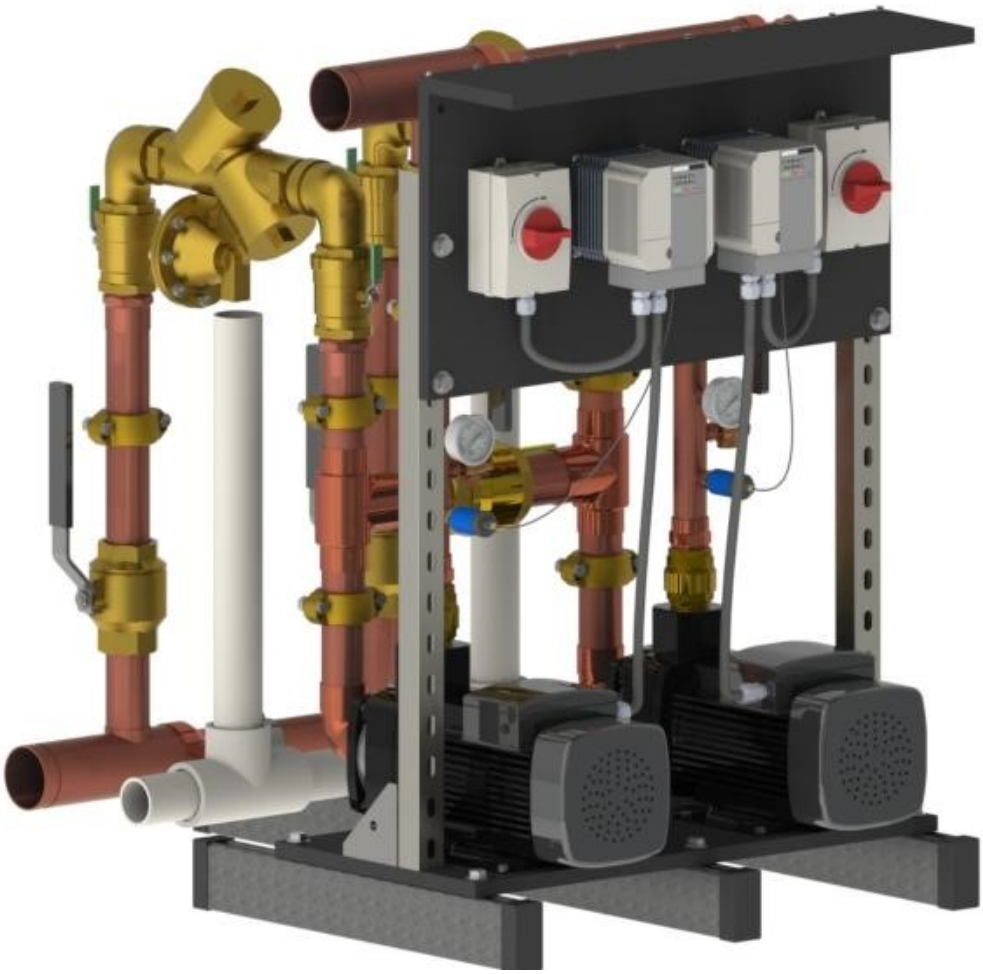
TOWLE WHITNEY LLC

Project



TW2975-140R-60
GEN-5: RPZ & VFD BOOSTER PUMP SYSTEM

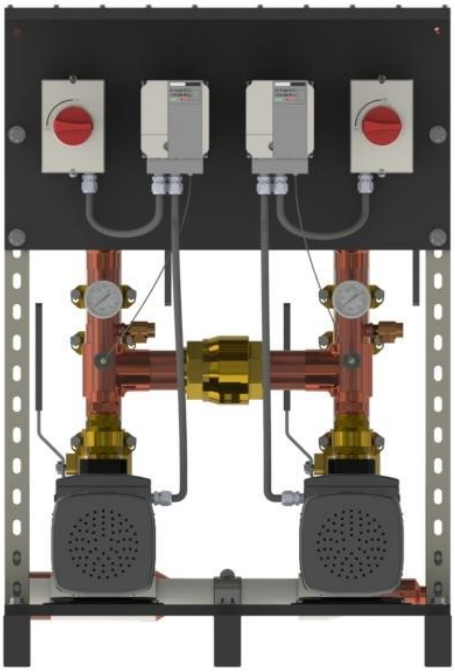
TOWLE WHITNEY LLC

TW2975T–140R-60DUPLEX

The ***TW2975T-140R-60 Duplex Booster Pump System*** is equipped with centrifugal pumps regulated by variable frequency drives that control each pump to maintain constant pressure regardless of varying demand or fluctuating incoming pressure.

