360-t Tunnel

Installation Manual

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www.PetitAutoWash.com

Rev. 8/18

Contents

1. Wash Bay Equipment

Assembly Note: Most fasteners supplied use nylon locking nuts, threads must be treated with anti-seize before assembly. Medium strength thread locker (Loctite 242, Blue) must be used on all other fasteners.

1.1. Pre-Install:

Mark the floor where all 4 frame legs will sit. Use a transit level, to measure the floor elevation at those 4 points. Identify the highest point and use it as a reference. Determine how much lower each of the 5 points and note the difference. Use leg shims (optional) to level each leg to match the reference height ± 3/16".

1.2. Unloading:

To unload the truck and install the equipment you will need:

- **Minimum 6,000 lb. Lifting capacity forklift with side-shift capability.**
- **Minimum 5ft to 6ft long fork extensions.**
- **Caster Wheel Kits are available that attach to shipping crates and bridge cradles.**

Be extraordinarily careful when picking the crate up from the lifting end. The weight and length make it possible to tip the forklift over when transporting. Drive slowly, keeping the crate as low to the ground as practical.

1.3. Unpacking:

The Bridge comes bolted on top of a steel cradle; this is used to transport & lift the Bridge onto the Main Rails. The Top Washer is folded up on top of the Bridge.

When unpacking, cut any ties to the steel Cradle but be careful to leave the T-Bars & Spray Arms tied up to the Bridge. Remove the Top Washer Cover from on top of the Bridge. Leave the steel transport Cradle firmly attached to the Bridge

Remove the E-Chain, legs, beams and other items from under the Cradle. Casters are available that bolt into the bridge cradle. This makes it easy to maneuver the machine into the wash bay.

1.4. Framework:

Please refer to the layout drawings section of the installation manual.

20” of clearance above the Bridge Rails is needed to unfold the Top Washer. T-Bars are held to their mounting blocks with a shear bolt, do not replace with a regular bolt. Ensure the T-bars are parallel with each other and perpendicular to the machine rails. Bridge Keepers bolt on to the outside of the Bridge End Plates.

Legs are universal but are also directional. Orient all the legs with the drain holes facing inboard or toward the center of the bay. All bolts should be inserted from inboard to outboard, so nuts are on outside of legs.

Note that the P.S. Main Rail has two Proximity Switch Target Flags each on the inboard side of the rail located at the entrance & exit end of the rail. The D.S. Main Rail has one Proximity Switch Target Flag on the inboard side of the rail. Both Main Rails mount w/ the 4-bolt flange holes toward the bottom.

When installing the Framework, it is important to fasten the legs to the floor exactly as depicted in the drawing. Leave the entire framework and floor anchors slightly loose, then use a level to insure the legs are plumb vertically (front/rear and left/right), before tightening all framework fasteners. Fully tighten the floor anchors last.

Alternately: If enough man power and Genie Lifts are available wait until the entire framework is assembled to fasten the legs to the floor. This will allow you to verify the correct position of the legs.

Referring to the Rail Kit drawing, layout and mark the floor where each of the legs for the 360-t frame will sit.

Assemble the Cross beams to the legs. If the factory Crossover Plumbing was purchased, one of the Top Crossbeams already has channel strut & plumbing attached. This Crossbeam must be used on the entrance legs. The Entrance Crossbeam is attached to the entrance side of the legs. The Exit Crossbeam is typically attached to the exit side of the legs. Be sure to square the legs to the Beam when attaching Left to Right Frame Gussets. Tighten the bolts until they are snug, but do not fully tighten at this time.

Stand up either the Exit or Entrance Cross Beam/ Leg assembly, position the legs EXACTLY as dimensioned in the drawing. Use the corner-to-corner dimension in the drawing to verify squareness and fasten loosely to floor.

Stand up the remaining Exit or Entrance Cross Beam/ Leg assembly and attach the two Longitudinal Braces and the Entrance to Exit Gussets, then fasten loosely to the floor.

Attach the D.S. & P.S. Main Rails snug, but do not fully tighten the fasteners. Be sure to identify the rails correctly, placing them in the correct position with the 4-bolt flange holes towards the bottom.

Attach the E-Chain Trough with E-Chain in it, to the Passenger Side Legs.

At this point use a level and verify the legs are plumb from front-to-back and left-to-right. Push them into position if needed, tighten all rail kit fasteners, recheck the legs and finally fully tighten the floor anchors on all 6 legs. This step is important as it will insure that the upper framework stays plumb and square. **Do not over tighten the fasteners in the drive rails. This can crush the tubing and cause alignment issues for the drive wheels.**

The Entrance and Exit Proximity Target Flags are already mounted on the P.S. Main Drive Rail. Verify that the flags are 4" from the end of the bridge rail. The Home Proximity Target Flag is already attached to the D.S. Main rail. Verify that the flag is 26-1/4" from the entrance end of the D.S. Main Rail.

Bridge Rail End Stops are directional and are already fastened to the inboard side of the Main Rails, at both the entrance and exit end. If the End Stops must be removed for any reason, verify that they are installed before beginning the startup procedure.

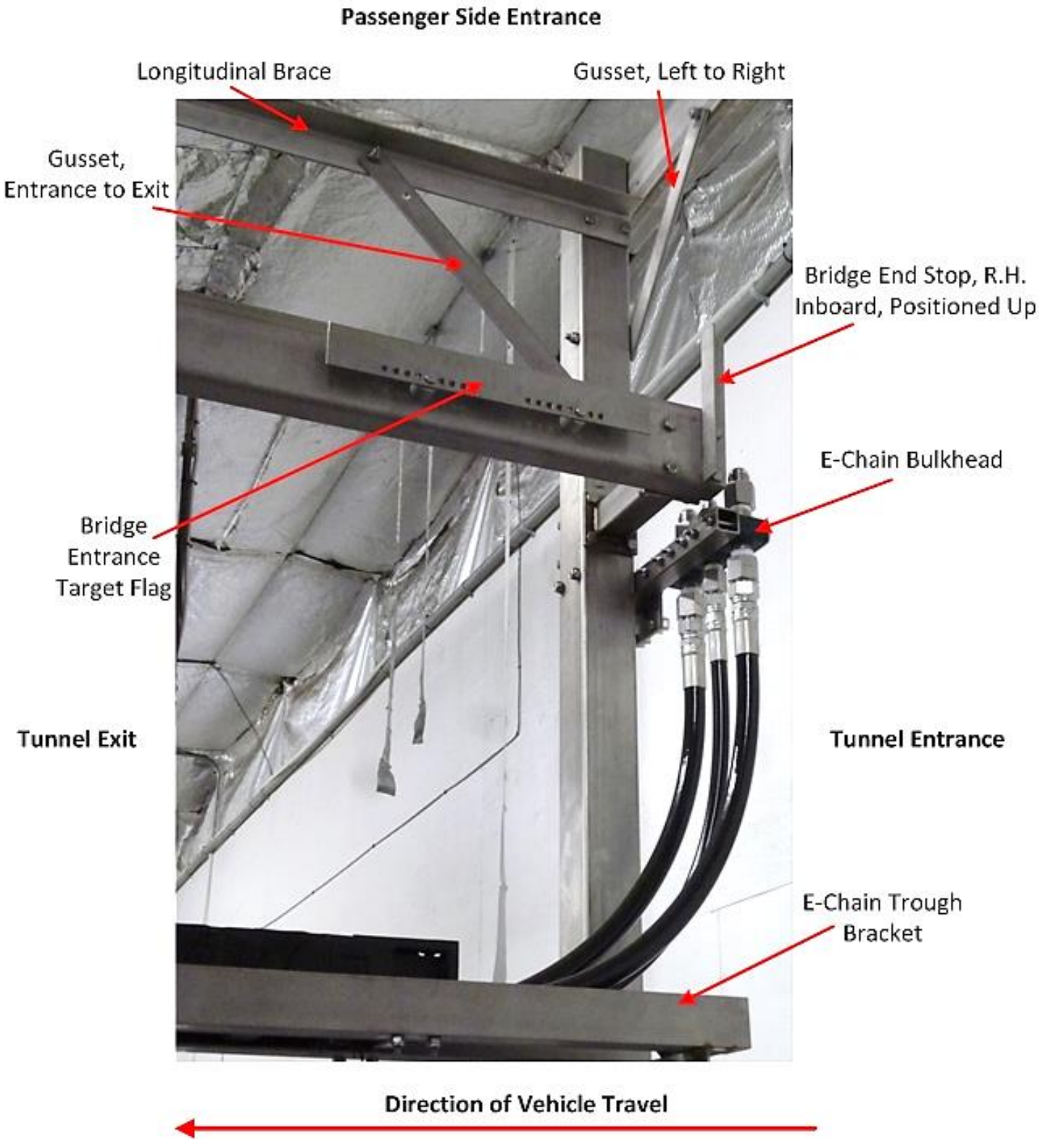
Install the E-Chain Bulkhead on the P.S. Entrance Leg. (See drawing under section: 1.7 E-chain)

