM3 Strainer NSF 61
 Bonomi Check 1000012 NSF 61
 ThermOmega Thermal Valve NSF 61
 Victaulic 607 "E" Coupling NSF 61
 Victaulic 660 Cap NSF 61
 Flexcon H2P25 Tank NSF 61
 Amtrol Tank NSF61
 Manifolds / piping Type L Copper
 Fittings Copper
 Discharge Riser Copper
 - Pressure Relief valve:
 - SS 4-20mA Transducer:
 - Pressure Gauges: CA AB1953

CE

Sealants

Rectorseal Nokorode Flux NSF 61
 Worthington SILVER Solder NSF 61
 LocTite 567 Thread Sealant NSF 61
 Gasoila Thread Sealant NSF 61



Service Conditions:

Ambient Temperature: -10°C to 40°C (14°F to 104°F) NEMA 1,
Humidity: 95% RH, non-condensing
Altitude: 3300 ft; higher by derate
Input voltage: +10%/-15%
Input frequency: 50/60 Hz ± 5%
3-phase, 3-wire, phase sequence insensitive

Design Features:

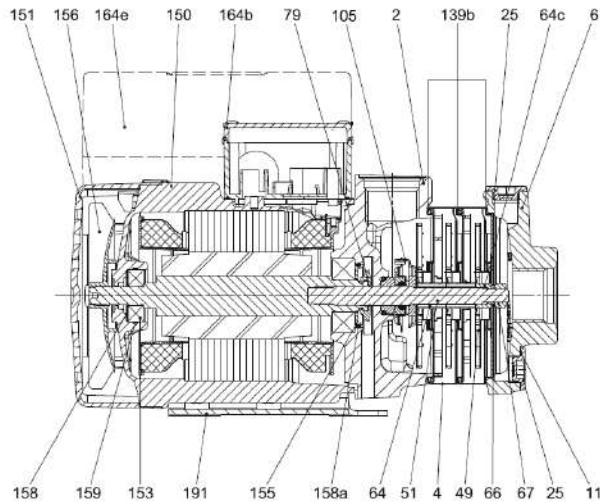
LCD keypad display, 5 lines x 16 characters, backlit, 6 languages, copy function
Multi-step speed settings: 5 available
Setpoint (PI) control
32-bit microprocessor logic
Nonvolatile memory, program retention
Displacement power factor: 0.98
Output frequency: 0.1 to 120 Hz
Frequency resolution: 0.06 Hz
Frequency regulation: 0.1%
Control Terminal Board: Quick disconnect
Carrier frequency: selectable to 15 kHz
24 VDC control logic, PNP / NPN selectable
Transmitter/Option power supply
Input/output terminal status
Timer function: Elapsed time, Delay on start, Delay on stop
RS-422/485 port: Modbus protocol
Volts/hertz ratio: Preset and programmable V/Hz patterns
Meter Functions: Volt, amp, kilowatt, elapsed run time, speed command
NEMA 1 or protected chassis
UL, cUL listed and CE marked; IEC 146;
MTBF: exceeds 28 years

Pump Protective Features:

Dry Well
Air in System
Blocked Impeller
Pump over Cycling
No Flow Protection
Loss of Prime
Transducer Loss
Over Torque

Performance Features:

Overload capacity: nominal 110% for 60sec. (150% peak)
Starting torque: 100% at 3 Hz
Motor preheat function
Adjustable accel/decel: 0.1 to 6000 sec.
Critical frequency rejection: 3 selectable, adjustable bands
Torque-limiting: 30-180%
Energy Saving control
Torque boost: full range, auto
Power loss ride-thru: 2 sec
Auto restart after power loss or resettable fault, selectable, programmable
Feedback signal loss detection
Serial communications loss detection
"Up/Down" floating point control capability (PI)
Stationary motor auto-tuning
Pump Sleep function
Run-permissive input