Each pump's suction line is protected with a Reduced Pressure Zone (RPZ) backflow prevention assembly.

System is built to fit through a 30" doorway.



Technical Specifications:

Pumps: Grundfos CM10-3
Horse Power: 5.4 HP per pump

VF Drives: Yaskawa

Flow Rate: 140 GPM
50/50 Split: 70 GPM per pump

Boost: 60 PSI (138' TDH)

Manifolds: 3" (Reversible in field)
RPZ: 2"

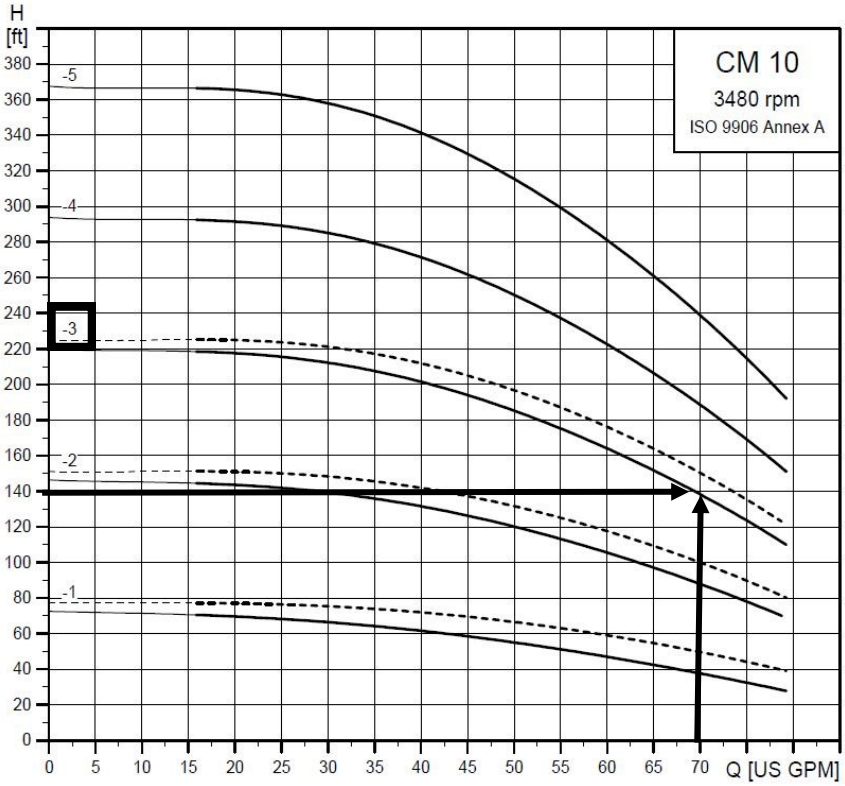
Tank: Flexcon H2P25 (26 Gallon)

Frame Size: 29" W x 42" H x 45" D
Weight (appr): 450 lbs

Power Options: Two independent circuits required

*** use VFD Input amps for circuit breaker sizing**

	VFD Input	VFD Output	Pump
208/1	**35.0**	17.5	14.8
208/3	**24.0**	19.6	14.8
480/3	**9.4**	8.8	7.4



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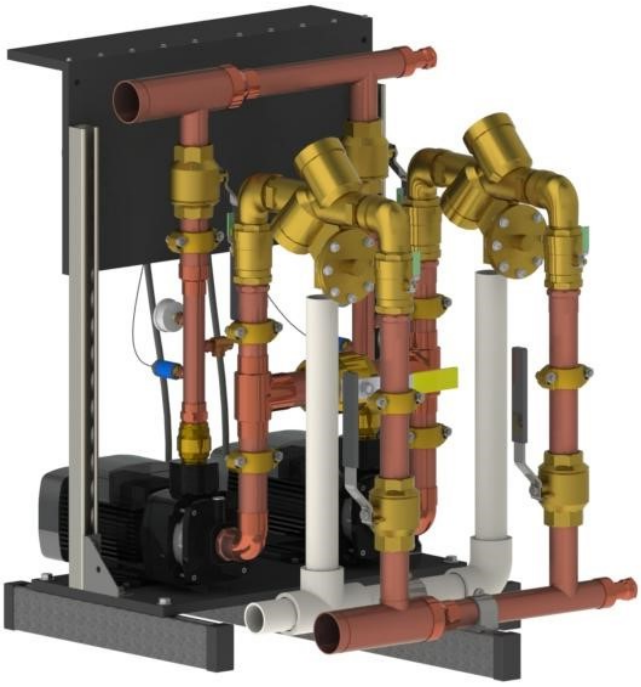
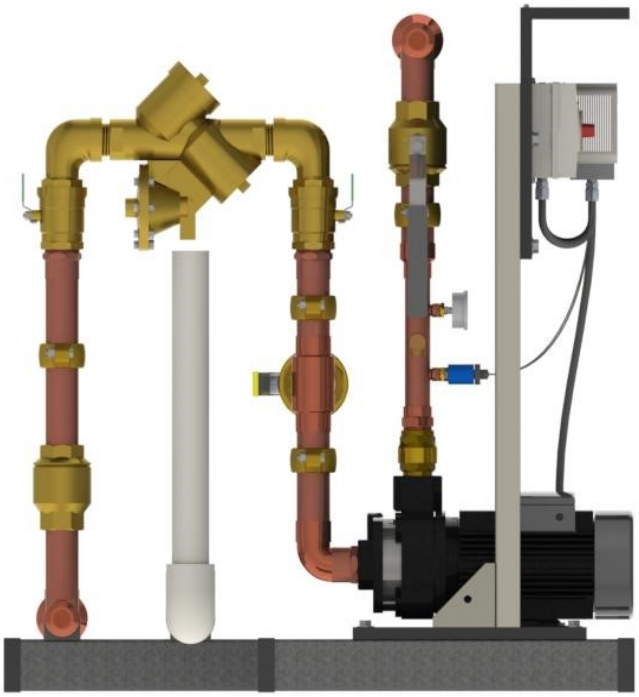
800-807-9827 **towle-whitney.com** **Info@towle-whitney.com**