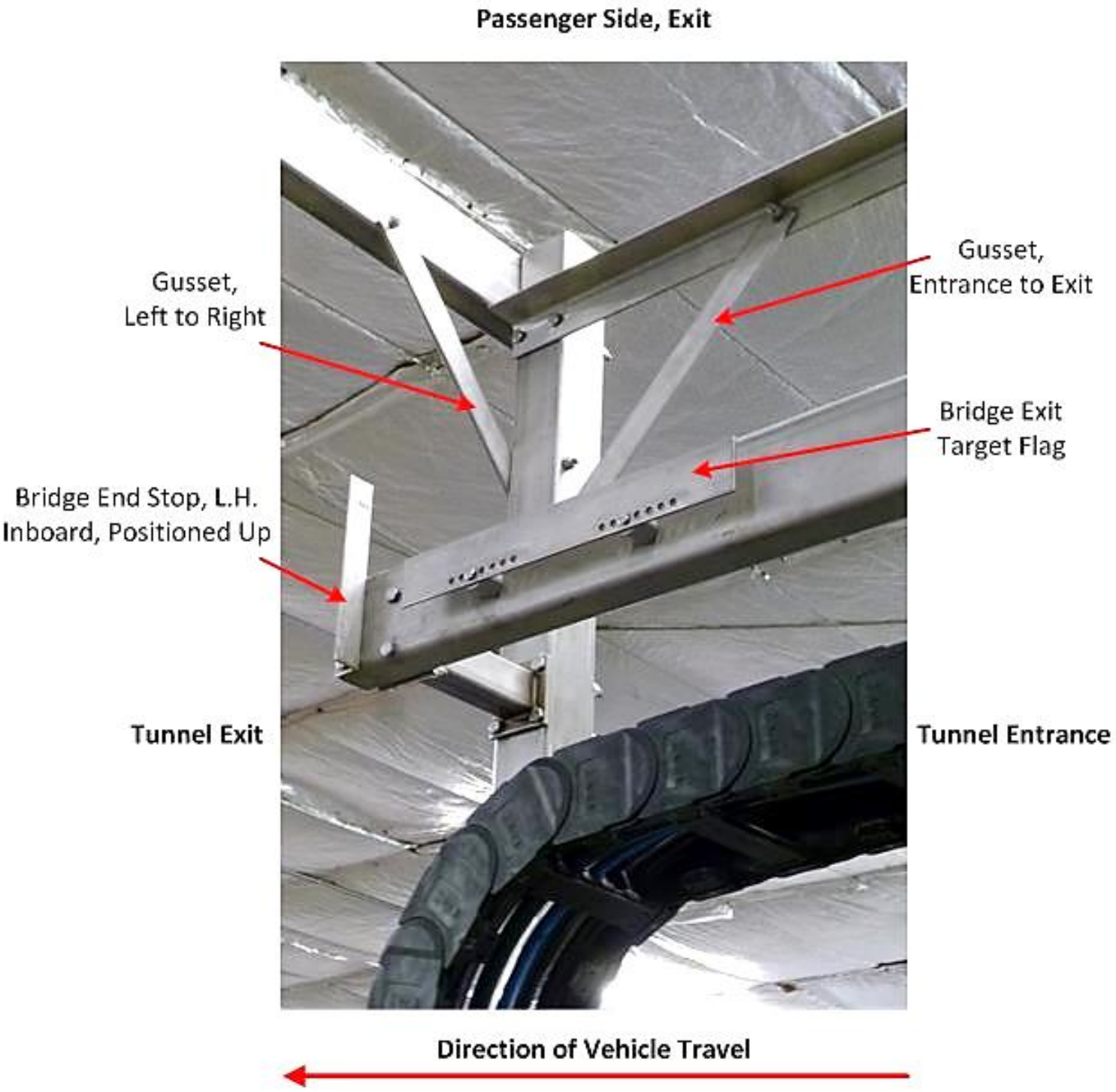
Accutrac 360-t Entrance

Accutrac 360-t Exit

Main Rail, P.S. Entrance

Main Rail, P.S. Exit


Passenger Side Entrance
Longitudinal Brace
Gusset, Left to Right
Gusset, Entrance to Exit
Bridge End Stop, R.H. Inboard, Positioned Up
E-Chain Bulkhead
Bridge Entrance Target Flag
Tunnel Exit
Tunnel Entrance
E-Chain Trough Bracket
Direction of Vehicle Travel


Passenger Side, Exit
Gusset,
Left to Right
Gusset,
Entrance to Exit
Bridge Exit
Target Flag
Bridge End Stop, L.H.
Inboard, Positioned Up
Tunnel Exit
Tunnel Entrance
Direction of Vehicle Travel

Raising the E-Chain

1.5. Raising the Bridge:

Note: Combined weight of Bridge & Cradle is 1,000 lbs. The steel Cradle is used to transport, lift and position the Bridge into place. To assist in transport, casters are available for the cradle. Make sure the Cradle is securely attached to the bridge and all the fasteners are tight.

Position the fork lift on the Exit side of the Bridge. If it is necessary to pick the Bridge up from the front (entrance side), you must first unplug the power wires & remove both halves of the Front Cover.

Verify that the Bridge Proximity switches are adjusted back, nearly flush with the bridge plates, so they will easily clear the rails & limit flags.

Remove the D.S. Main rail completely, or you can remove all but 1 bolt and swing the drive rail out of the way without completely removing it. and lift the Bridge while clearing the E-Chain and P.S. Rail. Then re-attach the D.S. Rail, side-shift and lower the Bridge into place.

If loading the bridge from the Exit end, leave 1 bolt in the Entrance end of the DS Main Rail, If loading from the Entrance, leave one bolt in the opposite end.

Now remove the bolts that hold the Cradle to the Bridge and lower the Cradle to the ground.

Flip the Bridge Keeper Brackets 180- degrees and keep on the **outboard side** of the Bridge End Plates, under the Rails. Verify that the Bridge End Stops are bolted on the inboard side of the Main Rails.

Unfold the Spray Arms. The spray arm breakaway force will be adjusted later.

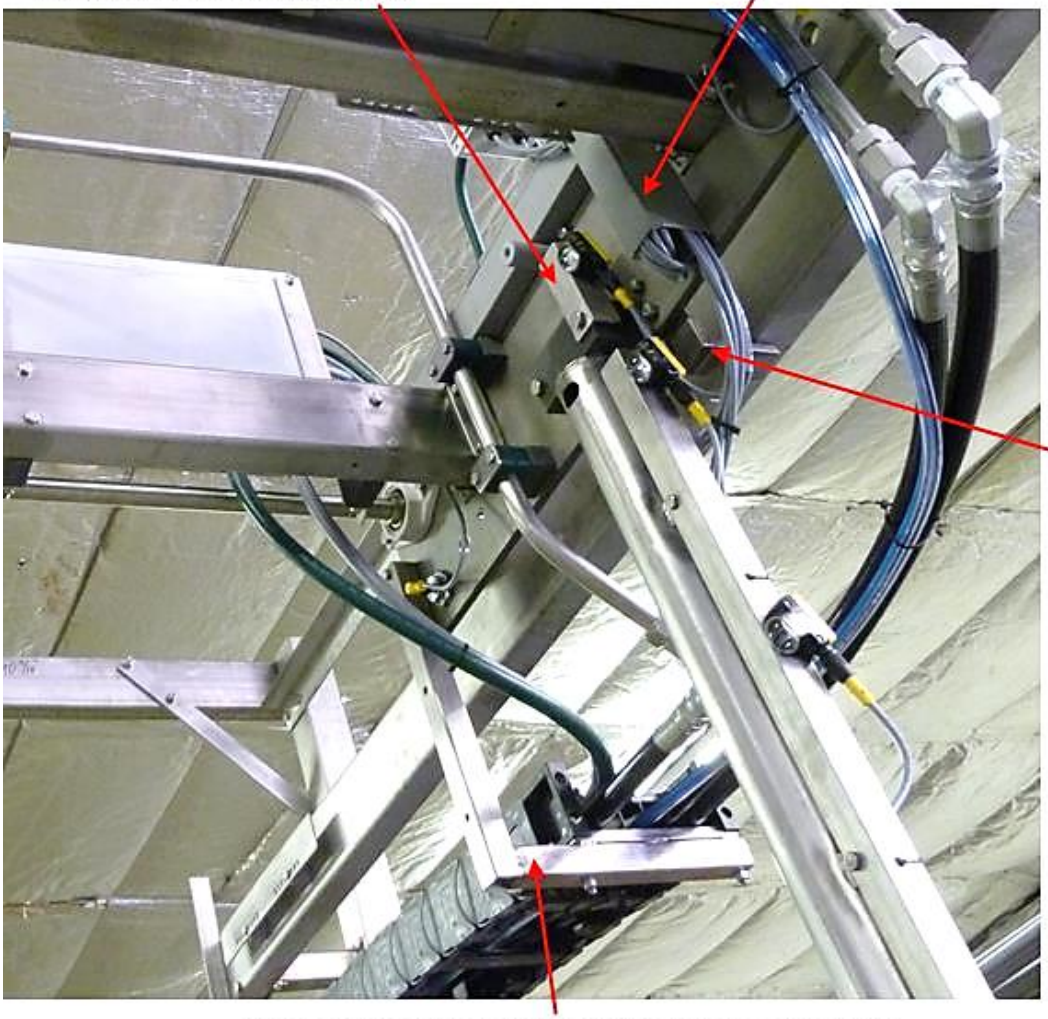
Install the T-Bars and fold the excess length of photo-eye cables back up into the wire duct. Tuck the sensor array junction box vent into the top of the T-bar. (Note that the PS T-bar Mount also holds a photo-eye bracket. Use a level to make sure bracket is straight up/down. **Note: The T-Bars are fastened to their mounting blocks with a shear bolt. Do not over-tighten the shear bolt. Do not replace with a regular bolt. Two replacement shear bolts are provided in the spare included parts kit.**

Re-install and adjust the Entrance and Exit Prox Switches on the Bridge. **The face of the prox switch should be 3/16 to ¼" from its target flag.** (The face of the prox switch will protrude approximately 3/4 to 13/16" beyond the plate it is mounted in).

