

## Pronto4 Series 4 Hardware Installation Overview

This document provides a high-level overview for installing a Pronto4 Series 4 (P4S4) system into a vehicle. More detailed installation and operating procedures are provided based on specific system and component configurations.

1. Placement
  - Locate P4S4 in central area of vehicle (front passenger, floor, back seat area, etc).
2. Breaker
  - Install Breaker near battery.
3. Battery
  - Route Battery Cable to P4S4 (either through firewall or through inside of right front panel and door jam).
  - Ensure the Breaker is open.
  - Attach battery power to P4S4 on P210.
4. Brake
  - Attach Brake Bracket to brake pedal.
  - Secure Brake Pull Cable to firewall.
  - Route Brake Pull Cable to P4S4.
5. Throttle
  - Install Throttle Right Angle Pulley under throttle pedal.
  - Attach Throttle Pull Cable to throttle pedal.
  - Route Throttle Cable to P4S4.
6. Transmission
  - Route Transmission push/pull cable to automatic transmission shifter.
  - Attach Transmission push/pull cable to P4S4.
  - Attach male of quick connect to transmission shifter (transmission connection is difficult and can be left until later).
  - Attach female of quick connect to transmission push/pull cable.
  - Do NOT connect male and female of transmission quick connects. Safety concern – the vehicle cannot be commanded to move if the transmission is not hooked up.
7. Steering Prep
  - Route Steering Cables to the steering area from P4S4.
  - Connect them to P202 and P205.
  - Lay Steering Ring on seat, connected to P4S4.
  - Ensure steering wheel is center for straight vehicle motion.
  - Remove Steering Wheel, if possible. If needed, open Steering Ring by removing master chain link.



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8. VIM
  - Locate VIM on front seat.
  - Ensure VIM power switch is off; E-Stop is released, is in Manual, and Run.
  - Attach VIM cable to P4S4 P207.
  - Attach VIM spades, fan out cable to VIM.
  - Connect Key On signal to vehicle 12v.
9. Steering Mount
  - Locate RAM Ball Mount on floor to right of driver leg.
  - Adjust and attach post to Steering Ring ball and floor ball.
  - Roughly locate Steering Ring over center of steering column. Do NOT attach Steering Ring to steering wheel yet.
10. Ethernet
  - Attach Ethernet Cable to P107.
  - Connect Ethernet Cable to laptop.
11. E-Stop
  - Connect External E-Stops to P201 and P203. Usually 1 on each front corner and 1 in rear center.
12. Safety
  - Connect and position Flashing Light and Audible Alarm to P204. Can be on roof rack or customer supplied.
13. Power On
  - Power on the P4S4 with the VIM On/Off switch. Ensure lights turn on in front and unit beeps.
14. P4S4 Access
  - Run VNC on laptop for address 192.168.200.220. Observe P4S4 programs loading/loaded.
15. Actuator Test 1
  - Switch from Manual to Auto on VIM.
  - Enable ServoPod.
  - Send 0, 100, 0 to Brake. Observe motion.
  - Send 0, 500, 0 to Throttle. Observe motion.
  - Send 0, 100, 0 to Transmission. Observe motion. 0 should be in the cable position of PARK. Since the transmission is NOT connected, the vehicle state does not change.
  - Cal Steering. Observe motion to steering center.
  - Send -90, +90, 0 to Steering. Observe motion. Do NOT disturb Steering Ring after 0 command.
  - Turn VIM Off.



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#### 16. Steering Install

- Mark zero on Steering Ring.
- Attach Steering Ring to steering wheel. Ensure steering wheel is centered and Steering Ring is at zero.
- Reinstall steering wheel.

#### 17. Actuator Test 2

- Start vehicle.
- Repeat steps 13, 14, and 15 to ensure actuation of vehicle.

#### 18. Vehicle Enable

- Locate fuse that kills engine and has key switched to 12VDC on one side.
- Remove fuse.
- Connect Key Switched 12VDC side of fuse to Key On signal of VIM Cable.
- Connect Enable Out to other side of fuse.

#### 19. Vehicle Start

- With Key On, locate two wires that when shorted start the engine.
- Measure current. If >5 amps, use an external relay.
- Connect the start leads from VIM spade lug cable.

#### 20. E-Stop Test

- Fire up the P4S4 using VNC, as in steps 13-15.
- Enable ServoPod.
- Start the engine manually.
- Disable ServoPod. Observe Engine Stop.
- Enable ServoPod, Start Engine.
- Press E-Stop system. Observe Engine Stop and brake applied.
- Release E-Stop. Observe brake released.

#### 21. Transmission Set-up

- Attach the Transmission push/pull cable's quick connect.
- Calibrate Transmission set-points.

#### 22. Application Ready

- Create Application Specific Safety Procedure for Vehicle Motion.
- Application Independent Installation is complete.