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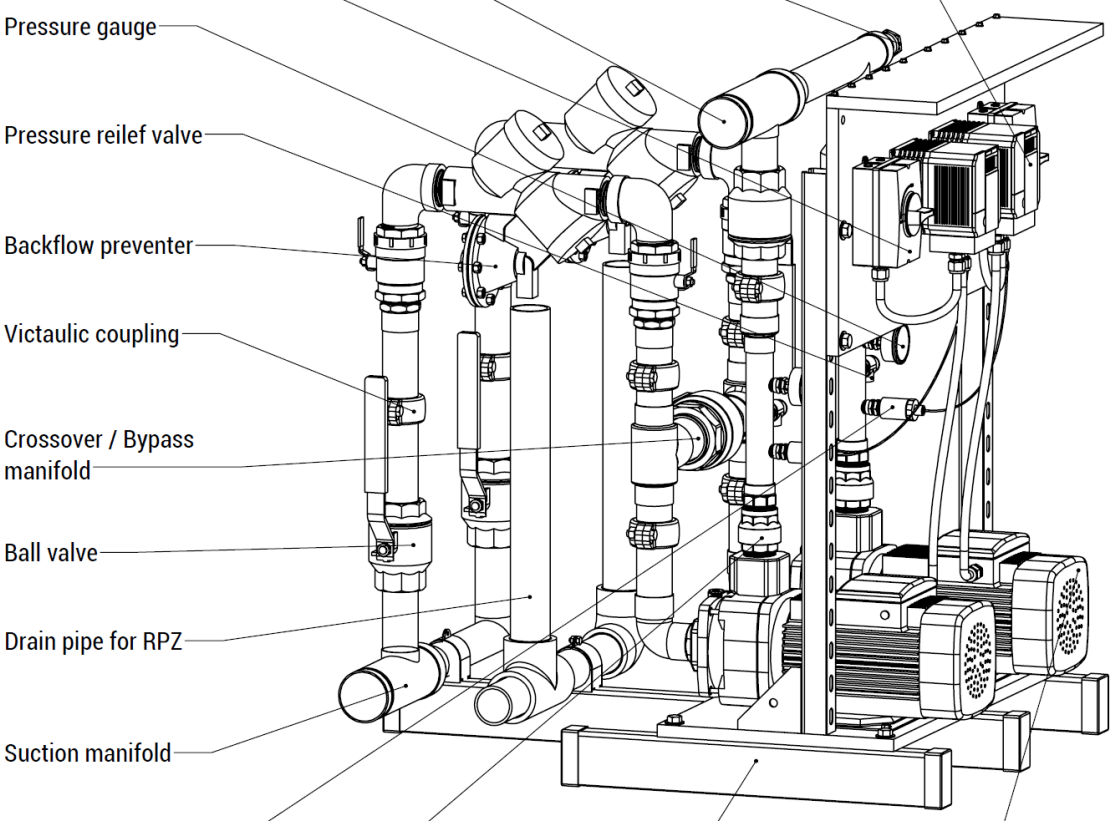
TW2975T Components



DIMENSIONS ARE SUBJECT TO CHANGE
DO NOT USE FOR CONSTRUCTION
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	VID	4/8/20
CHECKED		

COMMENTS:

TOWLE WHITNEY LLC

Duplex Variable Speed Booster System with Backflow Preventers

SIZE	DWG. NO.	REV.
A	2020-04-08-A	

SCALE:1:20 | WEIGHT: | SHEET 1 OF 1

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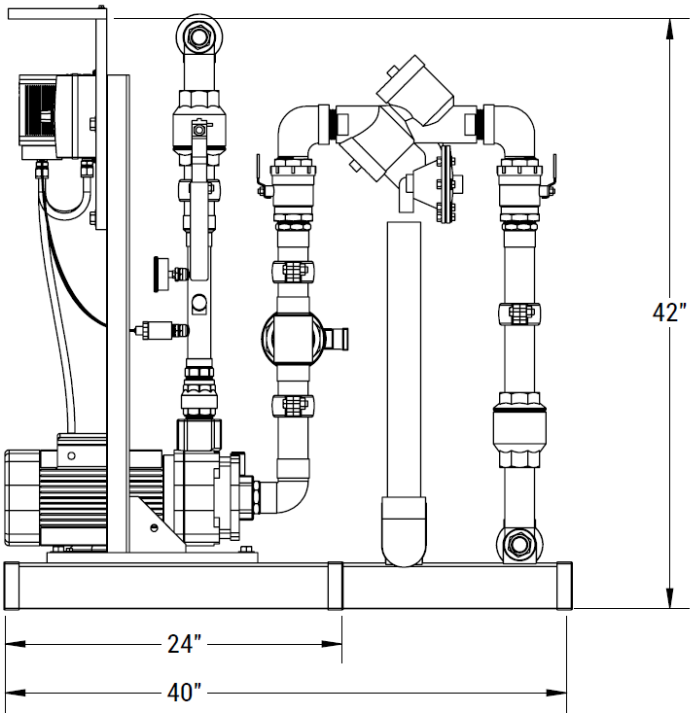
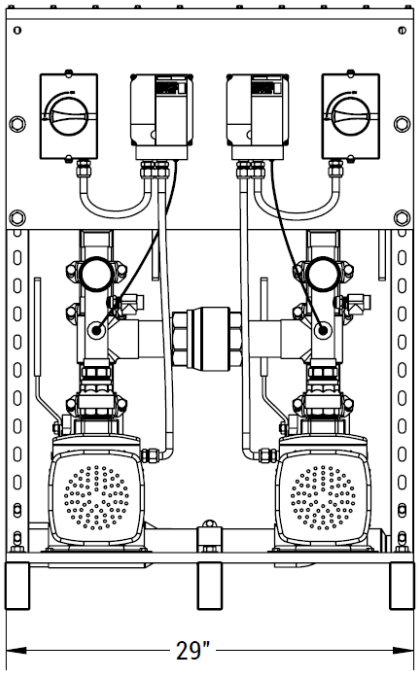
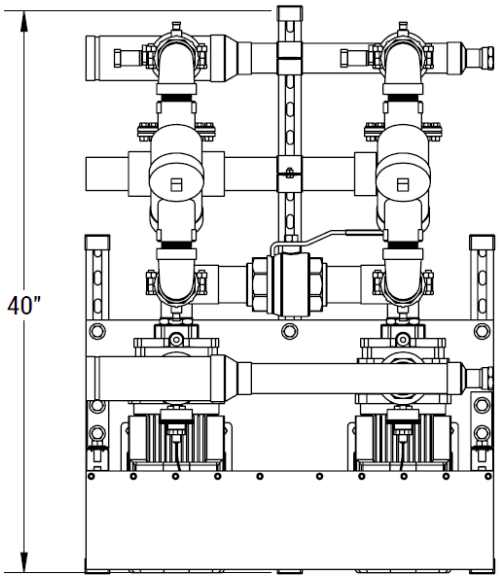
TW2975T Dimensions







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	NAME	DATE
DRAWN	VID	4/8/20
CHECKED		

COMMENTS:

TOWLE WHITNEY LLC

Duplex Variable Speed Booster System with Backflow Preventers

SIZE	DWG. NO.	REV.
A	2020-04-08-B	

SCALE:1:20 | WEIGHT: | SHEET 1 OF 1

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Electrical

Yaskawa VFD	UL 508C Power Conversion CSA 22.2 Industrial Controls	c UL us LISTED	CE	RoHS
Lovato Shut-off	NEMA4	c UL us LISTED	CE	RoHS

Pumps

Grundfos CM(I) SS Series	NSF 61
Goulds 2MS Series	NSF 61
Goulds 3656 Series	NSF 61
Walrus TPH Series	NSF 362