Unfold the Top Washer, attach the 3/4" feed hose and install the cover.

XP-4r Photo-eye Bracket is attached via one of the T-bar bolts. Once installed, verify bracket is installed straight up and down.

Excess Photo-eye cord-set should be tucked into the wire duct.



Flip the Bridge Keeper Brackets 180- degrees and keep on the **outboard side** of the Bridge End Plates.

Flip the Bridge E-Chain L-Bracket 180 degrees and re-fasten. Keep on the **inboard side** of the P.S. Bridge End Plate.

Bridge, Inboard, P.S.

1.6. Breakaway:

Refer to **Breakaway Tension Measurement and Breakaway, Parts Identification**

Note that the Nozzle side of the Spray Arm is defined as the Front.

Attachment point for checking the breakaway tension is the recessed groove between the two center nozzles approximately 45” above the ground.

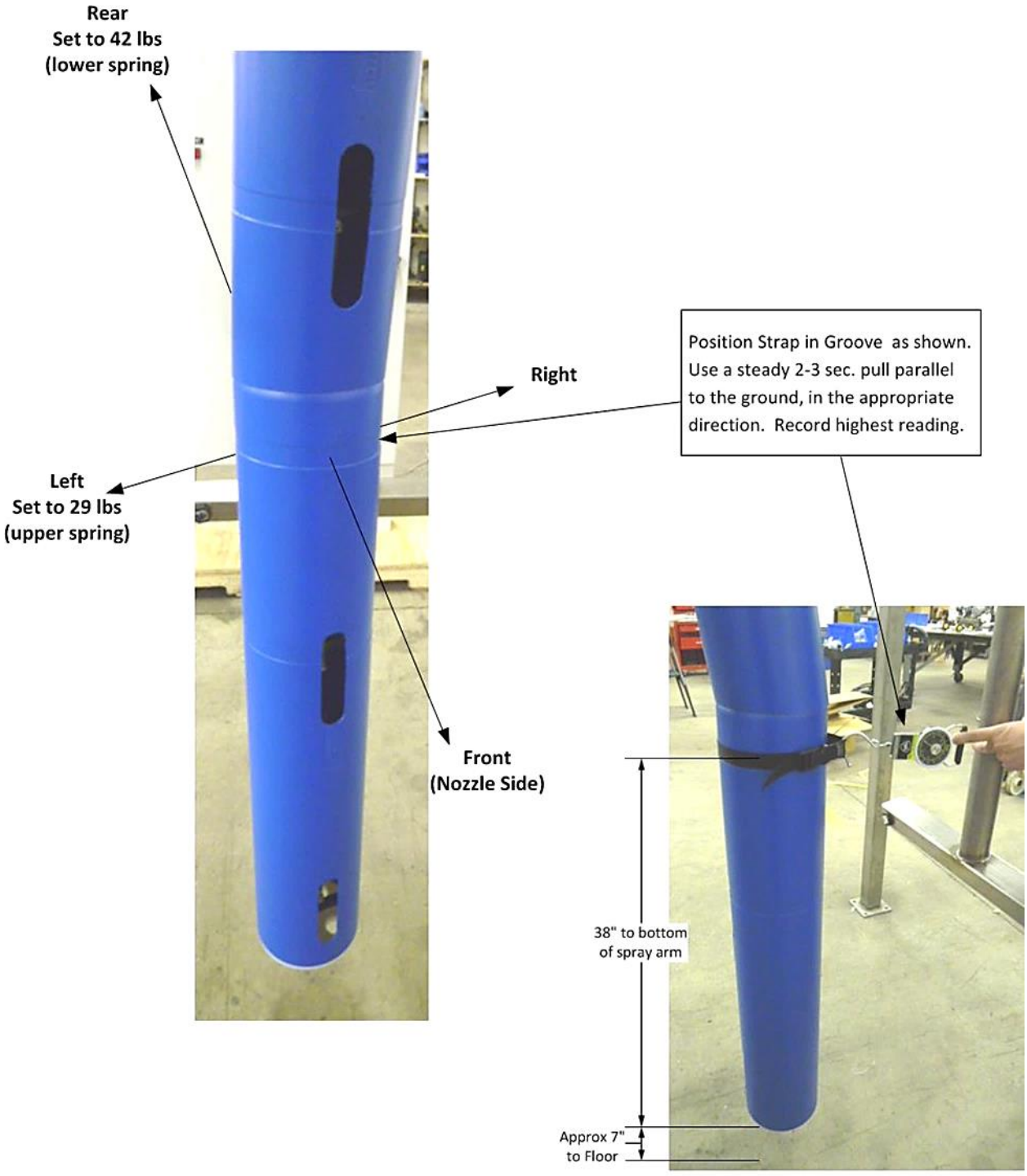
Use the provided luggage scale to verify the spring heights below, which will result in the correct breakaway force. **Over tightening the spring will cause structural damage**.

Prior to shipping the Upper Springs were properly adjusted but the Lower Spring tensions were backed off and require setting prior to startup.

Upper Spring (Left/Right): = **29 lb. to the left.**

Lower Spring (Front/Rear): = **42 lb. to the rear**.

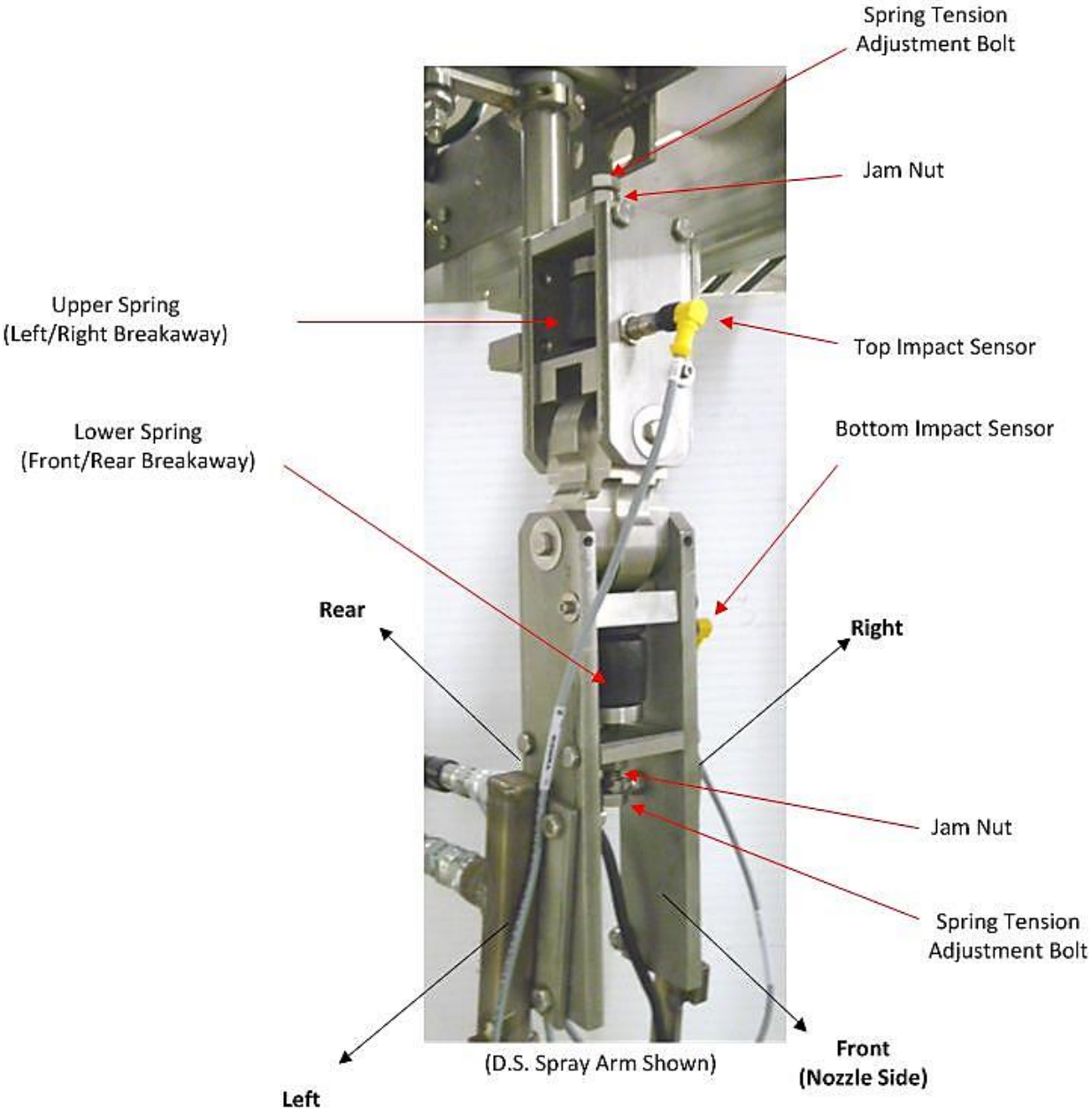
Important: The elastomeric springs will take an initial set. They must be re-tensioned again at 24 & 48hrs after the initial setup.



NOTE:

DO NOT SET BREAKAWAY FORCE IN FRONT OR RIGHT DIRECTION.
Breakaway force toward the front (approx 24 lbs) is significantly less than toward the rear.
Breakaway force toward the right (approx. 21 lbs) is also less than toward the left.

