COBRA®
Installation
Manual

NOTE:

Useful reference data is included at the end of this manual.

Review this information before beginning installation.

Introduction

The installation process begins with the sales process! The equipment package and related items determine the scope of the installation. Before we get into the specifics of the installation of a Cobra, it is essential that you thoroughly understand the entire installation process. This knowledge will save you time and money and help insure a smooth equipment installation.

Installation Planning

Planning for equipment installation is an important part of the construction planning of the facility. Many potentially profitable jobs have been rendered much less profitable because installation costs got out of hand.

The sale of the car wash project is just the beginning of the Distributor's responsibilities. After the sale, the Distributor's input in the construction and installation process is absolutely essential. We have often said that the car wash is a building wrapped around a process. In order for the process to go smoothly, the building must be right! Here is a sample planning structure you might find useful

- Soon after the sales papers are signed, set up a meeting with the principles connected with the project. This meeting should include the owner, architect or engineer, general contractor, plumber, electrician, mason and concrete contractor. In this meeting go over the plans carefully. Iron out and conflicts related to item responsibilities or job requirements. Red line the plans and sign off on any changes required by design changes or owner's choice. Go over the Scope of Work Document and make certain that all contractors understand their responsibilities. (A copy of the Scope of Work is included in this manual and can be printed as a part of all quotes.)

- Clearly establish an initial timeline for needed item coordination. The timing of the delivery of under-floor material, meter boxes and other items needs to be coordinated so that the project can proceed smoothly. These times may change as the project progresses due to weather or other factors, so good communications is essential. A sample project time line is shown on page 4 of this Manual.

- Install or supervise the installation of floor heating materials. Make sure that the piping plan is followed and that any changes are noted on "as built" plans.

- Continue to make periodic on-site checks on the progress of the job. Confirm the need for under-floor conduits and meter boxes. Verify the inclusion of bill changer openings and other special equipment requirements.

- Verify the progress needed for equipment delivery and installation. All too often, equipment is delivered early and becomes the ladders used to reach other items. It may also actually impede the installation of other items by being in the way. We believe that the following items should be completed before equipment is delivered:

  1.) The building should be essentially finished. This means that the walls are finished, the roof is complete, the lot is paved and the equipment room is secure.
  2.) The water should be available and turned on.
  3.) Electric power should be available and panels in place.
  4.) Equipment Room lighting is in place and functioning.

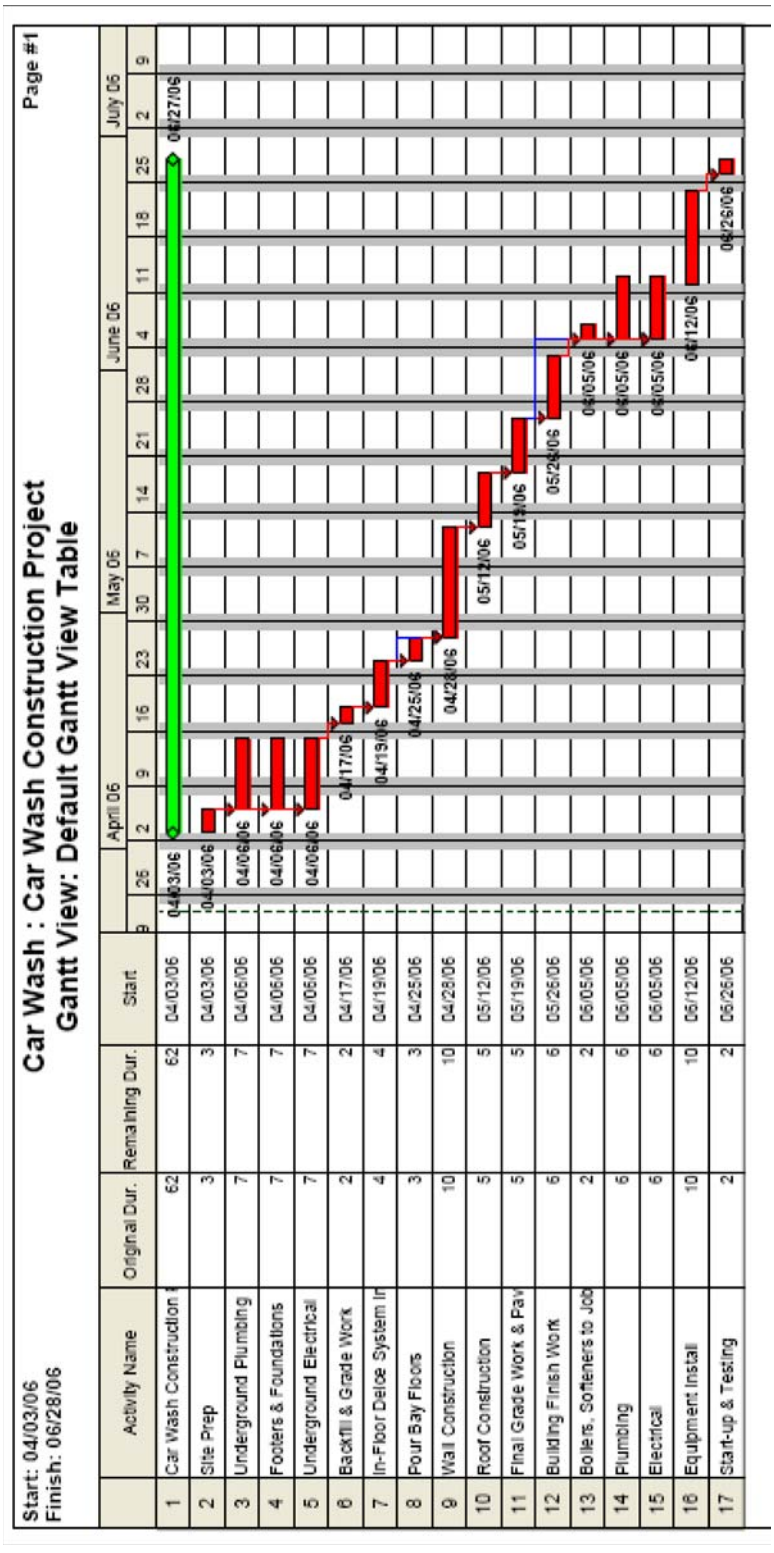
- When the equipment is delivered, it should be properly placed according to plan. DO NOT let plumbers or electricians dictate position based on their ease of installation. Insist that other contractors treat the equipment with care, making sure to protect its appearance as well as physical condition.

- While plumbers and electricians do their final hook-up, the install crew does self-serve bay installation, automatic bay installation, vacuum installation and other outside installation duties. This lessens the congestion in the equipment room and yet allows the plumber or electrician to ask questions related to their duties. The install crew also has the benefit of the plumber and electrician being available in case some special or unforeseen requirement presents itself. Before they leave the job, all work performed by them should be thoroughly tested. It should be understood that they will be available for any undetected problems connected with their work that may be found on start-up.

- When the plumber and electrician have completed their duties, the install crew can move into the equipment room without interference. They will able to perform their duties in a more timely fashion and not be hindered by the lack of water and power.

- When installation is complete, a thorough testing procedure must be initiated. Every system must be tested and adjusted. Now is the time to catch the little, embarrassing oversights that you do not want the owner to see. See page 32 for a sample start-up procedure. NEVER DO A FINAL START-UP ON FRIDAY! Factory personnel will be going home and replacement parts will be hard to get. Trust us on this one!

- Before the install crew leaves the job, the owner and his/her representatives must be thoroughly familiarized with the operation of the car wash equipment package. You will find this difficult because the owner is anxious to open the facility and begin collecting money and the install crew wants to go home! Short-cuts here will cost you! Be certain to show the owner or owner's representative the Operations Manual included on every PC.