Plumbing

Bluefin BVT200 Ball Valves	NSF 61
Wilkins 975XL RPZ:	NSF 61
Watts LF777SM3 Strainer	NSF 61
Bonomi Check 1000012	NSF 61
Victaulic 607 “E” Coupling	NSF 61
Victaulic 660 Cap	NSF 61
Flexcon H2P25 Tank	NSF 61
Manifolds / piping	Type L Copper
Fittings	Copper
Discharge Riser	Copper
- Pressure Relief valve:	SS
- SS 4-20mA Transducer:	SS
- Pressure Gauges:	CA AB1953

Sealants

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

TOWLE WHITNEY LLC

GENERAL SPECIFICATIONS

Assembled Units:

- All "wetted surfaces" shall be lead free (<.25% Pb) in conformance with the 1/4/14 federal law
- Each pump shall include an independent variable frequency drive (VFD) and disconnect switch.
- Each pump shall include a dedicated Reduced Pressure Zone Assembly (RPZ) backflow preventer.
- Each pump shall include isolation valves and grooved couplings on both the suction and discharge piping

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 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 STAINLESS STEEL casing and impellers.
- Shall have a 316 stainless steel shaft sleeve. Mechanical seal shall be rated to withstand pressure of up to 232 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

Backflow Prevention:

- Each pump suction line shall be supplied with a
  - 2” Reduced Pressure Zone (RPZ) Assembly backflow preventer
  - Air Gap adapter, and 3” DWV piping
  - 2” Strainer
  - 2” Check Valve

- Each RPZ shall be capable of being tested independently, regardless of which pump is running.
- Using isolation valves, strainer basket shall be able to be removed and cleaned independently, with the other pump operating.

Manifolds, valves and fittings:

- Manifolds are designed to switch sides (left / right) in the field.
- Shall be sized appropriately to allow water velocity not exceeding 10 ft/sec, to minimize cavitation and turbulence
- For isolation and maintenance, each pump shall have suction and discharge ball valves and grooved couplings

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

TOWLE WHITNEY LLC

Model 975XL2SEU

Reduced Pressure Principle Assembly with 90° Elbows

Application

Ideal for use where Lead-Free* valves are required. Designed for installation on potable water lines to protect against both backsiphonage and backpressure of contaminated water into the potable water supply. Elbows allow for a very small installation footprint for confined spaces or landscaping. Union ball valves allow easy removal for repair or winterizing. Assembly shall provide protection where a potential health hazard exists.

LEAD FREE

NSF/ANSI 61

Standards Compliance

- ASSE® Listed 1013
- IAPMO® Listed
- CSA® Certified
- AWWA compliant C511
- Approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California
- Meets the requirements of NSF/ANSI 61*

*(0.25% MAX. WEIGHTED AVERAGE LEAD CONTENT)

Options

(Suffixes can be combined)

Accessories

- ☐ Air gap (Model AG)
- ☐ Repair kits (rubber only)
- ☐ Thermal expansion tank (Mdl. XT)
- ☐ Soft seated check valve (Model 40XL2)
- ☐ Shock arrester (Model 1250XL)
- ☐ QT-SET Quick Test Fitting Set

Materials

Main valve body	Low Lead Cast Bronze ASTM B 584
Access covers	Low Lead Cast Bronze ASTM B 584
Fasteners	Stainless Steel, 300 Series
Elastomers	Silicone (FDA Approved)
	Buna Nitrile (FDA Approved)
Polymers	Noryl™
Springs	Stainless Steel, 300 series
Ball valve handles	Stainless Steel

Relief Valve discharge port:

3/4" - 1" - 0.63 sq. in.

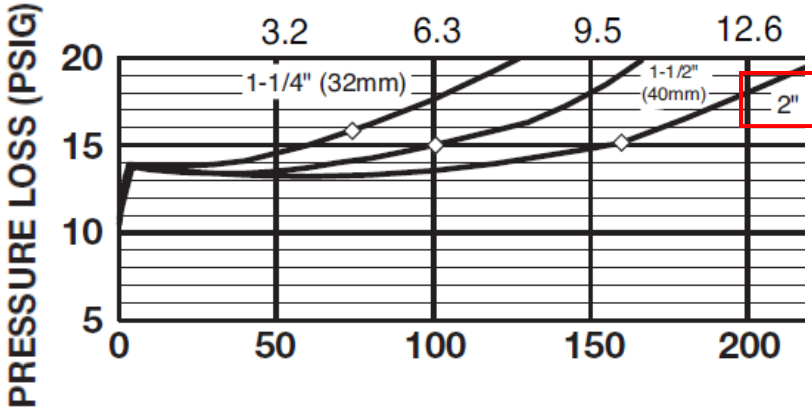
1 1/4" - 2" - 1.19 sq. in.