Breakaway Tension Measurement
Dwg./Part #:
Date: 11-14-14
Petit Auto Wash, Inc



Breakaway, Parts Identification
Dwg./Part #:
Date: 2/11/15
Petit Auto Wash, Inc

1.7. E-Chain:

At the Bridge, flip the Bridge E-Chain L-Bracket 180 degrees and re-fasten. Attach the free end of the E-Chain to the L-Bracket.

Refer to Bulkhead Hoses Attach the (2) 3/4" & (1) 1/2" high pressure hoses. Feed the 1/4" quad tubing alongside the 5/8" stainless steel tubing up into the center of the Bridge and insert the 4 tubes into the y-connectors. Be sure to match like-colors. Tie-wrap the quad tube neatly to the cable-tie holders located on the trolley e-chain trough.

Route the two multi-conductor cables exiting the E-Chain above the 3/4", top washer hose and into the Bridge Junction Box. While facing the junction box the Control Cable (Grey) goes into the left cord grip (P.S.) and the Motor cable (Dark Blue) goes into the right cord grip (D.S.). Be sure to fasten the grounding clips over the cable shielding. Refer to the electrical schematics for wire termination.

Important: When terminating individual wires in terminal blocks, strip the insulation 3/8" -7/16" to ensure a proper connection.

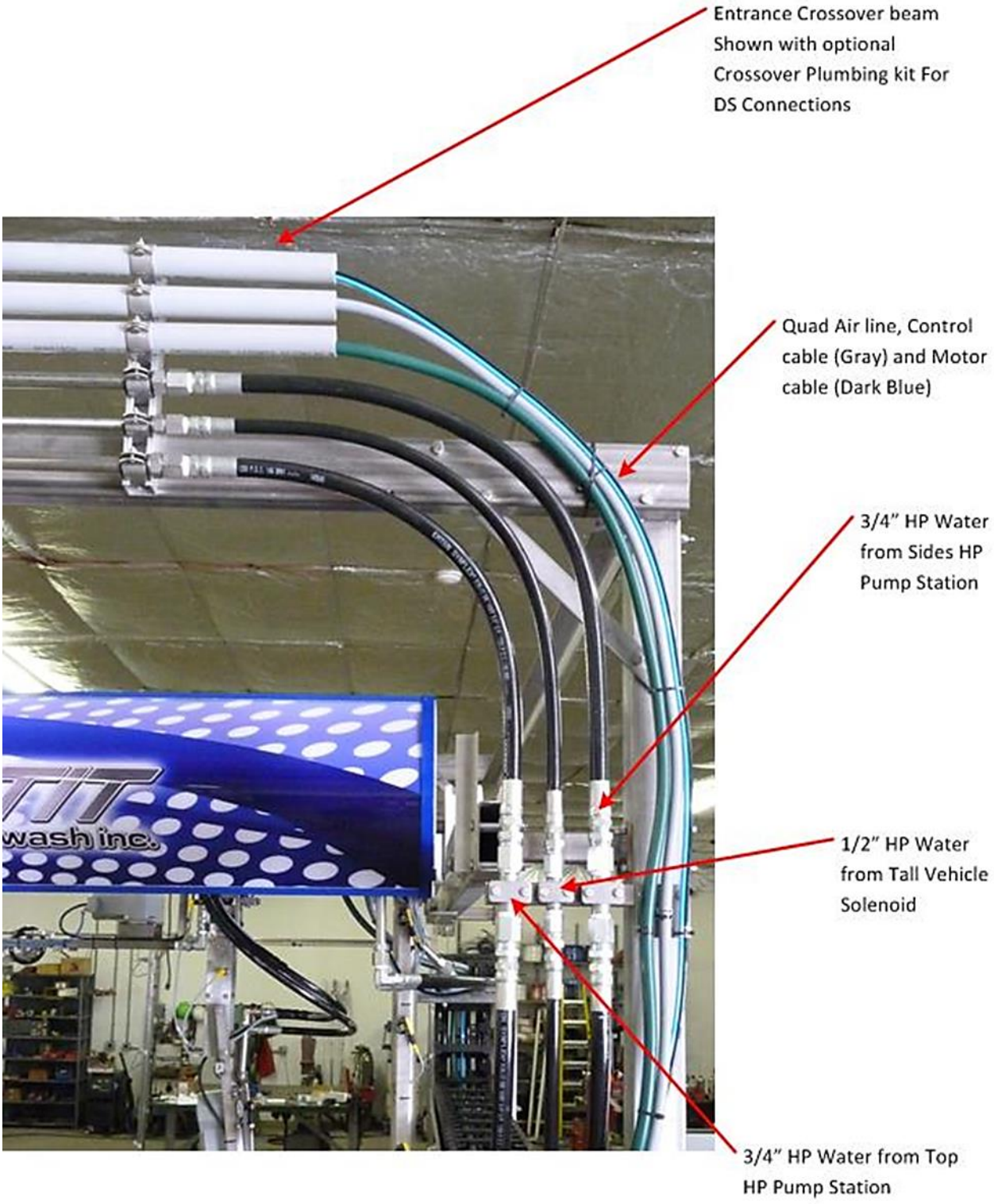
At opposite end of E-Chain, connect the hoses to the bulkhead. Route the two multi-conductor cables and quad air tubing to the cable tie mounting plate. (See Drawing Below)

Important: Note that the Electric Cables and Quad Tubing (air lines) come from the factory cable tied to the moving end (machine end) of the energy chain. You will need to tie wrap them at the fixed end of the E-chain. Prior to tie wrapping the electric cables and quad tubing you must ensure they are placed in the middle of the bend radius of the e-chain, at the 180-degree bend in the chain. To do this grab and pull each cable or tube and pull as far as possible out of the e-chain, then push them into the e-chain as far as possible. Pull back out half the distance and then tie wrap to the last e-chain crossbar.

Note that the ¾" & ½" high pressure hoses are designed to be free floating. Do not tie down either end of the high-pressure hoses.

Important: At the e-chain bulkhead, adjust the attachment point of the cables and hoses so that they do not sag and will not rub anything.

Run hoses and cables from the E-Chain Bulkhead back to their termination points in the mechanical room.



E-Chain Bulkhead & Crossover Plumbing Group (Optional)

1.8. Bridge Mount LED (144w):

The Bridge Mount LED is optional and attaches to the exit side of the Bridge.

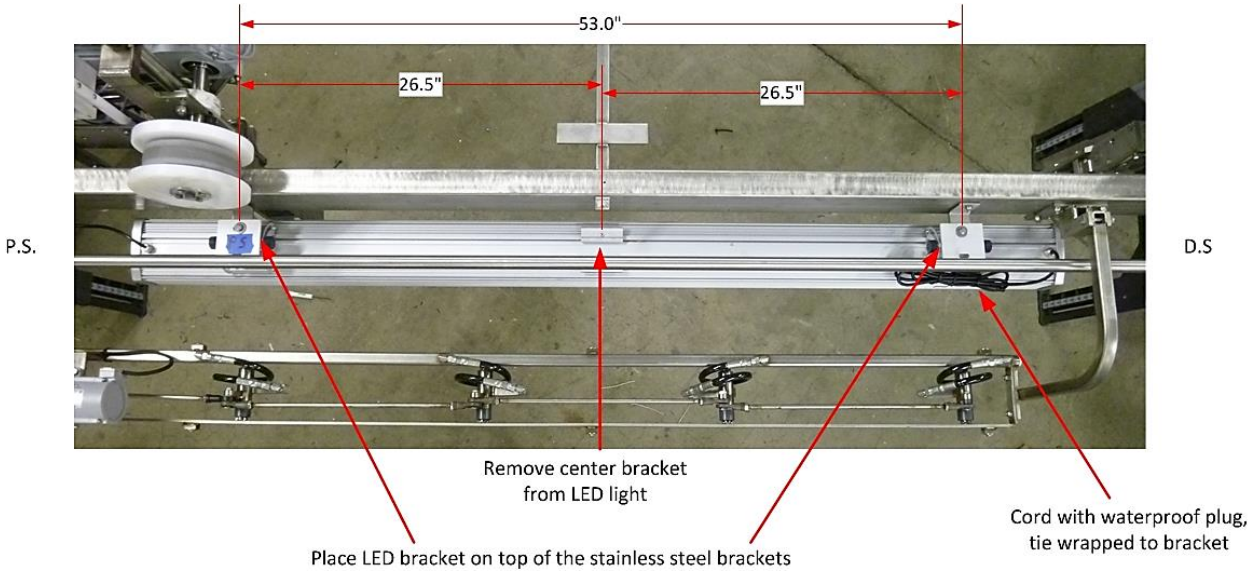
Note: For machines produced before 1/15/2015, refer to additional LED Retrofit instructions before proceeding with this installation.

Unpack the LED Light bar. Measure and find the centerline of the light bar. Position brackets so they are 26 1/2” from center and tighten the set screws, then tighten the thumb wheels that control the angle. The LED Light bar has quick disconnect leads on both sides. Find the cord that has a waterproof plug inserted into the quick disconnect. This end of the LED Light must be oriented to the driver side. Bundle and tie wrap the cord to the D.S. light bracket as shown below.

Using the included 1/4-20 x 1” bolts, fender washers and locking nuts, place the LED light on top of the Bridge L brackets, and tighten the fasteners. Fender washers should go on the LED light side.

Land the wiring in the Bridge Junction Box using the existing multi-conductors as shown in the LED schematics.

At the 360 Control Panel, if necessary, install the LED Relay bank onto the Motor terminal strip din rail at the bottom of the panel. Wire the LED 24VDC power supply, light controller, and relay bank per the LED schematics.