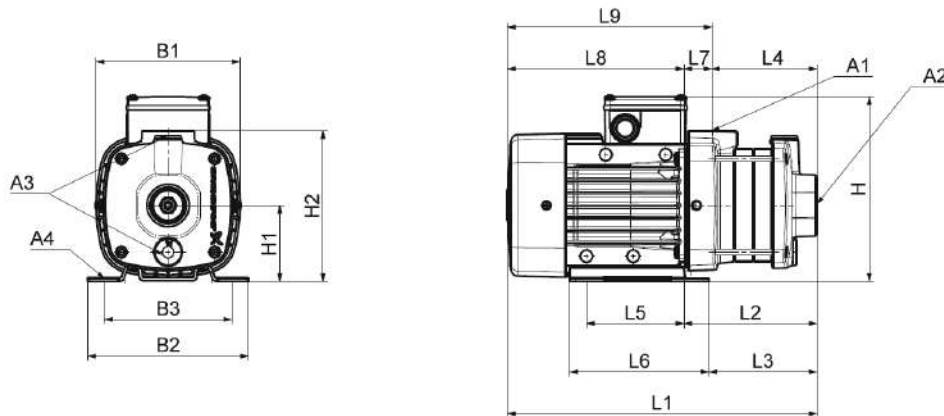


TM04 3723 3800

Fig. 7 CM(E) 1-3 with ML(E) 71 motor

Components

Pos.	Component	Pos.	Component	Pos.	Component
2	Discharge part	64c	Clamp	153	Ball bearing
4	Chamber	66	Washer (NORD-LOCK®)	155	Bearing cover plate
6	Inlet part	67	Nut	156	Fan
11	O-ring	79	Diverting disc	158	Corrugated spring
25	Plug	105	Shaft seal	158a	O-ring
49	Impeller	139b	Gasket	159	O-ring
51	Pump shaft	150	Stator housing	164b, 164e	Terminal box
64	Spacing pipe	151	Fan cover	191	Base plate



TM04 2248 2208

Dimensions

3 x 208-230 V / 440-480 V, 60 Hz (supply voltage E)
3 x 575 V, 60 Hz (supply voltage H)

Pump type	Frame size	P ₂ [hp]	NPT			Dimensions [in (mm)]															
			A1	A2	A3	A4	B1	B2	B3	H	H1	H2	L1	L2	L3	L4	L5	L6	L7	L8	L9
CM 15-1	90	3.4	2"	2"	3/8"	0.39 (10)	7.48 (190)	7.84 (199)	6.30 (160)	8.23 (210)	3.94 (100)	9.65 (245)	16.57 (421)	7.48 (190)	6.89 (175)	3.82 (97)	5.52 (140)	6.69 (170)	3.66 (93)	9.13 (232)	12.76 (324)
CM 15-2	100	5.4	2"	2"	3/8"	0.39 (10)	7.80 (198)	7.84 (199)	6.30 (160)	8.66 (220)	3.94 (100)	9.65 (245)	18.78 (477)	8.07 (205)	7.48 (190)	3.82 (97)	5.52 (140)	6.69 (170)	4.25 (108)	10.71 (272)	14.96 (380)
CM 15-3	112	8.4	2"	2"	3/8"	0.47 (12)	8.66 (220)	8.98 (228)	7.48 (190)	9.69 (246)	4.91 (112)	10.19 (257)	22.05 (560)	10.16 (258)	9.53 (242)	5.00 (127)	5.52 (140)	6.77 (72)	5.16 (131)	11.89 (302)	17.05 (433)

Pos.	Description	Material	Pump material version					
			CM(E) A Cast iron (ASTM A48 CL30/ EN-GJL-200)		CM(E) I Stainless steel (AISI 304 / EN 1.4301)		CM(E) G Stainless steel (AISI 316) / EN 1.4401	
			DIN W.-Nr.	ISO/AISI/AS TM	DIN W.-Nr.	ISO/AISI/AS TM	DIN W.-Nr.	ISO/AISI/AS TM
Motor parts								
156b	Motor flange	Cast iron						
150	Stator housing	Silumin (Alu)						
151	Fan cover	Composite PBT/PC						
153	Ball bearing							
156	Fan	Composite PA 66 30 % GF						
158	Corrugated spring	Steel						
164b	Terminal box, MG	Composite PC/ASA or silumin (Alu)						
164e	Terminal box, MGE							
191	Base plate	Steel, cataphoresis-treated	1.0330.3	ASTM A366 / A611-C1	1.0330.3	ASTM A366 / A611-C1		
		Steel, powder-coated, 60 to 120 µ, NCS 7005					1.0330.3	ASTM A366 / A611-C1
79	Diverting disc	Silicone fluid (LSR)						
155	Bearing cover plate	PPS						
Pump parts								
105	Shaft seal, steel parts	Stainless steel	1.4301/1.440 1 ¹⁾	AISI 304/ AISI 316 ¹⁾	1.4301/1.440 1 ¹⁾	AISI 304/ AISI 316 ¹⁾	1.4401	AISI 316
	Shaft seal, seal faces	SiC/SiC or Al ₂ O ₃ /carbon						
51	Pump shaft	Stainless steel	1.4057	AISI 431	1.4301/1.440 1 ¹⁾	AISI 304/ AISI 316 ¹⁾	1.4401	AISI 316
11 31 ¹⁾ 158a 159	O-rings	EPDM, FKM or FFKM						
157a ¹⁾	Gasket	Paper						
139b ²⁾	Gasket	Aramide fibers (nbr)						
2 ²⁾	Discharge part	Cast iron						
6 ²⁾	Inlet part	Cast iron						
4	Chamber	Stainless steel	1.4301/1.440 1 ¹⁾	AISI 304/ AISI 316 ¹⁾	1.4301/1.440 1 ¹⁾	AISI 304/ AISI 316 ¹⁾	1.4401	AISI 316
25	Plug	Stainless steel	1.4401	AISI 316L	1.4401	AISI 316L	1.4401	AISI 316L
49	Impeller	Stainless steel	1.4301/1.440 1 ¹⁾	AISI 304/ AISI 316 ¹⁾	1.4301/1.440 1 ¹⁾	AISI 304/ AISI 316 ¹⁾	1.4401	AISI 316
64	Spacing pipe	Stainless steel	1.4401	AISI 316	1.4401	AISI 316	1.4401	AISI 316
64c	Clamp	Stainless steel	STX2000 ³⁾		STX2000 ³⁾		STX2000 ³⁾	
6 ¹⁾	Flange	Cast iron						
16	Sleeve	Stainless steel			1.4301/1.440 1 ¹⁾	AISI 304/ AISI 316 ¹⁾	1.4401	AISI 316
67	Nut	Stainless steel A4						
66	Washer (NORD-LOCK [®])	Steel	1.4547 ⁴⁾		1.4547 ⁴⁾		1.4547 ⁴⁾	