Start: 04/03/06
Finish: 06/28/06

Car Wash : Car Wash Construction Project
Gantt View: Default Gantt View Table

Page #1

	Activity Name	Original Dur.	Remaining Dur.	Start
1	Car Wash Construction	62	62	04/03/06
2	Site Prep	3	3	04/03/06
3	Undergrcund Plumbing	7	7	04/06/06
4	Footers & Foundations	7	7	04/06/06
5	Undergrcund Electrical	7	7	04/06/06
6	Backfill & Grade Work	2	2	04/17/06
7	In-Floor Delce System Ir	4	4	04/19/06
8	Pour Bay Floors	3	3	04/25/06
9	Wall Construction	10	10	04/28/06
10	Roof Construction	5	5	05/12/06
11	Final Grade Work & Pav	5	5	05/19/06
12	Building Finish Work	6	6	05/26/06
13	Boilers, Softeners to Job	2	2	06/05/06
14	Plumbing	6	6	06/05/06
15	Electrical	6	6	06/05/06
16	Equipment Install	10	10	06/12/06
17	Start-up & Testing	2	2	06/26/06

Specific Cobra Requirements

Water

The Cobra is equipped with a Cat 3545 Pump, capable of delivering 45 GPM. Even though we do not use its total capacity, the 45 GPM figure may be neared as tips wear and the unloader attempts to maintain pressure by increasing flow. Water is also needed for chemical fill and we suggest that 5 GPM be available for this purpose. We therefore require there to be a minimum of 50 GPM of soft, heated water available to the pump station and chemical unit at a consistent pressure of at least 40 PSI but no greater than 60 PSI. The 40 PSI minimum is required to insure that adequate chemical dilution ratios are possible by the Hydrominders included with the chemical system. Pressures exceeding 60 PSI may prevent solenoids from operating correctly. Systems with greater than 60 PSI must have a pressure regulator installed between the water supply and wash equipment.

You will note that we have not dictated water tap or main sizes. The water available to our system may vary greatly from location to location, even if all are equipped with 2" taps and mains. Be certain that the project design person knows our requirements and plans accordingly.

We require that flexible connections be used from water supply to all connections on unit.

FAILING TO PROVIDE ADEQUATE WATER SUPPLY WILL AFFECT WARRANTY ISSUES!

Power

The Cobra is equipped with a 30 HP, 208/230 Volt, Three Phase motor. In addition the unit supplies power to additional equipment. We require that the Automatic Skid Panel have two power feeds from the main panel. One, 125 Amp feed connected directly to the main pump contactor and an additional 50 Amp feed connected to the power connections in the panel. Both feeds should include grounds and the 50 Amp feed must include a neutral. Be certain the follow all local codes with regards to disconnect issues. We also recommend that these two feeds be run in separate conduits.

In addition to the Automatic Skid Panel, the Cobra comes equipped with a Control Panel. This panel requires a dedicated 20 Amp, 120 Volt, Single Phase feed from the Main Panel.

Additional power requirements may be present depending on available options.

FAILING TO PROVIDE ADEQUATE POWER WILL AFFECT WARRANTY ISSUES!

Space Requirements

Dimension	Minimum	Preferred
Bay Length	28’	40’
Bay Width	14’	16’
Bay Height	10’	12’

In order for the Cobra to adequately size large vehicles, the bay dimensions are critical. A bay length of 28’ will allow installation but limit the size of vehicles the unit is able to wash, assuming the bay has end walls or doors. Appendix A1 shows the restrictions placed on the Cobra in a 28’ Bay with end walls. We recommend that end walls be revamped to allow arms to swing out side openings if possible and that any doors used be mounted exterior to the opening. If this is not possible, restrictions on vehicle length will have to be made. Note that the 24’ rail system is centered in the bay.

A2 shows the setup parameters of the 30’ Bay with end walls. The additional 2’ should allow the washing of most vehicles if installation is correct. Once again, the rail system is centered in the bay. The end stops are then used to limit carriage travel to prevent the wash system from hitting wall or door structures. Actual treadle mat placement may have to be adjusted to meet particular requirements. Final dimensions will be determined during the initial run-in of the system.

Internal dryer systems are not possible in either the 28’ or 30’ bay. If doors are mounted internally, further adjustment will be required and may further restrict the length of vehicles that may be washed.

NOTE: Both A1 & A2 show initial parameters only for end stop and treadle placement. Final settings to be determined by trial tests.

A3 shows the setup parameters for a 36’ or longer bay. You will note that we no longer center the rail system in the bay but move it toward the entrance. We can now set the end stops for maximum travel and can accommodate larger vehicles such as the crew cab Ford Pickup with full box.

It should also be possible to include a dryer, depending on its configuration and space requirements. Careful measurements should be made to insure that the dryer will not interfere with the forward travel of the arms when the Cobra is at the front of the vehicle.

In all cases, the installation process should remain “fluid” to accommodate unforeseen situations or conditions. We will demonstrate this requirement in the documentation of an actual installation that follows.

Installation Procedures

(Acknowledgement—We appreciate Hydro-Spray of Michigan's help in the documentation that follows. Their crew, Gale Baldwin, Tim Tillman and Dan Bovee provided an excellent example of the level of professionalism the assures a quality installation. Thanks also to Mike Bell, HS Factory Installer.)

Unloading The Equipment

The equipment will generally arrive from the factory via common carrier. A thorough visual inspection should be made to determine any possible damage that may have occurred during transit. Any such damage must be brought to the attention of the driver so that proper claim procedures can be followed.

Unloading will require a forklift suitable for the site conditions.

In this case, the lot was unpaved, so the large tire unit shown here was the right choice.

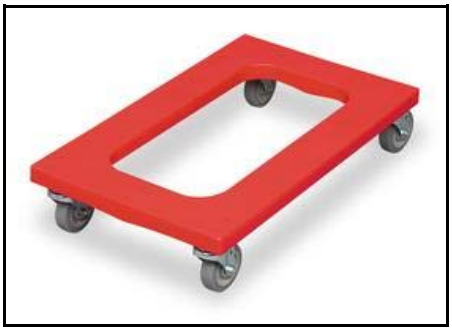
Only persons experienced in forklift operation should perform unloading. Correct and safe procedures should always be followed and sufficient personnel should be available.

Some pieces of equipment can be large and difficult to handle. Here, Tim helps steady the load and guides Gale as he moves the unit to the car wash building. Once off the truck, the load should be kept as low as possible to improve stability.

Once the equipment is on the site, moving it into position can be a real difficult job unless you have the proper tools. Shown at the right are three essential tools to have on any equipment installation.

Heavy Duty Equipment Caster Sets make positioning large and heavy pieces of equipment a much easier task.

Platform Dollys are invaluable in moving Items such as boilers and large crates or Boxes.



Once on the floor and off of the equipment Casters, heavy items can be placed in final position using a “Johnson Bar.”

All of these items are helpful in reducing the chance of injury or damaging equipment.

Item Inventory

As soon as possible, take an item inventory to determine the completeness of the shipment. Note any damaged or missing items and notify the factory of any purchased items that are missing or damaged items that must be replaced. (Note the protective covering for items that must be stored outside.)

Auto Bay Install
Beam Supports

Proper placement of the beam supports is very important. Dan is shown here setting up a laser level at the proper height of 9' 8" for the top surface of the beam supports. Use of a laser level is preferred because measuring up from the floor at different places around the bay may yield mounting levels that are not equal since the floor may not be level throughout the bay.

Once the laser level is operating, the position of the beam supports is determined from a starting point a specified distance from the inside of the entrance wall, 48" for a standard installation in a 36' or longer bay. The middle and front supports are then placed 140" on centers from this point. Once the correct horizontal position is determined, the exact vertical placement can be determined using the laser level.

Here Gale marks the correct 9’ 8” height by finding the laser mark at the horizontal placement mark for the beam support.

Using a bullet level to insure accuracy, Gale marks the mounting holes for the beam support.

With the mounting holes clearly marked, Dan first drills a pilot hole using a 1/4” bit to minimize the damage to the exit side of the block typical of the use of a hammer drill.