Bridge Mount LED

2. Mechanical Room Equipment

2.1. 360-t HMI Control Panel:

Important Wiring Instructions for all equipment

1. **If the electrical service is a Delta (also known as a High-Leg) system, refer to schematics before wiring the Accutrac 360 Control Panel.**
2. **Refer to the installation manual, equipment/electrical schedule and the schematics.**
3. **Wire the equipment according to NEC as well as state and local codes.**
4. **Insure proper grounding of control panel as well as proper grounding/bonding of the incoming electrical service.**
5. **Always run low-voltage control wires in separate conduits away from power wires.**
6. **Never drill holes or run wiring into top of electrical enclosures. Use bottom entry or lowest possible entry point on side of enclosure. Top entry will void the warranty**
7. **For Accutrac 360s, run the two 25-conductor umbilical cables from the control panel to bay equipment in separate 1-1/4" conduits. Whenever possible, especially on long parallel runs, keep the lines at least 12" away from each other. Follow instructions in the Appendix for stripping insulation from the 25-conductor cables.**

Locate the Control Panel as close to the bay equipment as possible. Mount the panel to the wall at a height that the Touch-Screen is readily accessible. Route the two multi-conductor cables from the bay equipment to the panel through separate 1-1/4" diameter or larger conduits. On long runs it is recommended that the electrician install two separates 12" square junction boxes near the wash bay and route the 25- conductor cables through the boxes. In the future when the moving part of the control cable needs replaced it can be spiced at the junction box rather than replacing the entire run.

Refer to the Schematics for the Power & Control wiring requirements. Please note that the Computer Control also requires a Cat-5 Ethernet connection to the customer's LAN (Local Area Network).

Locate and land the following external inputs into the Input Isolation relays. Factory supplied Input relay coils are 24VAC/DC. 120VAC coils are available upon request.

-**Input #1022**: Conveyor Pulse Signal (verify signal is received at consistent intervals)
-**Input #1023**: Conveyor Entrance/Gate Photo Eye Signal ("On" when blocked by vehicle)
-**Input #1024**: Conveyor Running Signal ("On" whenever conveyor is running)

Note: Inputs #1022 & #1023 either need to be wired directly from each device or from a buffer relay fired directly by the devices. Do not use tunnel controller "Mirror" outputs as this will result in unreliable input timing and would cause the 360-t to malfunction.

Wired to Tunnel Controller Outputs:

-Input #1025: 360 Start (Extend & Enable) Signal ("On" whenever vehicle is in the 360)

-Input #1026: Start Top HP Pump & Oscillator

-Input #1027: Start Side HP Pump & Oscillator

-Input #1030 (Optional): Rear Obstacle Avoidance Signal (Allows an operator to selectively add an adjustable length to the rear of a car to avoid potential obstacles. See: 360-t Start-up Manual, Section 3.5: Set Timers & Miscellaneous Features.

Wired to either the Tunnel Controller Outputs or a remote button box.

-Input #1028 (Optional): Remote Machine Reset

2.2. 25HP Variable Frequency Drive Panel:

Caution: Never drill holes in top of Control Panel. Use bottom or side entry only

Wall mount the panel using the supplied mounting feet. Electrician to provide (2) separate current limiting Circuit Breakers (or equivalent) & wire, sized for the 25 HP motors, to the VFD Panel and from the VFD Panel to both 25 HP motors. (2) Cat-5 Ethernet cables and (2) 18 AWG wires for the HP enable circuit are required from the Control Panel to the VFD Panel.

2.3. 25HP Pump Stations & Tall Vehicle Solenoid:

Notes: When wiring the pump station, note that not all 3-phase motors are not wired the same. Refer to the diagram on the inside of each motor junction box for correct wiring specifications.

Some installations may not use the Tall Vehicle nozzle and solenoid valve.
Caster wheel kits are available for transporting the pump stations.

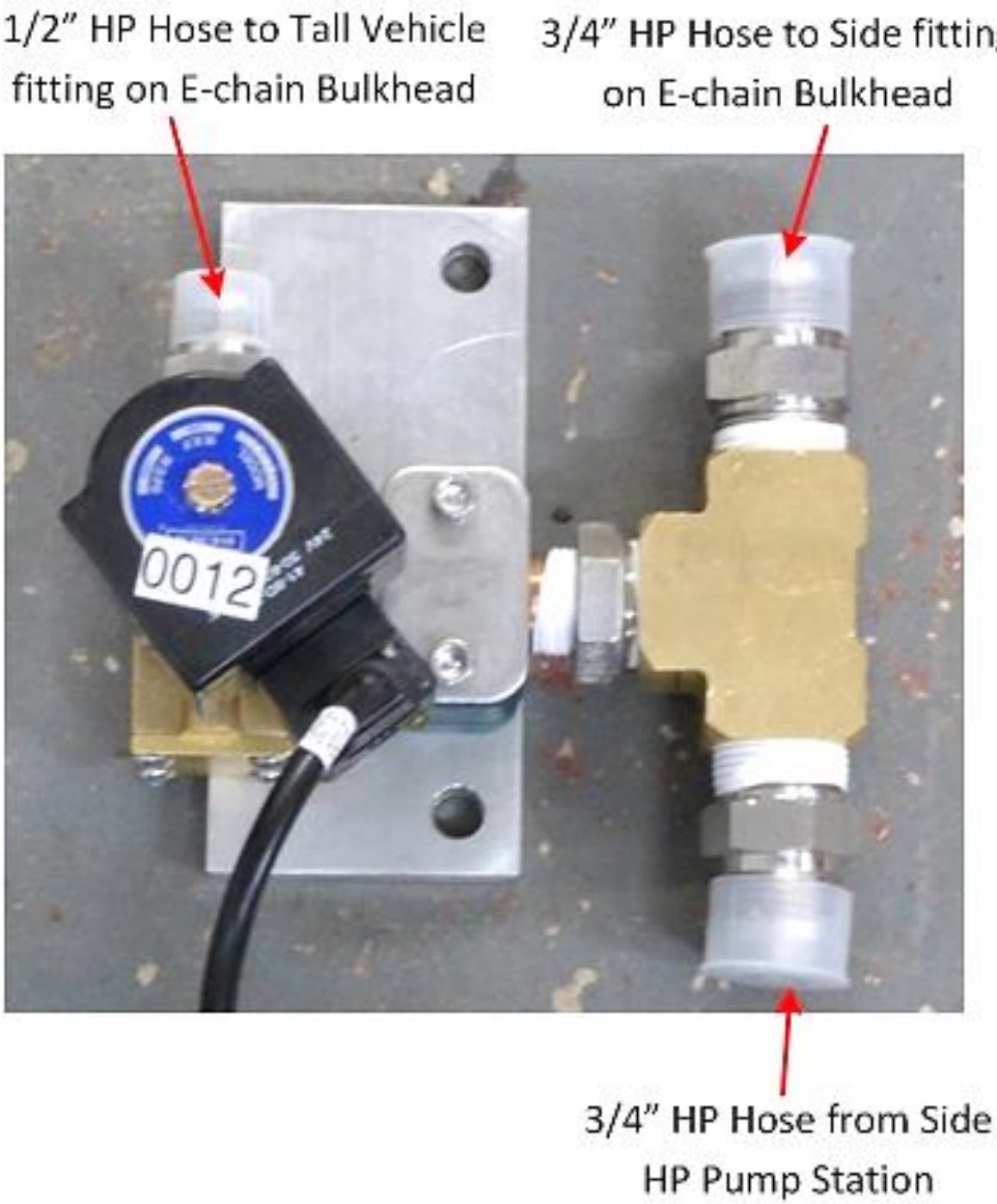
Feed each pump station fill-tank with a 1" hose capable of supplying 40gpm @ 40 psi. Install 40gpm flow restrictors in the water lines feeding both the Side and Top HP Pump Stations. Note that if the incoming water pressure is below 40psi, you may need to upsize these restrictors. If, while all equipment is running, the building's water pressure drops excessively you may need to add restrictors to other equipment or possibly down size these restrictors. Call the factory for recommendations.

Mount the Tall Vehicle Solenoid manifold on the wall in a convenient place near the HP pump stations.

T.V. Solenoid is 24VAC. Run a 3-wire 18 AWG conductor from the solenoid to the 360-t Control Panel. Terminate the signal wire on Output # 0012.

Run (1) ¾" high pressure line from the Top Washer 25Hp Pump to the Tunnel E-Chain Bulkhead. (See drawing in section 1.7)

Run (1) ¾" high pressure line from the Side (Spray Arm) 25Hp Pump to the Tall Vehicle Solenoid Manifold. From the T.V. Solenoid Manifold run (1) 3/4" & (1) 1/2" high pressure line to Tunnel E-Chain Bulkhead.



Tall Vehicle Solenoid

Refer to Pump Station Installation Manual for additional information.