Features

Sizes: 3/4", 1", 1-1/4", 1-1/2", 2"

Maximum working water pressure	175 PSI
Maximum working water temperature	180°F
Hydrostatic test pressure	350 PSI
End connections Threaded	ANSI B1.20.1

Capacity thru Schedule 40 Pipe				
Pipe size	5 ft/sec	7.5 ft/sec	10 ft/sec	15 ft/sec
1/2"	5	7	9	14
3/4"	8	12	17	25
1"	13	20	27	40
1 1/4"	23	35	47	70
1 1/2"	32	48	63	95
2"	52	78	105	167



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CENTRIFUGAL PUMP MATERIAL

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/ASTM	DIN W.-Nr.	ISO/AISI/ASTM	DIN W.-Nr.	ISO/AISI/ASTM
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	1.4301/1.4401 *)	AISI 304/ AISI 316 *)	1.4301/1.4401 *)	AISI 304/ AISI 316 *)	1.4401	AISI 316
	Shaft seal, seal faces	SiC/SiC or Al_2O_3 /carbon						
51	Pump shaft	Stainless steel	1.4057	AISI 431	1.4301/1.4401 *)	AISI 304/ AISI 316 *)	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	1.4301/1.4401 *)	AISI 304/ AISI 316 *)	1.4301/1.4401 *)	AISI 304/ AISI 316 *)	1.4401	AISI 316
25	Plug	Stainless steel	1.4401	AISI 316L	1.4401	AISI 316L	1.4401	AISI 316L
49	Impeller	Stainless steel	1.4301/1.4401 *)	AISI 304/ AISI 316 *)	1.4301/1.4401 *)	AISI 304/ AISI 316 *)	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			1.4301/1.4401 *)	AISI 304/ AISI 316 *)	1.4401	AISI 316
67	Nut	Stainless steel A4						
66	Washer (NORD-LOCK®)	Steel	1.4547 4)		1.4547 4)		1.4547 4)	

*) On request.

1) Only in CM(E)-I/G pumps.

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CM(E) I and CM(E) G

(I = AISI 304 / EN 1.4301 and G = AISI 316 / EN 1.4401)

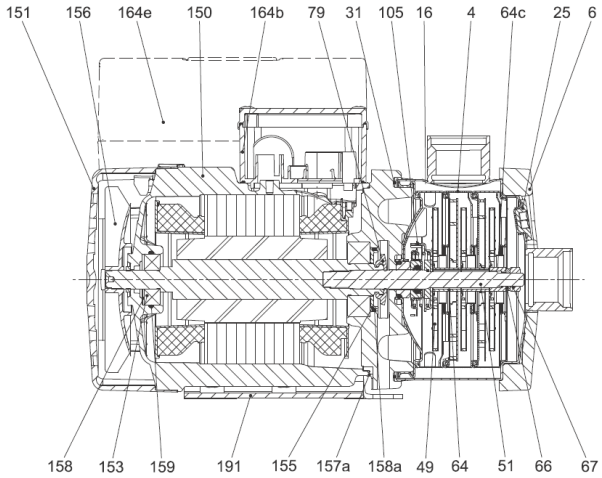
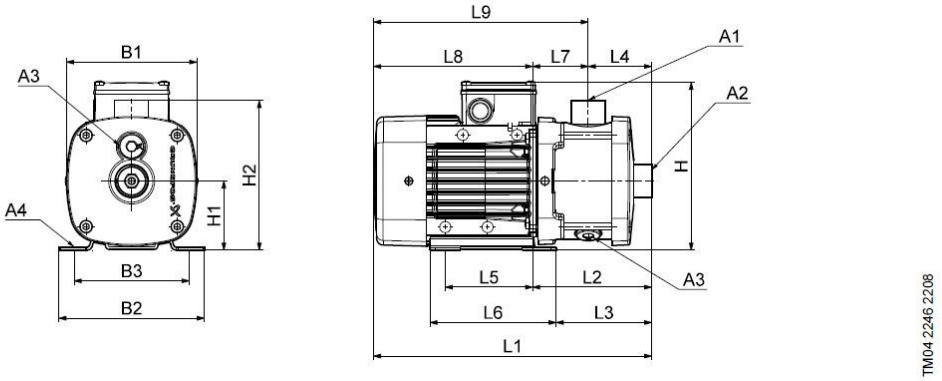


Fig. 12 CM(E) 1-3 with ML(E) 71 motor

Components

Pos.	Component	Pos.	Component	Pos.	Component
4	Chamber	64c	Clamp	155	Bearing cover plate
6	Flange	66	Washer (NORD-LOCK®)	156	Fan
16	Sleeve	67	Nut	157a	Gasket
25	Plug	79	Diverting disc	158	Corrugated spring
31	O-ring	105	Shaft seal	158a	O-ring
49	Impeller	150	Stator housing	159	O-ring
51	Pump shaft	151	Fan cover	164b, 164e	Terminal box
64	Spacing pipe	153	Ball bearing	191	Base plate