Once the pilot hole is complete, Dan uses the larger bit that is sized to fit the bolts that will fasten the beam support to the wall.

With the holes drilled, Gale holds a beam support in place and inserts the fastening bolt (in this case all-thread) through the hole.

On the outside wall, Tim places the backing plate over the bolts and holds the nuts secure as Gale tightens them from the inside.

This process is repeated for all six beam mounting plates.

Gale once again uses a bullet level to insure accuracy as he performs final tightening of the support.

With all six beam supports in place and level, you are ready to install the beams. Here Gale and Tim measure the required length of the front beam. Beams are shipped 16' long and must be cut to fit the bay. Bays wider than 16' inside dimension require special order beams.

Here Dan cuts the beam to proper length using a power band saw. It is a good idea to refinish the cut end with cold galvanizing compound spray to prevent rust formation.

Great Idea!

Use small clamps to pre-position the beam and prevent it from shifting. These remain in place until final adjustments are complete and beams are welded in place.

Here Gale and Tim lift the beam in place. These beams are heavy and care should be used in lifting them in place to avoid injury.

This process is repeated for the center beam, and later the entrance beam when preparing to install the entrance rails..

Here Gale and Tim hang one of the center rail hangers using the U bolts provided. It is a good idea to find the equipment centerline and mark it on the beam. The equipment centerline should be determined by the center of the door opening. Initial placement of the rail hangers are as follows:

Center - 75-3/4" off centerline
End - 75-1/4" off centerline

Both middle and front rail hangers should be positioned in this manner. The middle hangers have the side rail mounts while the end

You are now ready to mount the front rails. This is made easy by first positioning the center end of the rail by using the center mounting bolt. Once this bolt is hand tightened, the other end can be placed.

With the center end of the rail in place, the front end can easily be lifted in place. Both front mounting bolts and remaining center bolt can be put in place and hand tightened.

This process is then repeated for the other front rail.

With both front rails in place, you can set them at the proper distance apart, 142-1/4" inside to inside. The rail is then adjusted to be level and true using a bullet level as Tim is doing here. Bullet Levels equipped with magnetic strips make this task easy.

Note the large C Clamp that is used to hold the beams in place during adjustment.

It is important that both rails be true. Here Gale is adjusting the other rail, once again using a bullet level.

This process is repeated for both ends of the front rail and care is taken to insure that the rails are parallel and level.

With both front rails in place, you are ready to mount the carriage.

Mounting The Carriage

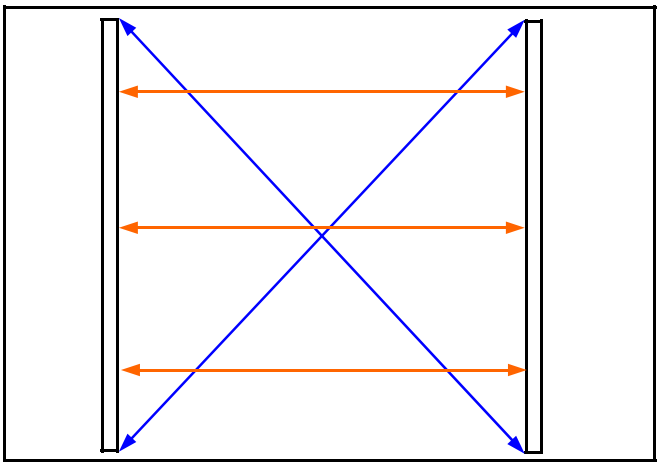
The carriage is shipped from the factory upside down and must be turned over for mounting. Here you can see the forklift being used to do this using a lifting strap. It is placed right side up on two heavy crates that were used to ship parts to the site. Be careful so as not to damage the carriage.

As you can see, the two rear rails were left off so that the carriage could be mounted on the rails.

The rear rails can now be installed in the same manner as the front.

You can now make all final adjustments to the rail system. Final attachment and welding should be done after the carriage system is tested to insure proper operation.

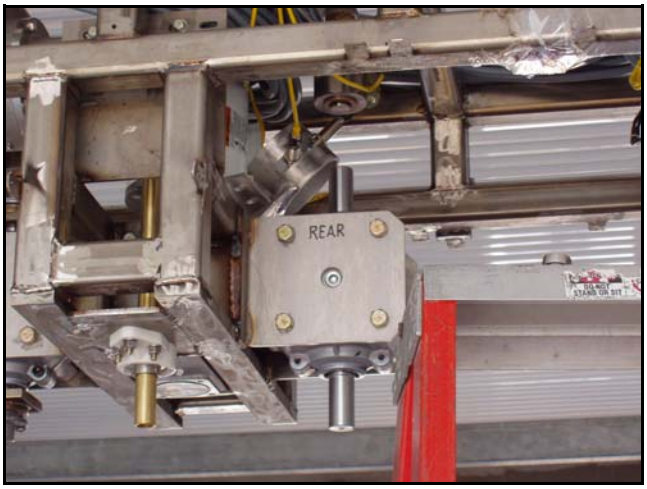
Make sure that the rail system is parallel and square. Square can be checked by measuring from one corner of the rails system to the other in an X pattern. These measurements will be equal if the system is square.



Mounting The Arms

You are now ready to mount the arms. Start by placing the arms in the bay so they will be readily accessible.

Start by removing the sensor halo bracket and carefully placing it out of the way. It is located on the passenger side of the carriage.

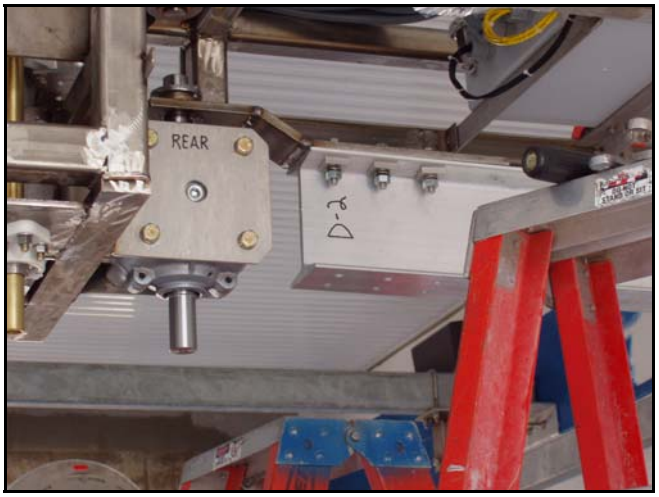


Remove the lower attachment from the arm support.

Place the arm support upper mounting attachment over the upper gear box shaft and insert the shaft bushing. Hand tighten the bushing bolts.

Note that you do not insert the shaft key at this time. They will be put in place when arm Installation is complete and alignment Checked..

The arm support will now be positioned on the gear box.



Next the lower arm attachment is installed in the same manner.

Fasten the lower arm attachment using the bolts and beveled spacers provided. Tighten securely. Center the arm support on the gear box. Check alignment, insert shaft keys and tighten securely.

Note that these are stainless bolts and nuts. It is wise to use anti-seize compound on each bolt to prevent galling.

You are now ready to install the arm assembly. Begin by placing a cinch strap around the carriage.

Place a cement block or some other support approximately 8” high on the floor under the end of the arm support.

Carefully balance the arm assembly on the cement block being sure not to damage any arm components and insert the arm attachments through the cinch strap.