2.4. Air Solenoid Valve Manifold:

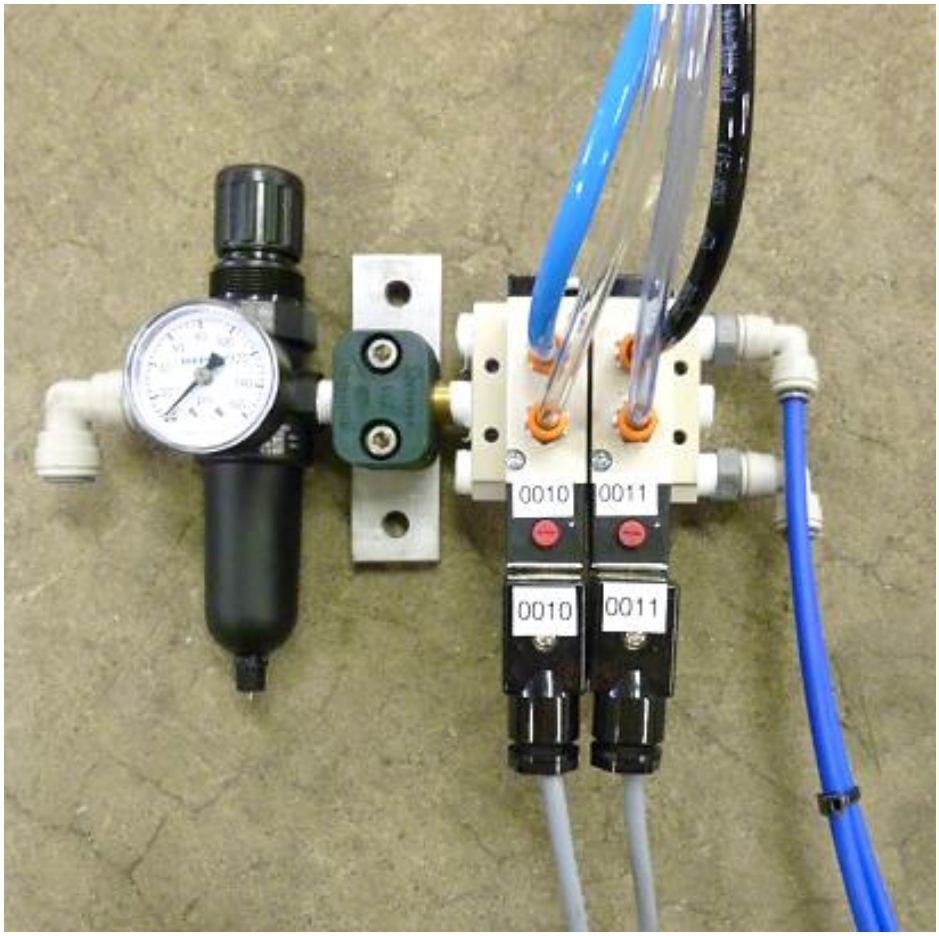
Mount the Air Solenoid Sub-assembly close to the Control Panel. Feed the Pressure Regulator with a 3/8' airline @ 100psi. **Set the pressure regulator to 70 - 85 psi.**

Wire the two solenoids into the Control Panel. Terminate the Brown wires on the appropriate Output relay, and the Blue wires to 24VAC Common.

Route the quad airline to the Air Solenoids as shown:

	Solenoid 0010 (Rotate to Front of car)	**Solenoid 0011** (Rotate to Rear of car)
Top	Blue	Black
Bottom	Clear	Translucent Blue

Note that the energy chain is supplied with approximately 50ft of ¼" quad tubing that extends beyond the e-chain bulkhead. If you need to add additional length to the tubing, use ¼" poly tubing. Adding additional quad tubing will cause excessive line resistance and pressure loss.



3. Appendices

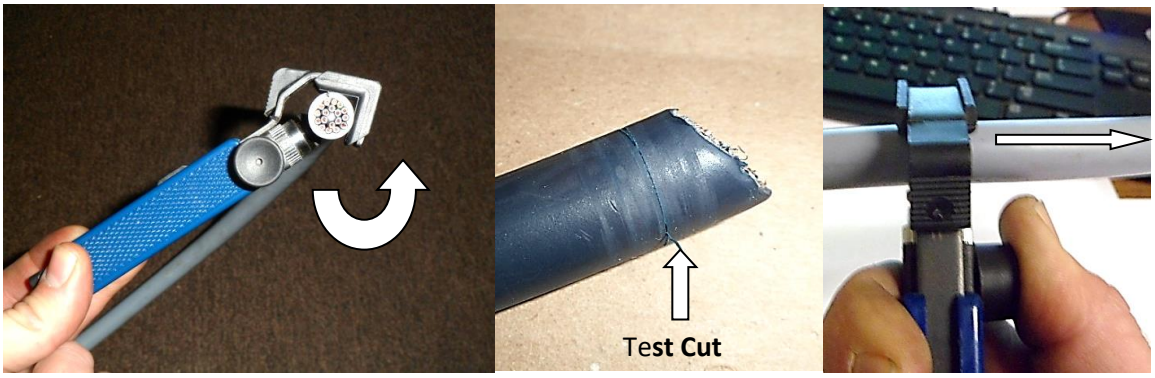
3.1. Appendix A: Multi-Conductor Cable Stripping Procedure

Tools Required:

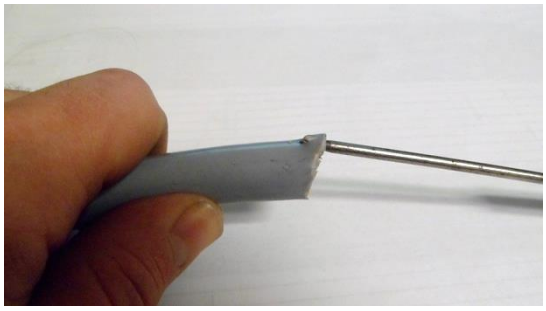
Measuring Tape, Light Colored Marker, Pick, Wire Stripping Tool, Flush Cut Snips, Electrical Tape

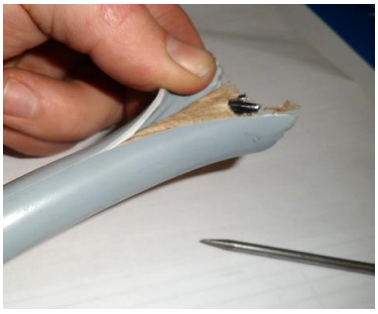
- Mark out the desired length of the multi-conductor cable, if space permits, allow extra length in case a wire gets nicked
- Set the wire stripping tool's cutter depth to ¾ of the thickness of the outer insulation, the wire stripping tool should NOT cut deeper than the outer layer.

- To strip the cable: Latch the wire stripping tool onto the top of the cable. Spin the tool in the direction shown. Make sure the first 360 degree cut is inline and not spiraling.
  Note: Make a test cut at the very end of the cable to verify correct cut depth.
- **DO NOT REMOVE** the wire stripping tool. Press and hold the center button and run the tool down the length of the cable, eventually sliding the tool off the end of the cable. Do not let go of the button until the wire stripping tool is separated from the cable.



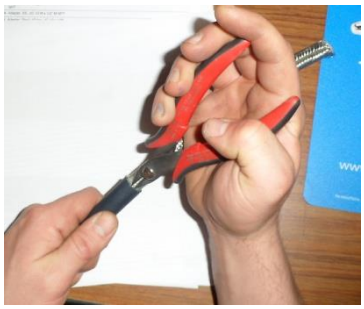
- At the 360 degree cut flex the cable repeatedly until the outer layer of the cable separates. At the end of the cable, carefully pick at the lengthwise slice, and then peel back the outer layer by hand.
- **Note:** Always pick away from the inner layers of the cable.



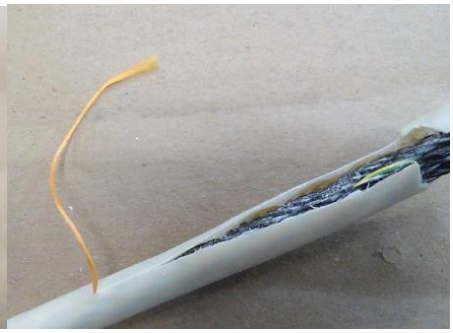


- Carefully cut away the metal shielding. Cut away from the center of the cable, barely grazing the metal shielding with the cutters. Remove the metal shielding.

Note: This step is where most nicking of wires occurs.



- At the **VERY END** of the cable, cut into the inner white shielding to find the orange pull string. Cut up and away from the wires. Use the pull string to strip back the inner insulation. Carefully cut away the inner insulation, again cutting away from the wires. If damaged, cut back 1-2 inches off of the end of the cable.



3.2. Appendix B: I/O & Circuit Breaker Lists

INPUTS, 360-t Tunnel				
PLC Inputs are 24VDC(+)				
Cable Color	**Input Card Wire Color**	**Input/ Wire #**	**Description**	
	white	1000	E-Stop ok, 360 Control Panel Door	
	brown	1001	Remote E-Stop ok *Optional, If not used jumper to 24VDC(+)*	
	green	1002	Machine Reset, 360 Control Panel Door	
	yellow	1003	Home Prox Made	
	grey	1004	Exit Prox Made	
	pink	1005	Entrance Prox Made	
	blue	1006	SPARE	
	red	1007	Bridge PE-1 clear (A Freq)	
	black	1008	Bridge PE-2 clear (B Freq)	
	violet	1009	DS Trolley Retracted	
	grey/pink	1010	DS Trolley Extended	
	red/blue	1011	DS Impact Sensor Top not ok (Left/Right)	
	white/green	1012	DS Impact Sensor Bottom not ok (Front/Rear)	
	brown/green	1013	PS Trolley Retracted	
	white/yellow	1014	PS Trolley Extended	
	yellow/brown	1015	PS Impact Sensor Top not ok (Left/Right)	
	white	1016	PS Impact Sensor Bottom not ok (Front/Rear)	
	brown	1017	SPARE	
	green	1018	Profile XP-1 clear (B Freq) (Bottom)	
	yellow	1019	Profile XP-2 clear (A Freq)	
	grey	1020	Profile XP-3 clear (B Freq)	
	pink	1021	Profile XP-4 clear (A Freq) (Top) *If no Top Washer, Jumper to 24VDC(+)*	
	blue	1022	Pulse Switch (From Tunnel Controller Input/ Pulse Switch)	Isolation Relay (*)
	red	1023	Entrance Photo-Eye (From Tunnel Controller Input/ Photo Eye)	Isolation Relay (*)
	black	1024	Conveyor Running (From Tunnel Controller Output/ Conv motor starte	Isolation Relay (*)
	violet	1025	Start 360 Extend & Enable (From Tunnel Controller Output)	Isolation Relay (*)
	grey/pink	1026	Start Top HP Pump & Top Oscillator (From Tunnel Controller Output)	Isolation Relay (*)
	red/blue	1027	Start Side HP Pump & Side Oscillators (From Tunnel Controller Output)	Isolation Relay (*)
	white/green	1028	Machine Reset, Remote Button (Optional)	Isolation Relay (*)
	brown/green	1029	SPARE (Prior to 9/2015, Remote E-stop)	Isolation Relay (*)
	white/yellow	1030	Rear Obstacle Avoidance (Optional) (From Tunnel Controller Output)	Isolation Relay (*)
	yellow/brown	1031	MCR (Master Control Rly) Monitor	
	(*) NOTE : Isolation Relay Coils are 24VDC. Other voltages available upon request.			