¹⁾ On request.

¹⁾ Only in CM(E)-I/G pumps.



PRO-LINE®

Diaphragm Well Tanks: PL Series

125 PSIG Working Pressure

Construction

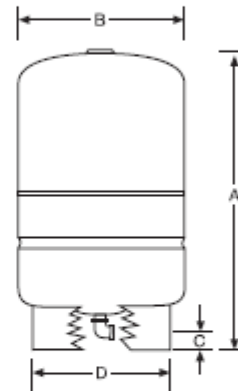
Shell	Deep Drawn Steel
Diaphragm	Butyl
Liner	Polypropylene
System Connection	304L Stainless Steel
Finish	Tan
Water Circulator	Turbulator™
Air Valve	Projection Welded
Factory Precharge	38 PSIG (2.6 bar)

Application

- Controls pump cycling in residential well water systems.

Performance

Maximum Operating Temperature	200°F (93°C)
Maximum Working Pressure	125 PSIG (8.6 bar)
Maximum Relief Valve Setting	100 PSIG (6.9 bar)
Warranty	5 Year



Stand Models

Model	Tank Volume		Max. Accept. Factor	A Tank Height		B Tank Diameter		C Sys. Conn. Centerline		D Stand Diameter		System Conn. (NPTF)	Shipping Weight	
	Gal	Lit		in	mm	in	mm	in	mm	in	mm		in	Lbs
PL-14	14.0	53	0.81	25	635	15	381	1 ¹ / ₂	40	12	304	1	22	10
PL-20	20.0	76	0.57	32	813	15	381	1 ¹ / ₂	40	12	304	1	28	13
PL-26	26.0	98	0.44	39	991	15	381	1 ¹ / ₂	40	12	304	1	34	15
PL-32	32.0	121	0.35	47	1194	15	381	1 ¹ / ₂	40	12	304	1	40	18
PL-34	34.0	129	1.00	30	762	22	559	1 ¹ / ₂	49	20 ¹ / ₂	521	1 ¹ / ₄	50	23
PL-44	44.0	167	0.77	36	914	22	559	1 ¹ / ₂	49	20 ¹ / ₂	521	1 ¹ / ₄	57	26
PL-62	62.0	235	0.55	47	1194	22	559	1 ¹ / ₂	49	20 ¹ / ₂	521	1 ¹ / ₄	75	34
PL-81	81.0	301	0.41	57	1448	22	559	1 ¹ / ₂	49	20 ¹ / ₂	521	1 ¹ / ₄	92	42
PL-86	86.0	326	0.54	47	1194	26	660	2 ¹ / ₄	52	20 ¹ / ₂	521	1 ¹ / ₄	99	45
PL-119	119.0	450	0.39	62	1575	26	660	2 ¹ / ₄	52	20 ¹ / ₂	521	1 ¹ / ₄	133	60

All dimensions and weights are approximate.