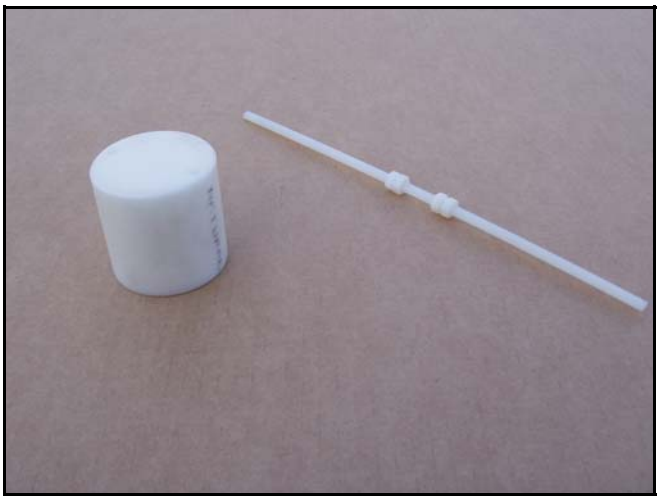
Using the cinch strap, raise the arm assembly up to where it will mate with the arm support.

Align the bolt holes and attach the arm using the bolts and beveled spacers provided. Tighten securely.

Repeat the procedure on the driver side arm.

This completes the arm installation procedure. Do not install covers at this time.

Locate the nylon sensor target mount and the nylon all thread. Position it on the passenger side upper gear box shaft. Temporarily replace the sensor halo and mark the position on the target mount so it aligns with the center sensor with the arms in the home position. (Arms centered, 90º or parallel with the carriage assembly.) Remove the sensor halo and sensor target and screw the stainless screw provided into the sensor target at your mark. Countersink the screw so that its head is even with the surface of the sensor target. This will prevent and damage to the sensors as the arms rotate. Replace the sensor target using the nylon all thread to fasten it to the top shaft hub. Replace the sensor halo and tighten securely. Insert the shaft keys and tighten the shaft hubs bolts securely.

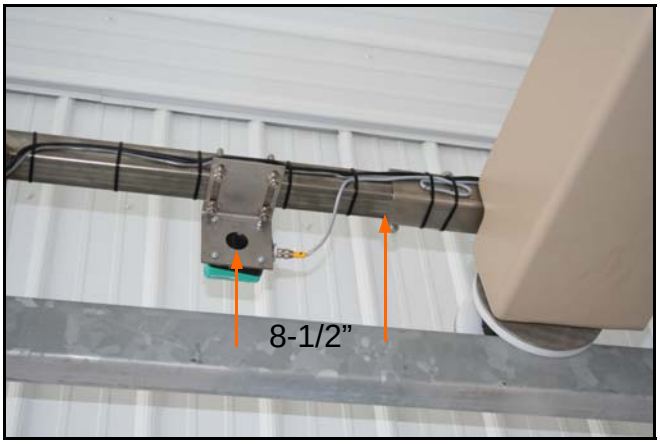


Insert the eye support poles into their receiving tubes. The rear supports should be 18" from the inside edge of the pole to the opening of the receiver tube. The front supports should be 18" as well. Both longer supports should be on the same side as the "H" Hose Bracket and the shorter supports on the opposite side.

Mount the front and rear limit sensors on the eye supports 8-1/2" from the center of the sensor to the edge of the receiver tube.

Limit Sensors and flags are mounted on the passenger side of the carriage assembly.

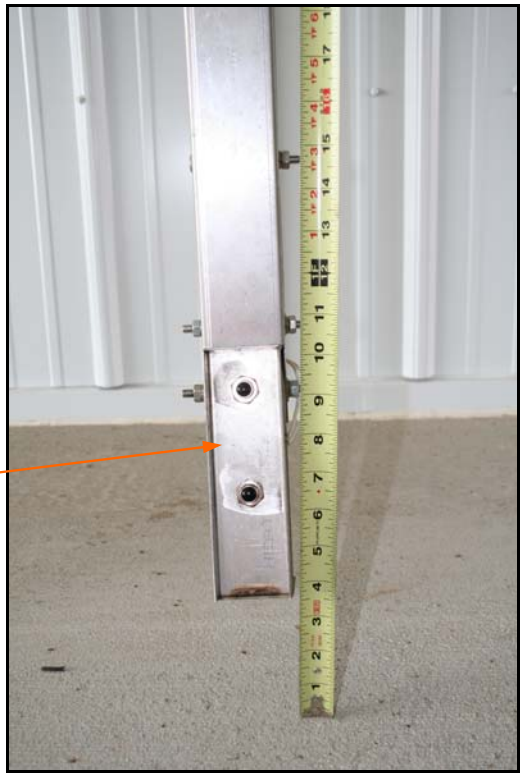
You can now install the eyes. Carefully tie up any extra cable to the eye supports using tie wraps.



If standard installation is possible in bays of 36’ or longer, you can mount the front and rear flags as shown here. If you bay is less than 36’, see the drawings in the Appendix.

The stops on the driver side rail are mounted so that they exactly match the position of the flag unit.

After mounting the eye support poles, attach the eye mount assembly so that the center line between the eyes is about 8” from the floor on the longer supports. The receiver eyes are attached to the shorter supports. The transmitter eyes are on the longer supports.



Attach the eye mount assembly so that the center line of the eyes are about 36” from the floor on the shorter supports.

Hose Installation

Install the high pressure pipe extension as shown. It is clamped, along with control cables and additional hoses by the clamp assembly provided at the end of the carriage. Route hoses and control cables through an opening in the bay ceiling just after the 3”X5” center beam. Loop the hoses so that the bottom of the loop is about 12—18” off the floor. This will allow plenty of hose as the carriage travels. Remember …. Neatness Counts!

All hoses to the carriage are routed through the hose clamp assembly provided. With the carriage at the center position on the track, the hoses should loop 12—18” off the floor.

Hoses into the carriage should be attached to the main feed pipe to insure that they do not interfere with the attachment of the arm covers.

Note the use a PVC protective sleeve to protect the hoses from chaffing on sharp corners.

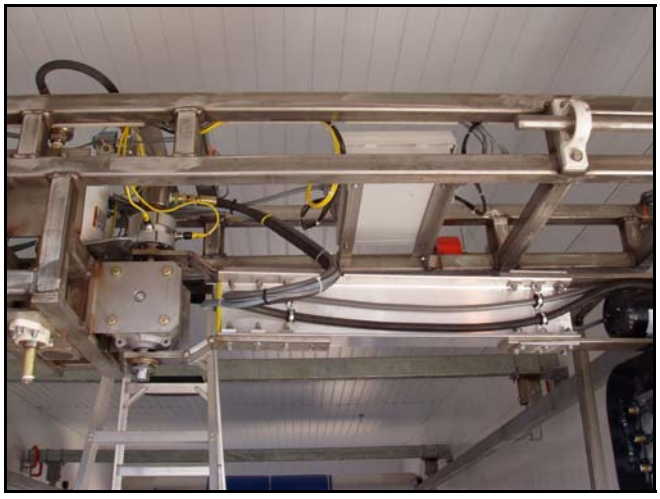
The hose installation will include:

- High Pressure Hose
- Tire Cleaner Hose
- Tri-Foamer Hoses
- Air Hose

Shown at right is the hose trough assembly. In northern climates, it is insulated as shown. The check valve assemblies for the high pressure line, the tire cleaner line and the tri-foam system are also visible.

Shown at right is an excellent way to prevent hoses from chaffing and wear on sharp corners. The use of Unistrut and Hydra-Zorb clamps is encouraged. Doing so will help prevent future hose problems and leaks.

DAMAGE RESULTING FROM IMPROPER HOSE INSTALLATION IS NOT COVERED UNDER WARRANTY.

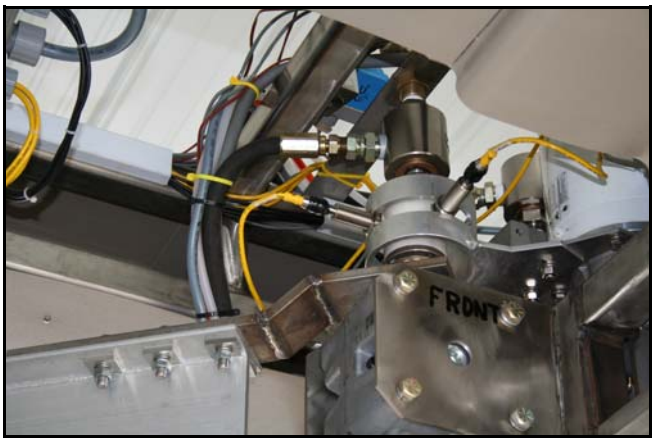


Here, this installer used rubber lined clamps to hold hoses securely in place on the arms.