OUTPUTS, 360-t Tunnel				
Cable Color	Output Card Wire Color	Output/ Wire #	Description	Output Voltage/Type
	white	0000	Bridge Fwd	VFD L1, 24VDC(+)
	brown	0001	Bridge Rev	VFD L2, 24VDC(+)
	green	0002	DS Trolley Extend (DS Wash Arm)	VFD L1, 24VDC(+)
	yellow	0003	DS Trolley Retract (PS Wash Arm	VFD L2, 24VDC(+)
	grey	0004	PS Trolley Extend (DS Wash Arm)	VFD L1, 24VDC(+)
	pink	0005	PS Trolley Retract (PS Wash Arm)	VFD L2, 24VDC(+)
	blue	0006	DS Oscillator Run	VFD L1, 24VDC(+)
	red	0007	PS Oscillator Run	VFD L1, 24VDC(+)
	black	0008	Top Oscillator Run	VFD L1, 24VDC(+)
	violet	0009	Alarm Light, 360 Control Panel Door	Direct, 24VDC(+)
	grey/pink	0010	Spray Arms Front of Car S.V.	Relay, 24VAC
	red/blue	0011	Spray Arms Rear of Car S.V.	Relay, 24VAC
	white/green	0012	T.V. Solenoid Valve	Relay, 24VAC
	brown/green	0013	Fault Relay (To Tunnel Controller) Closes on 360 fault or Panel E-Stop	Relay, Dry Contact
	white/yellow	0014	Remote Alarm Light (Same as Panel Light)	Relay, Dry Contact
	yellow/brown	0015	PE Inhibit (PE White wire to DC(-))	Relay, 24VDC(-)

CIRCUIT BREAKERS, 360-t Tunnel			
C.B. #	Amps	Voltage	Description
CB-1	5A	120VAC	PLC, 24VDC Power Supply
CB-3	10A	120VAC	24VAC Transformer & 24VDC VFD Cooling Fan Power Supply
CB-4	4A	24VDC	External Wash Bay 24VDC Power
CB-5	6A	24VAC	Heaters, Junction Box
CB-6	6A	24VAC	24VAC Output Relays
CB-7	4A	120VAC	Bridge Cover, LED Light Bar Power Supply
CB-8	7A	24VDC	LED Light Bar, 24VDC+

ANALOG INPUTS, 360-t Tunnel	
Analog inputs are 24VDC(+), 4-20mA	
Input #	Description
3000	Future Option: Passenger Side Width
3001	Future Option: Driver Side Width
3002	Future Option: HP pump Pressure Transducer
3003	Future Option: HP pump Pressure Transducer

MOTOR WIRING, 360-t Tunnel	
Motors are 208VAC 3-ph	
Wire #	Description
4000 U, V, W	Bridge Motor
4001 U, V, W	Driver Side Trolley
4002 U, V, W	Passenger Side Trolley
4003 U, V, W	Driver Side Oscillator
4004 U, V, W	Passenger Side Oscillator
4005 U, V, W	Top Washer Oscillator

	PANEL RELAYS	
	Coil 24VDC(+)	A1
	Coil 24VDC(-)	A2
	N.O. Contact	14
	Com Contact	11
	N.C. Contact	12

3.3. Appendix C: Wire Number & Terminal Layouts

Control Panel Terminal Strip Layout, 360-t (Tunnel)

Input/ Low Voltage Terminal Strip

Grey 25 Cond. 18AWG Shielded Cable CF140-07-25

	24PS	DC(+) from P.S.
	24PS	DC(+) from P.S.
	24PS	DC(+) from P.S.
	24PS	DC(+) from P.S.
	24PS	DC(+) from P.S.
	24PS	DC(+) from P.S.
	ES1	E-Stop, Panel, aux contact
	ES2	E-Stop, Remote, aux contact
	MCR A1	MCR Coil (E-Stop 1 & 2 aux.)
	MCR	Master Control Relay
	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
Cond. #1	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
2	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
	1000	E-Stop OK, Panel
	1001	Remote E-stop Ok
	1002	Machine Reset, Panel
3	1003	Home Prox
4	1004	Exit Prox
5	1005	Entrance Prox
6	1006	Spare
7	1007	PE-1 clear
8	1008	PE-2 clear
9	1009	DS Trolley Retract
10	1010	DS Trolley Extend
11	1011	DS Impact Top
12	1012	DS Impact Bottom
13	1013	PS Trolley Retract
14	1014	PS Trolley Extend
15	1015	PS Impact Top
16	1016	PS Impact Bottom
17	1017	Spare
18	1018	XP-1 clear
19	1019	XP-2 clear
20	1020	XP-3 clear
21	1021	XP-4 clear
	1022	Pulse Switch
	1023	Entrance/Gate Photo Eye
	1024	Conv. Running
	1025	360 Extend & Enable
	1026	Start Top HP Pump & Top Osc.
	1027	Start Side HP Pump & Side Osc.
	1028	Machine Reset, Remote
	1029	Spare (prior to 9-2015 Remote E-Stop)
	1030	Rear Obstacle Avoidance
	24VDC(+)	Analog (Optional)
	3000	Analog (Optional)
	Shield	Analog (Optional)
	24VDC(+)	Analog (Optional)
	3001	Analog (Optional)
	Shield	Analog (Optional)
	24VDC(+)	Future Analog
	3002	Future Analog
	Shield	Future Analog
	24VDC(+)	Future Analog
	3003	Future Analog
	Shield	Future Analog
22	24AC B5	24VAC Enclosure Htrs (Brkr #5)
23	24AC C	24V Com Enclosure Htrs
24	PE Inhbt	PE Inhibit
Grn/25	GND	

Output Terminal Strip (24VAC, Dry Contact)

	24DO	MCR Switched Discreet Output DC	
	24DO	MCR Switched Discreet Output DC	
	24DO	MCR Switched Discreet Output DC	
	24VDC(-)		
	24VDC(-)		
	24VDC(-)		
	0008	Top Oscillator Run	Direct, 24VDC(+)
	►⊢ 0009	Alarm Light, Panel	Direct, 24VDC(+)
	►⊢ 0013	Fault Relay Control	Direct, 24VDC(+)
Relay	0010	Spray Arms Front	24VAC
"	0011	Spray Arms Front	24VAC
"	0012	T.V. Solenoid	Dry Contact
"	0013	Fault Relay	Dry Contact
"	0014	Remote Alarm Light	Dry Contact
"	0015	PE Inhibit	24VDC (-)
	24AC Hot		
	24AC Hot		
	24AC Hot		
	24AC C		
	24AC C		
	24AC C		
	GND		
	GND		
	GND		
	120 N		
	120 N		
	120 N		
	GND		
	GND		
	GND		

Motor Terminal Strip

Green 24 Cond. 18AWG Shielded Cable CF6-07-24

Cond. #1	4000U	Bridge		
2	4000V	"		
3	4000W	"		
4	4001U	DS Trolley		
5	4001V	"		
6	4001W	"		
7	4002U	PS Trolley		
8	4002V	"		
9	4002W	"		
10	4003U	DS Oscillator		
11	4003V	"		
12	4003W	"		
13	4004U	PS Oscillator	Isolation Relay	
14	4004V	"	Isolation Relay	
15	4004W	"	Isolation Relay	
16	120 B7	Bridge Lighted Sign 120VAC (Brkr #7)	Isolation Relay	
17	120 N	Bridge Lighted Sign 120V Neutral	Isolation Relay	
18	4005U	Top Oscillator	Isolation Relay	
19	4005V	"	Isolation Relay	
20	4005W	"	Isolation Relay	
21	B LED +	Bridge Mounted LED 24VDC(+)	Isolation Relay	
22	B LED -	Bridge Mounted LED 24VDC(-)		
Grn/25	GND			

Bridge J.B. Terminal Strip Layout, 360-i & 360-t

Lower Terminal Strip (Motors)

Green 24 Conductor 18AWG Shielded Cable CF6-07-24 (208VAC motors, 120V sign)