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		Rp	Dimensions [in (mm)]															
			A1	A2	A3	A4	B1	B2	B3	H	H1	H2	L1	L2	L3	L4	L5	L6	L7	L8	L9
CM 10-1	80	1.7	1 1/2"	1 1/2"	3/8"	0.39 (10)	7.09 (180)	6.22 (158)	4.92 (125)	8.50 (216)	3.94 (100)	8.58 (218)	15.71 (399)	7.28 (185)	6.34 (161)	4.13 (105)	3.78 (96)	5.39 (137)	4.15 (80)	8.43 (214)	11.57 (294)
CM 10-2*	90	3.4	1 1/2"	1 1/2"	3/8"	0.39 (10)	7.09 (180)	7.84 (199)	6.30 (160)	8.27 (210)	3.94 (100)	8.58 (218)	17.72 (450)	7.05 (179)	6.46 (164)	4.13 (105)	5.51 (140)	6.69 (170)	2.91 (74)	10.71 (272)	13.58 (345)
CM 10-3*	100	5.4	1 1/2"	1 1/2"	3/8"	0.39 (10)	7.80 (198)	7.84 (199)	6.30 (160)	8.66 (220)	3.94 (100)	8.58 (218)	19.96 (507)	9.25 (235)	8.66 (220)	4.13 (105)	5.51 (140)	6.69 (170)	5.12 (130)	10.71 (272)	15.83 (402)
CM 10-4*	112	8.0	1 1/2"	1 1/2"	3/8"	.47 (12)	8.66 (220)	8.98 (228)	7.48 (190)	9.69 (246)	4.41 (112)	9.06 (230)	23.19 (589)	11.30 (287)	10.67 (271)	5.32 (135)	5.51 (140)	6.77 (172)	5.98 (152)	11.89 (302)	17.87 (454)
CM 10-5*	112	8.0	1 1/2"	1 1/2"	3/8"	.47 (12)	8.66 (220)	8.98 (228)	7.48 (190)	9.69 (246)	4.41 (112)	9.06 (230)	25.55 (649)	13.66 (347)	13.03 (331)	7.68 (195)	5.51 (140)	6.77 (172)	5.98 (152)	11.89 (302)	17.87 (454)

iQpump Micro AC Drive

YASKAWA

Performance Features (Drive)

- Ratings:
  1 to 5 HP at 200-240 VAC 1-Ph.
  1 to 25 HP (ND) at 200-240 VAC 3-Ph.
  1 to 25 HP (ND) at 380-480 VAC 3-Ph.
- Overload Capacity:
  120% for 60 sec. (Normal Duty)
- Control Methods: V/f Control,
  Open Loop Current Vector Control
- DC injection braking, ramp to stop
- Electronic reversing
- Adjustable accel/decel: 0.01 to 6000 seconds
- Controlled speed range:
  40:1(1) 100:1(2)
- Speed Regulation:
  ± 0.5 to 1% with slip compensation(1)
  ± 0.2%(2)
- Displacement power factor: 0.98
- Output frequency: 0 to 400 Hz
- Frequency resolution:
  0.01 Hz with digital reference
  0.06 / 60 Hz with analog reference
- Frequency accuracy:
  0.01% with digital command
  0.5% with analog command
- Volts / hertz ratio: infinitely adjustable pattern
- DC Injection braking: adjustable amplitude, duration, current limited
- Torque boost: full range, auto
- Power loss ride-thru: 0.5 sec.
- Speed search
- Auto restart
- 3 Critical frequency rejection settings
- Slip Compensation
- Energy $avings Function
- Enhanced PID with loss of feedback function

(1) V/f Mode
(2) Open Loop Current Vector Mode

Design Features (Drive)

- Dual microprocessor logic
- Digital keypad operator, 5 digits
- LED status display
- Remote Mount Keypad Capability
- RJ-45 Style Digital Operator Connector
- 7 multifunction digital inputs
- 3 multifunction digital outputs
- Hardwire baseblock (EN954-1 Cat. 3)
- Programmable form C output contact for customer use: 1A at 250 VAC or 30 VDC
- 24 VDC control logic compatible with sourcing or sinking outputs (PNP or NPN)
- Carrier frequency: 15 kHz max; swing PWM
- 2 Remote speed references:
  0-10 VDC (20 kohms) or isolated 4-20 mA (250 ohms)
- Signal follower: bias and gain
- 2 programmable open collector outputs
- Analog monitor output:
  0-10 VDC proportional to output frequency or output current
- Approx. 400 parameters and monitors
- Digital pulse train input (33 kHz max.)
- Cooling fan controlled by drive run/stop
- RS-422/485 Modbus 115 kbps
- UL recognized electronic overload
- MTBF: 28 years
- NEMA 1 enclosure
- Side-by-Side mounting
- Maintenance monitors

Protective Features (Drive)

- Current limit, stall prevention during accel, decel, and run
- Motor and drive overload
- Over voltage prevention function
- Instantaneous over current
- Short circuit
- Under voltage
- Heatsink overheat
- Ground fault protection
- Over/under torque
- Short circuit current rating: 30kA rms sym.