Shown at right is the proper hose routing of the driver side arm as viewed looking toward the entrance of the bay.

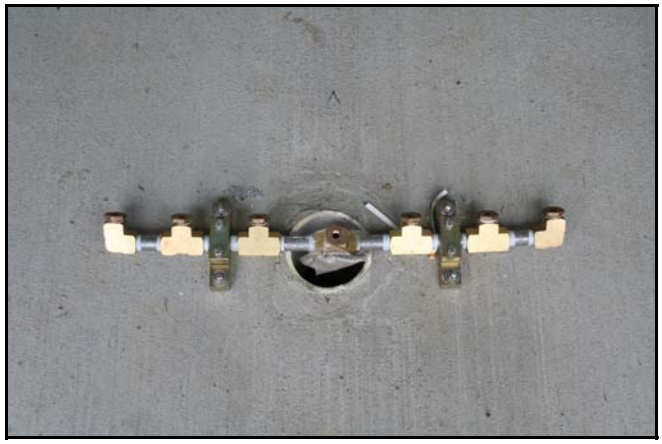
Shown at right is the proper hose routing of the passenger side arm as viewed looking toward the exit of the bay.

Be sure to route the hoses so that they clear the proximity switches.



Configure the Tri-Foam System as shown here.

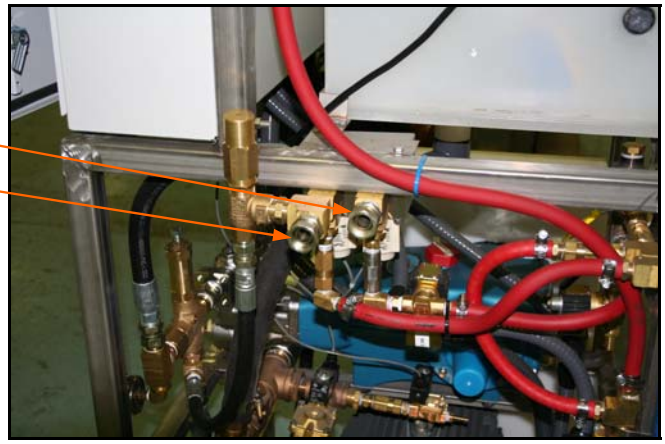
The correct installation of the Undercarriage Spray Bar is shown here. We recommend that the PCV hose chase used here be drained to the bay pit. (See conduit placement drawing)



TOWER Connection

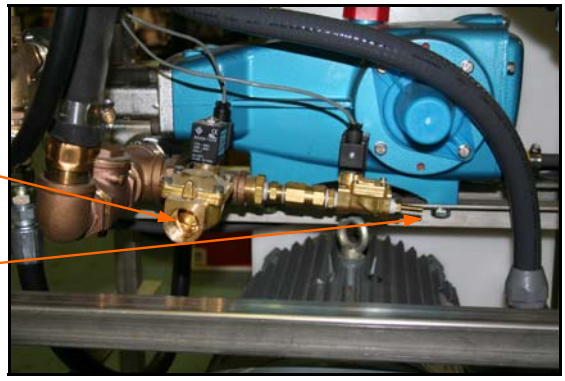
UNDERCARRIAGE Connection

At least 36” of clearance is recommended on this side of Auto Skid to allow maintenance.

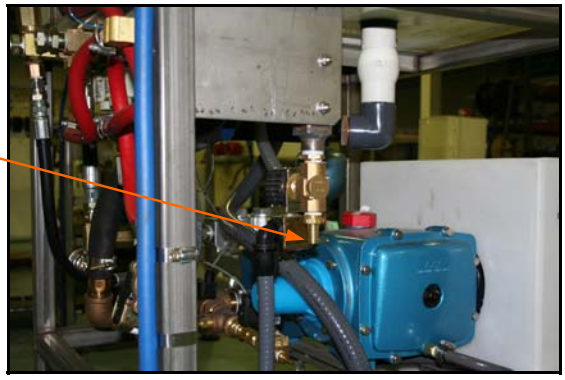


COLD WATER RINSE

WAX



CITY WATER FOR WEEP



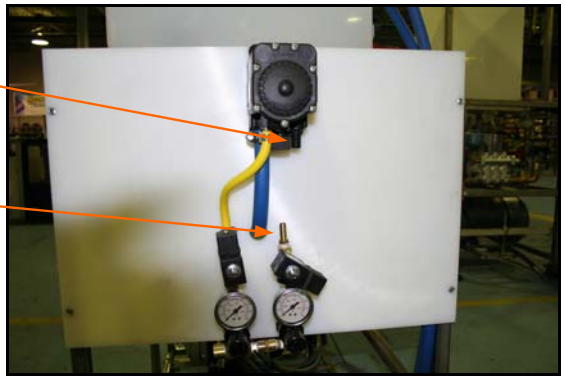
AIR FROM COMPRESSOR

AIR OUT TO CHECK VALVE

AIR IN FROM COMPRESSOR
FOR AIR BLOWDOWN

TIRE CLEANER TO BAY

AIR TO TIRE CLEANER
CHECK VALVE



Note the flexible connection from the water feed line to the unit. This is required.

Wire Installation

Three control cables are provide by the factory and are pre-wired to the unit. Control wires from each arm must be field wired. There are low voltage and high voltage panel boxes on the carriage for these cables. Be sure to leave about a 1' maintenance loop in the 3 control cables for access to the panle boxes later on. Follow the connection information included in each box. Route the cables so as to prevent any binding or chaffing as the arms move. Strain relief connections are provided for entry to each box. Inside panel wiring instruction is provided on A4 of this manual. You will also have wires going to the ACW, Entry Switch, Treadle and Backup Switches, Menu Board and optional stop/go lights. See the schematic and I/O Sheets for proper connection information.

Shown here is the proper placement of the optional Entry Stop/Go Light and signage.

The entry switch.

The Treadle & Backup Switch Mat.

The installation of the Menu Sign is shown here. Make sure that it does not interfere with the operation of the Cobra.

Shown here, and in the photo above, are the disconnects for the dryer motors. Be certain to conform all controls to local codes.

System Startup

After wiring and hose installation is complete, you can start the system startup. We recommend that you follow the procedure outlined below.

1. Turn water supply on and verify that no leaks are present.
2. Setup water softener and fill with water.
3. Setup RO System and begin filling RO Supply Tank.
4. Start water heating system.
5. Install wands but do not install spray tips.
6. Check power for correct voltage and for any wild leg. (If wild leg is present, make sure that 120V circuits are not connected to this leg of power.)
7. If power check is ok, power up unit and confirm Modbus Plus Network.
8. Power up PC and Citect MMI. Open Auto Monitor Page. (*) Next page.
9. Enter VFD Settings as outline below.