Cable Cond. #	Terminal Label	
1	4000U	Bridge
2	4000V	"
3	4000W	"
4	4001U	DS Trolley
5	4001V	"
6	4001W	"
7	4002U	PS Trolley
8	4002V	"
9	4002W	"
10	4003U	DS Osc
11	4003V	"
12	4003W	"
13	4004U	PS Osc
14	4004V	"
15	4004W	"
16	120 B7	Bridge Lighted Sign 120VAC (Brkr #
17	120 N	Bridge Lighted Sign 120V Neutral
18	4005U	Top Washer
19	4005V	"
20	4005W	"
21	B LED+	24VDC LED Light
22	LED R-	"
23	LED G-	"
24	LED B-	"
Grn/25	GND	
	GND	
	GND	

Upper Terminal Strip (Control)

Grey 25 Cond. 18AWG Shielded Cable CF140-07-25 (24VAC, 24VDC)

Cable Cond. #	Terminal Label	
1	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
2	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
3	1003	Home Prox (Tunnel Only)
4	1004	Exit Prox
5	1005	Entrance Prox
6	1006	Spare
7	1007	PE-1 "A" freq
8	1008	PE-2 "B" freq
9	1009	DS Trolley Retracted
10	1010	DS Trolley Extended
11	1011	DS Impact, Top (L/R)
12	1012	DS Impact, Bottom (F/Rr)
13	1013	PS Trolley Retracted
14	1014	PS Trolley Extended
15	1015	PS Impact, Top (L/R)
16	1016	PS Impact, Bottom (F/Rr)
17	1017	Spare
18	1018	Profile XP1 (Bottom) "B" freq
19	1019	Profile XP2 "A" freq
20	1020	Profile XP3 "B" freq
21	1021	Profile XP4 (Top) "A" freq
22	24AC B5	24VAC Enclosure Heaters (Brkr #5)
	24AC B5	24VAC Enclosure Heaters (Brkr #5)
	24AC B5	24VAC Enclosure Heaters (Brkr #5)
23	24AC C	24V Com Enclosure Heaters
	24AC C	24V Com Enclosure Heaters
	24AC C	24V Com Enclosure Heaters
24	PE Inhbt	PE Inhibit
Grn/25	GND	
	GND	
	GND	

Cable Labeling Key

DSTC	DS Trolley Control
PSTC	PS Trolley Control
DSSA	DS Sensor Array
PSSA	PS Sensor Array
DSTM	DS Trolley Motor
PSTM	PS Trolley Motor
ENT	Bridge Entrance Prox
EXT	Bridge Exit Prox
BM	Bridge Motor
120 B7	Bridge Lighted Sign (120V Breaker #7)

Trolley Control Terminal Strip Layouts, 360-i & 360-t

D.S. Trolley Control J.B. (DS TC)
Blue 12 Cond. 18 AWG Cable

Cable Cond. #	Terminal Label	
1	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
2	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
3	1009	Retract Prox
4	1010	Extend Prox
5	1011	Top Impact Prox
6	1012	Bottom Impact Prox
7	24AC B5	24VAC Enclosure Htr (Brkr #5)
8	24AC C	24V Com Enclosure Htr
Grn/ 12	Ground	

P.S. Trolley Control J.B. (PS TC)
Blue 12 Cond. 18 AWG Cable

Cable Cond. #	Terminal Label	
1	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
2	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
3	1013	Retract Prox (by small wheel)
4	1014	Extend Prox (by big wheel)
5	1015	Top Impact Prox (Lt/Rt)
6	1016	Bottom Impact Prox (Ft/Rr)
7	24AC B5	24VAC Enclosure Htr (Brkr #5)
8	24AC C	24V Com Enclosure Htr
Grn/ 12	Ground	

Cable Labeling Key

RETR	Trolley Retract Prox	**I-TOP**	Top Impact Prox
EXTD	Trolley Extend Prox	**I-BOT**	Bottom Impact Prox

Trolley & Bridge Motor Terminal Strip Layouts, 360-i & 360-t

D.S. Trolley Motor J.B. (DS TM)
***Note**: Oscillator Motor & Trolley Motor wires both terminate with wire nuts in the Trolley Motor J.B.*

Blue 7 Conductor 18AWG Cable

Cable Cond. #	Wire Label	
1	4001U	Trolley Motor Blk
2	4001V	Trolley Motor Grey
3	4001W	Trolley Motor Wht
4	4003U	Osc Motor Blk
5	4003V	Osc Motor Grey
6	4003W	Osc Motor Wht
Grn/ 7	GND	

P.S. Trolley Motor J.B. (PS TM)

Blue 7 Conductor 18AWG Cable

Cable Cond. #	Wire Label	
1	4002U	Trolley Motor Blk
2	4002V	Trolley Motor Grey
3	4002W	Trolley Motor Wht
4	4004U	Osc Motor Blk
5	4004V	Osc Motor Grey
6	4004W	Osc Motor Wht
Grn/ 7	GND	

Bridge Motor J.B. (BM)
Grey 4 Conductor Shielded Cable

Cable Cond. #	Wire Label	
1	4000U	Bridge Motor Blk
2	4000V	Bridge Motor Grey
3	4000W	Bridge Motor Wht
Grn/ 4	GND	

Note: Prior to 6-15-19 Bridge & Trolley Motors had 9 wires:
L1 to T1 & T7, L2 to T2 & T8, L3 to T3 & T9. T4, T5 & T6 wired together.

Sensor Array Terminal Strip Layouts, 360-i & 360-t

DS Sensor Array J.B. (DS SA)
7 Conductor 20 AWG Cable 18 AWG CF5-07-07 (CF130-05-07 optional)

Cable Cond. #	Terminal Label	
1	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
2	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
3	1003	Home Prox (Tunnel Only)
4	24AC B5	24VAC Enclosure Htr
5	24AC C	24V Com Enclosure Htr
6	PE Inhbt	PE Inhibit
	PE Inhbt	
Grn/ 7	GND	

PS Sensor Array J.B. (PS SA)
12 Conductor 20AWG Cable 18 AWG CF5-07-12 (CF130-05-12 optional)

Cable Cond. #	Terminal Label	
1	24VDC(+)	
	24VDC(+)	
	24VDC(+)	
2	24VDC(-)	
	24VDC(-)	
	24VDC(-)	
3	1006	Spare
4	1007	T-Bar PE-1 "A" freq (Ent)
5	1008	T-Bar PE-2 "B" freq (Exit)
6	1018	Profile XP-1 "B" freq (Bottom)
7	1019	Profile XP-2 "A" freq
8	1020	Profile XP-3 "B" freq
9	1021	Profile XP-4 "A" freq (Top)
10	24AC B5	24VAC Enclosure Htr
11	24AC C	24V Com Enclosure Htr
Grn/ 12	GND	

Photo-eyes

Brown wire to 24V(+)
Blue wire to 24V(-)
Black wire to output
"A" Freq. Photo-eyes: Grey wire to 24V(+)
"B" Freq. Photo-eyes: Grey wire to 24V(-)
Land all Emitter White wires on "PE Inhibit" terminal
Insulate Receiver White wires

Cable Labeling Key

PE-1	T-Bar PE towards Entrance
PE-2	T-Bar PE towards Exit
XP-1	1st Profile PE (bottom)
XP-2	2nd Profile PE
XP-3	3rd Profile PE
XP-4	4th Profile PE (top)
Home	Bridge Prox near Entrance (Tunnel Only)

3.4. Appendix D: Tunnel Rail Kit, Parts List

Parts List for Assembly P/N: 89-3975

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89-3975
Rail Kit, 360-t Tunnel

Type	PL	Stock Y/N	
Revision		Mult. At Level	
Status	R	Bin/Column	
Date	4/20/2012	Stock Range	
By		Price /each	

Qty	P/N	Title	Detail	Reference(m)
6	11-1147	HHCS,18-8,1/4-20*1 1/2		6@ flags
4	11-1156	HHCS,18-8,3/8-16*1 1/4		gussets to longitudinal brace
36	11-1158	HHCS,18-8,F593C,3/8-16*4	High Strength, Order From Fastenal Only	16@rail mt to leg, 8@leg to gusset, 8@leg to longitudinal brace, 4@ e-trough to leg
68	11-1210	HN,NL,18-8,3/8-16		
16	11-2374	HHCS,18-8,F593C,3/8-16*3	High Strength, Order From Fastenal Only	main rail to rail mounting brkt
4	11-3673	HHCS,18-8,3/8-16*2 3/4		frame gusset to top cross beam
8	11-3993	HHCS,18-8,3/8-16*5 1/2		leg to top cross beam
1	88-1835	Main Rail, 360-t, DS	9' 2"	
1	88-1836	Main Rail, 360-t, PS	9' 2"	
2	88-2967	Top Cross Beam, freestanding 360		bolts to exit side of exit legs & ent side of entance legs, orient 1/4" holes so they are 4" from DS end
4	88-3121	Rail Mounting Bracket, 360		
6	88-3670	Spacer, PVC, 1" OD, Flag	1/4" ID x 1" OD	@ flags
4	88-3752	Leg, Freestanding 360		
4	88-3757	Frame Gusset, L to R, freestanding 360	13.5"	
3	88-3763	Bridge Flag	15" OAL	Ent & Exit Flags on PS: near edges 4" from end of Rails. Home Flag on DS: near edge 26.25" from Ent
4	88-3797	Frame Gusset, Ent to Exit, freestanding 360	20"	
2	88-3979	Frame Brace, Longitudinal, 360-t, 2" angle		
2	88-4021	Bridge End Stop, RH		on inboard side of Main Rails
2	88-4022	Bridge End Stop, LH		on inboard side of Main Rails