Pump Control Features

- Operator keypad with intuitive pump language
- Hand-Off-Auto
- Programmable pump process set point
- Pump start level and start time
- Sleep protection
- Simplex, duplex and triplex control
- Automatic system restart
- No flow detection
- Low and high feedback set points
- Pre-charge low level control
- Thrust bearing control
- Automatic system stabilization
- Motor condensation pre-heat function

Pump Protective Features

- Dry well
- Air in system
- Blocked impeller
- Pump over cycling
- No flow protection
- Loss of prime
- Transducer loss
- Over torque

Pump Alarms and Messages

- Low feedback
- High feedback
- Low level
- Low water
- Pump over cycling
- No flow detection
- Loss of prime
- Pump fault
- Motor thermostat
- Pre-charge mode
- Thrust bearing active
- Start mode active
- Sleep mode active

TOWLE WHITNEY LLC

PNEUMATIC EXPANSION TANK SPECIFICATIONS

Submittal Data

Flex2Pro Series

Water System Tanks

Job Name: _____ Schedule #: _____

Location: _____ Model #: _____

Engineer: _____ Representative: _____

Contractor: _____

Description

Flex2Pro (H2P) series tanks are diaphragm type, pre-charged hydro-pneumatic tanks designed for residential and commercial water well, pressure booster, and irrigation systems.

Materials of Construction

Shell: Drawn steel w/ epoxy finish

Diaphragm: Butyl rubber w/ copolymer polypropylene lower water chamber

Connection: Stainless steel FPT

Ratings

Max. Working Pressure:	125 PSI
Max. Working Temp:	140 F
Pre-Charge (adjustable):	38 PSI

NSF/ANSI 61
NSF/ANSI 372

Tank Specifications

Model	Diameter (inches)	Height (inches)	System Connection (inches)	Volume (gallons)	Drawdown (gallons)			Weight (lbs)
					20/40	30/50	40/60	
H2P 14	16	22	1	14	5.6	4.8	4.1	28
H2P 20	16	29	1	20	8.1	6.8	5.9	36
H2P 25	16	34.5	1	26	10.5	8.9	7.7	41
H2P 30	21	27.75	1 ¼	32	12.9	10.9	9.4	54
H2P 35	16	42.75	1	33.4	13.3	11.3	9.7	49
H2P 45	21	36.25	1 ¼	44	17.7	15.0	13.0	67
H2P 65	21	48	1 ¼	62	25.0	21.1	18.3	82
H2P 80	21	62	1 ¼	81	32.6	27.6	23.9	99
H2P 85	26	44.5	1 ¼	85	34.3	29.0	25.1	121
H2P 120	26	59.75	1 ¼	119	48.0	40.6	35.1	153

FLEXCON INDUSTRIES
A Swan Group Company

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Booster Pump Systems

Three Year Limited Warranty

This warranty applies to booster pump systems built by Towle Whitney LLC, and shall:

- Exist 36 months from the date of shipment.
- Be in effect only after installation photographs are received by Towle Whitney LLC.

Towle Whitney LLC liability under this warranty shall be limited to the repair or replacement of any part or parts found to be defective (material or workmanship) within the warranty period. Towle Whitney LLC shall determine whether the part needs to be returned, or field scrapped. The warranty excludes:

- Any water damage or consequential damage.
- Transducers and Pump Seals.
- Debris in water causing internal pump damage.
- Systems not installed in accordance with Installation and Maintenance Instructions.
- Labor, transportation, and related costs incurred by the customer.
- Misuse, negligence, inappropriate chemicals or additives in water.
- Inadequate protection from freezing.
- Lightning, high voltage spikes, accidents, floods, or acts of God.
- Re-Installation costs of repaired or replacement equipment.
- Re-Imbursement for the loss caused by interruption of service.
- Adjusting drive parameters without consulting Towle Whitney.

This warranty applies to all states and territories of the United States and Canada only. There are no express or implied warranties, including merchantability or fitness for a particular purpose, which extend beyond those warranties described or referred to above.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages and some jurisdictions do not allow limit actions on how long implied warranties may last. Therefore, the above limitations or exclusions may not apply. This warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.