Arms			
ACC	6.5	BFR	60 Hz
DEC	8.0	UNC	230
LSP	3.0	FRS	60 Hz
HSP	5.5	NCR	3.5
ITH	7.2	NSP	1725
UFR	20%	COS	0.77
FLG	20%	TUN	NO
STA	20%	UFT	L
SLP	100	NRD	YES
TDC	0.5	SFR	4.0
SDC	0.7	TFR	60
TDC2	0	SSL	NO
SDC2	0	SCS	NO
JPF	0	FLS	NO
JF2	0		
SP2	5		
SP3	5		
CLI	7.2		
TLS	0		
FTD	60		
TTD	100		
CTD	4.8		
SDS	30		
SFR	4		

Carriage			
ACC	2.0	BFR	60 Hz
DEC	1.7	UNC	230
LSP	40	FRS	60 Hz
HSP	55	NCR	3.5
ITH	7.0	NSP	1725
UFR	20%	COS	0.77
FLG	20%	TUN	NO
STA	20%	UFT	N
SLP	100	NRD	YES
TDC	0.5	SFR	4.0
SDC	3.3	TFR	60
TDC2	0	SSL	NO
SDC2	0	SCS	NO
JPF	60	FLS	NO
JF2	0		
SP2	55		
SP3	55		
CLI	7.2		
TLS	0		
FTD	60		
TTD	100		
CTD	4.8		
SDS	30		
SFR	4		

10. Check operation and proper direction of travel of the carriage using the appropriate control buttons on the Auto Monitor Page. (If direction is wrong, switch any two motor leads on the Carriage VFD.)
11. Check operation of front and rear limit proximity switches.
12. Check operation and proper direction of travel of the arms using the appropriate control buttons on the Auto Monitor Page. (If direction is wrong, switch any two motor leads on the Arms VFD.)
13. Check operation of front, home and rear proximity switches.
14. Confirm proper operation of both sets of front and rear photo eyes.
15. Check all pumps and motors for correct rotation.
16. Run water through the tower using the Pump/Tower Button on the Auto Monitor Page. Let the system run for at least 3 minutes.
17. Run water through the undercarriage system using the Pump/Floor Button on the Auto Monitor Page. Let the system run for at least 3 minutes.
18. Run water through the undercarriage by selecting a wash with the undercarriage option and then clicking on the Entry Switch Button.
19. Install spray tips and repeat the tests above. Check for any leaks.
20. Setup the chemical system and test operation using the appropriate control buttons on the Auto Monitor Page.
21. Check the operation of the dryer using the Dryer Test Button on the Auto Monitor Page.
22. Check the operation of the system using a variety of vehicles. Make any needed adjustments to limit flags or Treadle placement.
23. Install arm covers.
24. Finalize welding of beam and rail systems.
25. Perform Owner Orientation.
26. Finalize installation, checking for neatness and quality. Make sure you leave the facility clean and orderly.

(*) Set up wash parameters following instructions in Operating System Manual. A copy can be found on the computer.

Finished Bay

When completed, the automatic bay should look similar to the bay pictured below.

Useful Data

Hydro-Spray Equipment Dimensions (For Equipment Room Planning)

Equipment	Length	Width	Height
Auto Skid	30”	30”	77”
1-4 Bay SS Skid	63”	30”	72”
Tank Stand	43”	25”	63”
5-6 Bay SS Skid	84”	30”	72”

Hydro-Spray Supplier Websites (For additional specifications)

Supplier	Website Address
DixMor Weep Mizer/Dryer Time Displays	www.dixmor.com
Munchkin Boilers	www.htproducts.com
IDX Coin Acceptors	www.idxinc.com
Lochinvar Boilers	www.lochinvar.com
Dilling & Harris	www.dilling-harris.com
Industrial Vac	www.industrialvac.com
Hamilton Manufacturing	www.hamiltonmfg.com
Diamond Water Softeners	www.diamondh2o.com
Rowe Changers	www.roweinternational.com
Graingers	www.grainger.com
Cat Pump	www.catpumps.com

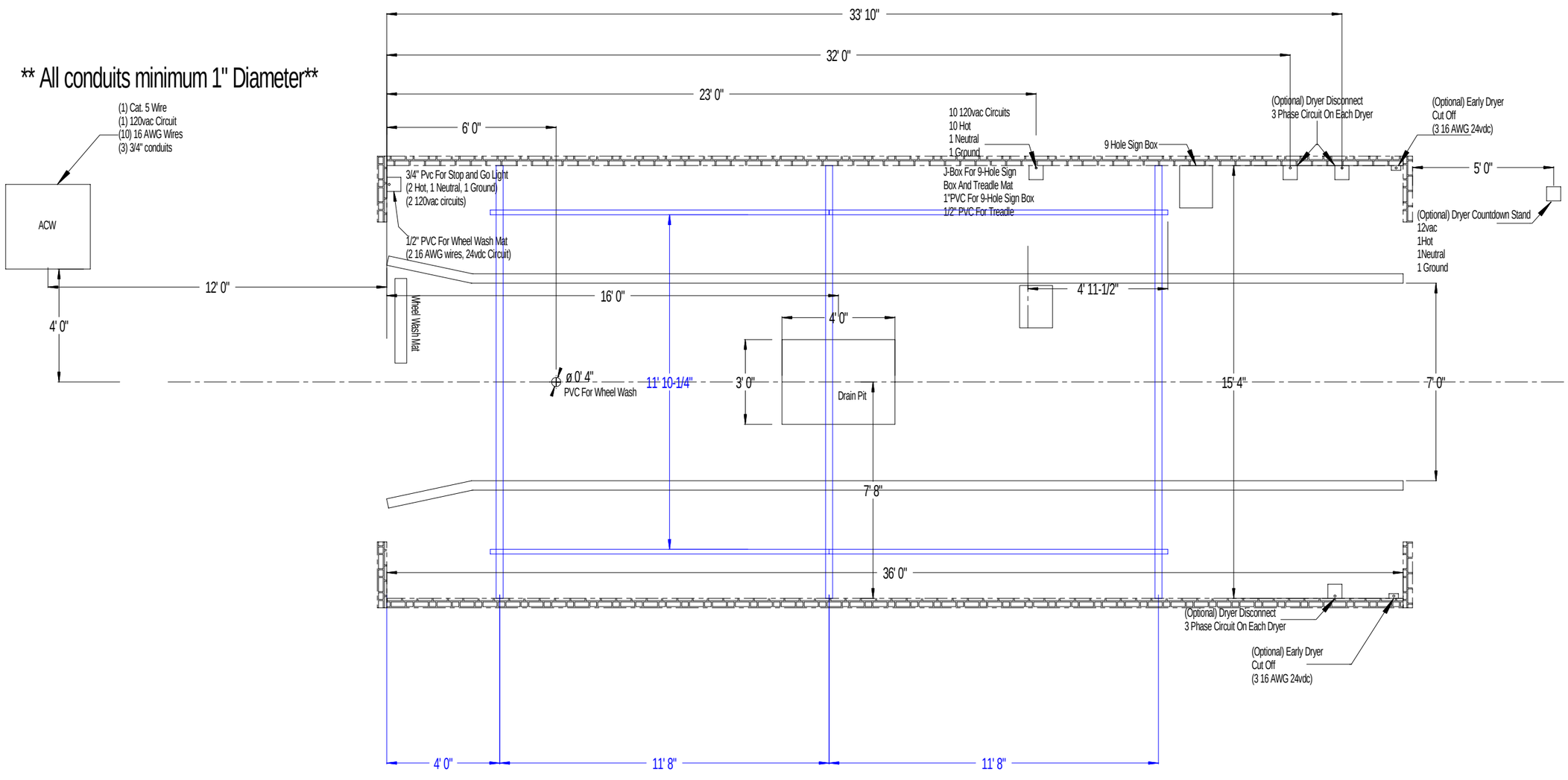
Water Discharge of Pipes

Approximate GPM

Pressure P.S.I.	Pipe Size	Length In Feet				
		25	**50**	**100**	**200**	**400**
10		16	11	8	5	4
20		23	16	11	8	5
40	3/4”	34	24	16	11	8
60		43	29	20	14	10
80		50	34	24	16	11
100		57	39	28	18	13
10		31	21	14	10	7
20		44	31	21	14	10
40	1”	65	44	31	21	14
60		81	55	38	26	18
80		94	65	44	31	21
100		107	73	50	35	24
10		84	58	39	27	19
20		121	84	58	39	27
40	1-1/4”	177	121	84	58	39
60		220	151	104	72	50
80		257	177	121	84	58
100		292	200	137	95	65
10		94	65	44	31	21
20		137	94	65	45	31
40	1-1/2”	200	137	94	65	45
60		250	170	117	81	56
80		290	200	137	94	65
100		330	225	155	106	73
10		183	126	86	59	41
20		265	183	126	86	59
40	2”	385	265	183	126	86
60		480	330	227	156	108
80		560	385	265	183	126
100		640	435	300	205	142

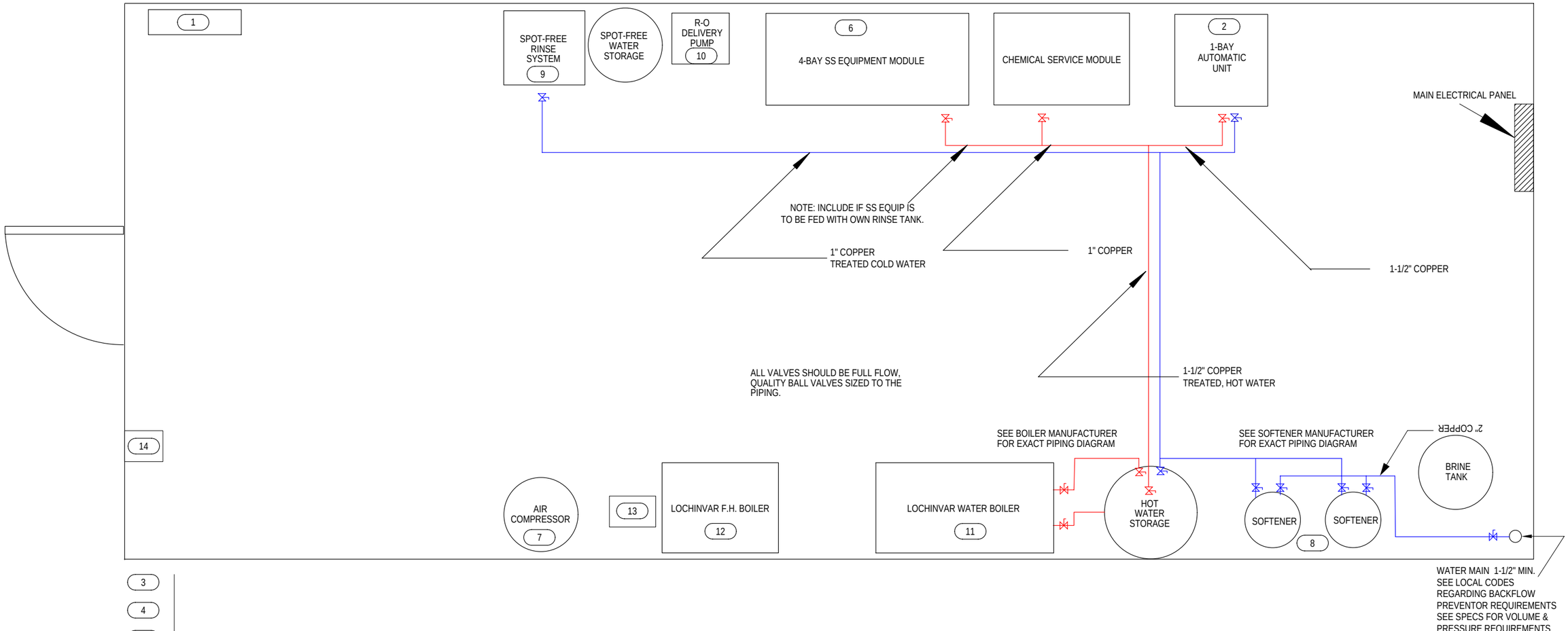
Typical
Auto Bay Layout
With 12' Rails
Inside Bay Dim. 36' X 15' 4"

** All conduits minimum 1" Diameter**



Hydro-Spray Equipment Schedule

PROJECT:	TYPICAL				
CONFIGURATION:	4 SS & 1 Auto				
		AUTOMATIC CAR WASH EQUIPMENT			
ITEM NUMBER	Number REQ'D	**DESCRIPTION**	**ELECTRICAL**	**LOCATION**	**REMARKS**
1	1	Control Panel	120 Volts / 1 Phase / 10 Amp	Equipment Room	Dedicated Circuit from main panel
2	1	Cobra Automatic Equipment Skid	208/230 / 3 Phase / 130 Amp	Equipment Room	Water Connection- 1-1/2" / hot / soft - 1/2" Air from Compressor
			(1) 125 Amp Power Feed (Main Pump)		1" Cold / Soft water feed to cold water rinse system
			(1) 50 Amp Power Feed (Panel & Control)		Note Double Power Feed
3	1	Lighted Menu Sign (In bay)	120 Volts / I Phase / 10 Amp	Auto Bay	Powered by Auto Skid
4	1	Lighted Menu Selection Sign	120 Volts / I Phase / 10 Amp	Auto Approach Apron	Powered from main panel
5	1	Hamilton Goldline ACW	120 Volts / I Phase / 10 Amps	Auto Approach Apron	Powered from main panel
		SELF-SERVICE SELECTIONS			
ITEM NUMBER	Number REQ'D	**DESCRIPTION**	**ELECTRICAL**	**LOCATION**	**REMARKS**
6	1	Self Serve, 4 bay Module Skid, Painted Frame, Timer Controlled	208/230 Volt / 3 Phase / 20 Amp Per Bay	Equipment Room	Water Connection – 1" / hot / soft - 1/2" Air From Compressor
		SUPPORT EQUIPMENT			
ITEM NUMBER	Number REQ'D	**DESCRIPTION**	**ELECTRICAL**	**LOCATION**	**REMARKS**
7	1	Air Compressor	208/230 Volts / 3 Phase / 15 Amp	Equipment Room	
8	1	Water Softener, 210,000 Grain Capacity, Twin, Electric Meter	120 Volts / 60hz / 10 watts	Equipment Room	Provide Duplex Receptacle
9	1	7200 GPD R-O System	220 Volts / 1 Phase / 25 Amps	Equipment Room	Powered from main panel
10	1	7.5 HP Repressurization Pump	208/230 Volts / 3 Phase / 25 Amps	Equipment Room	Powered by Auto Skid
11	1	745 WTB Water Heating Boiler	120 Volts / I Phase / 10 Amps	Equipment Room	Connections: Gas/ 1-1/4" Water/ 2" Stack/ 8"
12	1	CBN399 Floor Heating Boiler		Equipment Room	Connections: Gas/ 1" Water/ 2" Stack/ 10"
13	1	Floor Heat Circulating Pump	120 Volts / I Phase / 15 Amps	Equipment Room	
14	1	Hamilton Double Rear Load Changer	120 Volts / I Phase / 10 Amps	Equipment Room Wall	Mounted Through Wall, See Specs. For Opening
15	1	Standard Arch (Dryer)		Auto Bay Exit Side	Dryer MUST NOT interfere with Wash Equipment
15a	3	10 H.P. Producer (each)	208/230 Volts / 3 Phase / 40 Amp	Auto Bay Exit Side	
16	1	Dryer Count Down and Stand	120 Volts / 1 Phase / 1.2 Amp	Auto Bay Exit Side	Outside Bay Exit, See Layout Sheet For Location
17	1	Fresh N' Up Fragrance/Vac Combo, Coin Box Type	120 Volt / 20 Amp	Wash Lot	Owner Discretion
18	4	Super Vac. Coin Box, SST finish, SST dome (IVS#110000)	120 Volts / 20 Amp	Wash Lot	Owner Discretion
19	1	D&H 3+1 Combo Vac	120 Volts / 20 Amp	Wash Lot	Owner Discretion



3
4
5
15/15a
16
17
18
19

VARIOUS LOCATIONS OUTSIDE EQUIPMENT ROOM
SEE BUILDING PLANS FOR EXACT PLACEMENT

HYDRO-SPRAY CAR WASH EQUIPMENT
1237 West 4th Street
Mansfield, OH 44906
Tel.: (419) 529-5669
Fax.: (419) 529-9115
http://www.hydrospray.com

ADDRESS QUESTIONS TO:
DENVER ENGINEERING OFFICE
Tel.: (303) 797-8315
Fax.: (303) 795-1371

EQUIPMENT PLUMBIING LAYOUT

AUTOMATIC & SELF-SERVE
TYPICAL ONLY, NOT FOR CONTRUCTION

NTS	ONE

WHEEL WASH SWITCH

TO 24VDC +

TO NODE 17/18/36/43
INPUT # 6

TREADLE/BACKUP SWITCH

TO 24VDC +

TREADLE

TO NODE 17/18/36/43
INPUT # 7

BACKUP

TO NODE 20/22/39/46
INPUT # 16

SCHNEIDER
AUTOMATION, INC.

170 NEF 110 21

NODES# 20/22/39/46

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

TO 24 VDC+

TO 24 VDC-

3 4 5 6 7 11 12 13 14

13 & 14 USED ONLY ON
DOUBLE EYE SYSTEMS

8 9 10

15 TO OUTPUT # 11 NODES 17, 18, 36, 43

16 TO OUTPUT # 12 NODES 17, 18, 36, 43

POWER
SOURCE

24 VDC- (TS-3) 2

24 VDC+ (TS-4) 1

18 CONDUCTOR
22 GA. CABLE

ARM DRIVE

120 VAC CONTROL

TOWER CONTACTOR

MODICON

L1

6

5

TO 115 VAC NEUTRAL

T1

4

YW/GN

7 CONDUCTOR CABLE
FROM CARRIER

L1 L2

T1 T2 T3

4 5 6

1 2 3

TO TOP SPINNER VFD T1, T2, T3

INCOMING
POWER
FROM
BREAKER

CARRIAGE DRIVE

MODICON

L1 L2

T1 T2 T3

1 2 3

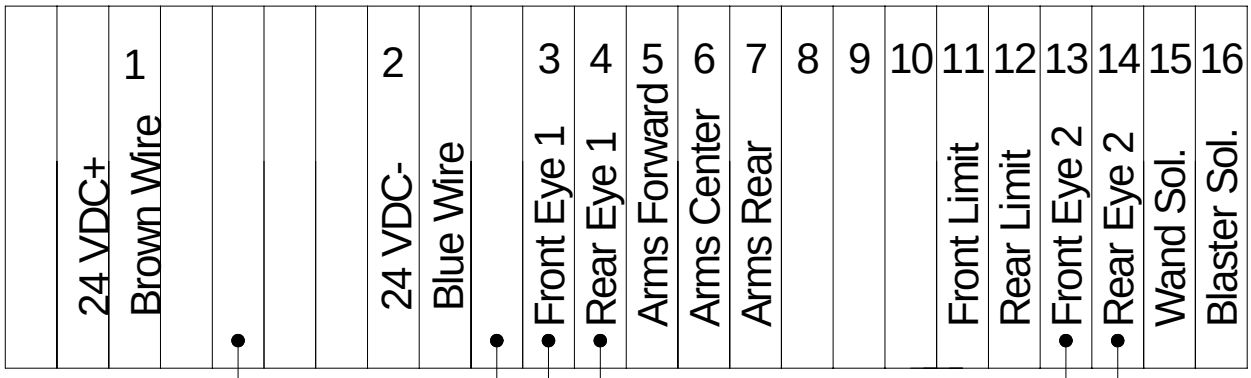
INCOMING
POWER
FROM
BREAKER

YW/GN

7 CONDUCTOR CABLE
FROM CARRIER

1" Panduit

LOW VOLTAGE PANEL BOX



1" Panduit

Ground Bar

Heater

24VAC

24VAC Common

TX Blacks

F.TX 1 Red

7 6 5

F.RX 1 Yellow

8 4

RX Shields

Amplifier

9 F .RX 2 Yellow 3

10 11 1 2

F. TX 2 Red

TX Blacks

R .TX 1 Red

7 6 5

R .RX 1 Yellow

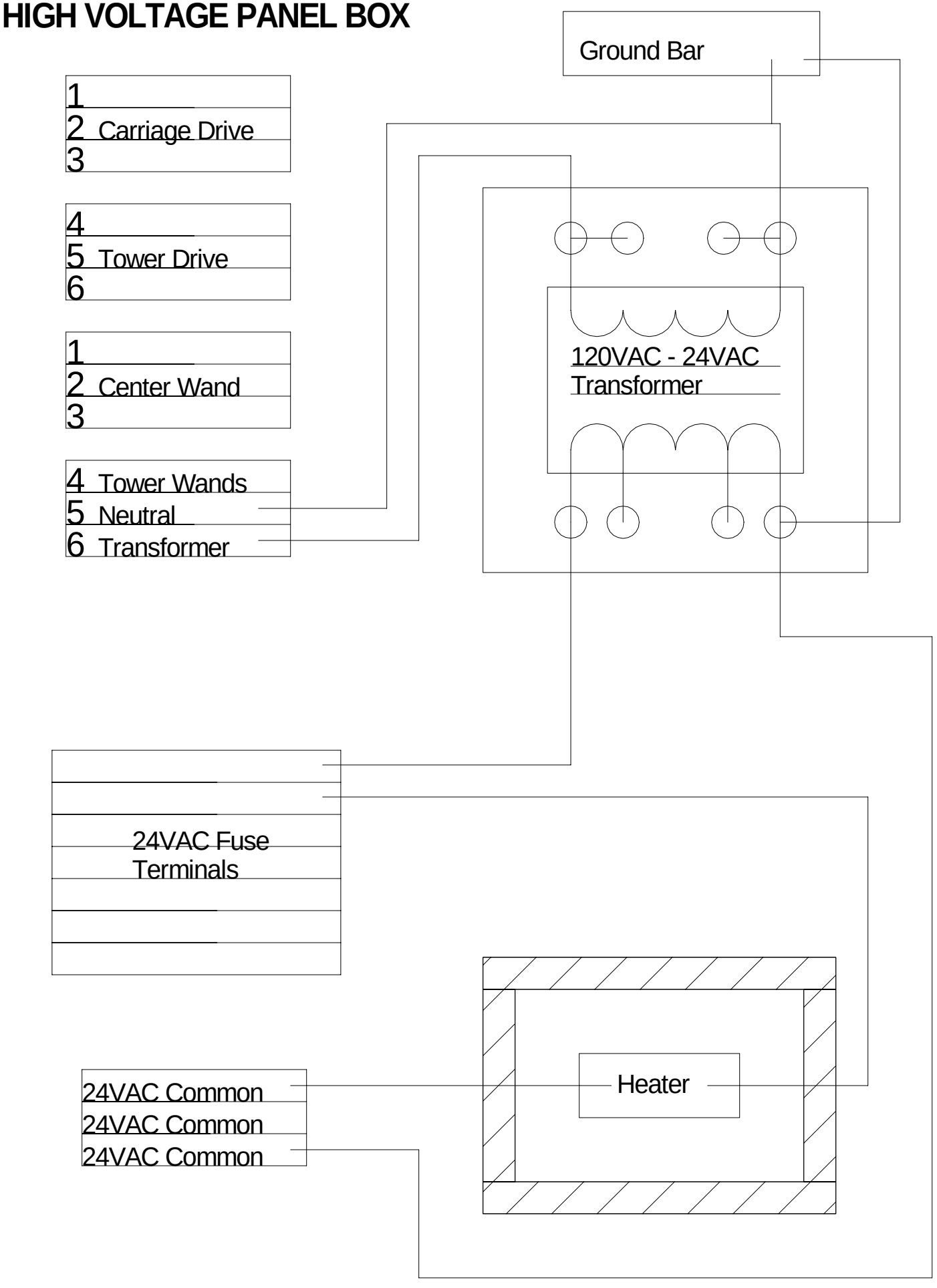
8 4

RX Shields

Amplifier

9 R .RX 2 Yellow 3

10 11 1 2

R. TX 2 Red

HIGH VOLTAGE PANEL BOX