



Manual for Universal Gate Model UG-141 with Series 1-349AAA Gate Controller

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List of Illustrations

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2. AS-101-403-08	Gate Panel
3. SC-101-405-01	Schematic-Gate Controller
4. BP-100-000	Base Mounting Plans
5. AS101-405-01	Gate Controller – Board Layout
6. FC101-405-01	Gate Controller Connection Diagram

Optional Equipment Drawings:

6. AS-101-105-00	Folding Gate Arm Assembly
7. AS-101-208-00	Rebound Assembly

Bill Of Material:

8. BM-101-101-00	Gate (2 sheets)
9. BM-101-101-01	Limit Switch Assembly
10. BM-101-102-01	Gate Motor Assembly
11. BM-101-403-08	Gate Panel
12. BM-101-103-01	Gate Controller
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15. FC-101-100-01	Feeder Wire Size Chart
16. FC101-405-01	Gate Controller Connection Diagram

Note: For field connections specific to your application, refer to standard system drawings and custom drawings (if applicable) that were supplied with your gate.

Equipment Description:

This manual has been prepared to assist the user in the installation, operation and maintenance of the PPI Universal Gate Model UG-141 (part no. 1-141).

The Universal Gate assembly consists of three major components: the housing, the gear-motor assembly and the Gate Controller.

Housing:

The housing is constructed of #14 Ga. steel; all seams are welded. The cabinet is finished in a powder coat paint that will resist rust and corrosion. All internal components are painted or plated to prevent rust and corrosion.

Gear -Motor Assembly:

The motor and gearbox are located in the upper compartment as are the gate arm limit switches. To gain access to this compartment, unlock the door on the housing and release the latches located at the top of the housing.

Universal Controller:

The PPI Gate Controller Series 1-349AAA is a plug-in device which consists of the appropriate connectors, switches and solid state logic to perform all necessary functions of the PPI gate.

The gate controller contains the following controls:

1. Raise\lower switch
2. Power “on” LED indicator
3. Internal resettable fuse
4. Pluggable terminal block for gate motor
5. Connector for limit switch cable
6. Pluggable terminal block for control wiring

All other electrical parts and components used in the gate, with the exception of the limit switch assembly and the gear-motor assembly are housed inside the gate controller. All Series 1-349AAA gate controllers are identical and are completely interchangeable with any other Series

1-349AAA controller. All 1-349AAA controllers are also pin compatible with the older 1-249AAA controllers and can be used to replace these controllers.

The Universal Gate can perform a wide variety of functions by providing the appropriate connections on the gate controller terminal blocks. No change is necessary within the gate controller to perform the various operations.

Equipment Warranty:

A statement covering the warranty of this equipment is given on page 15. It should be read and understood.

Unpacking:

Specifically designed, reinforced packing cartons have been used to provide the best possible protection during transit. A careful visual inspection of the units should be made as soon as they are removed from the cartons for any damage incurred during shipping. In the event the units have been damaged as a result of shipping, the carrier and PPI should be notified as soon as possible.

The gate is shipped as a fully assembled unit. There is no need for field assembly of the equipment. However, some peripheral equipment, specifically plug-in modules such as loop detectors and timers for example, may be packed separately or placed in a smaller box in the bottom of the gate housing. If, after checking all boxes and the inside of the gates, any item listed on the packing slip is missing, please notify PPI as soon as possible.

Remove all shipping tape and padding from the unit before attempting to operate the gate.

Mounting:

To open the gate housing, unlock the door located on the front of the housing and lift it out of its frame exposing the termination panel.

The housing should be held firmly to the mounting surface by four bolts. Refer to the Base Mounting Plan BM-100-000 for bolt configuration. Refer to the appropriate Standard System drawings for recommended equipment placement and separation.

Power and System Connection:

Power and control wire connections are made on the termination block TB1 and the gate controller inside the housing respectively. Incoming wires should be routed through the opening in the base of the housing to their appropriate termination points.

For system connection details, refer to the appropriate Standard System Drawings or Custom System Drawings supplied by PPI.

Caution: All gates are wired for 115VAC, 50/60 Hz operation unless labeled otherwise.

Remove the cover over terminal strip TB1 in order to connect the incoming power. All terminals are numbered for easy identification. It is very important to provide adequate voltage to this equipment (115VAC, 60Hz, 15A). Improper wire size will result in an excessive voltage drop

which will cause the equipment to malfunction. Under no circumstances should the voltage drop exceed 10 volts under load conditions from the nominal 115VAC input. Prior to pulling the cable for primary power input, refer to the PPI Feeder Wire Size Chart. This chart shows proper cable size for power input to the system gate or gates. The motor draws 8A starting current.

All gates are rated for 115VAC 60Hz unless otherwise labeled. 220-240VAC 50Hz operation must be specified when ordering.

Note: National and local electric codes require proper grounding of all equipment enclosures. In system installations where rigid metal conduits are used, the conduits can be used for grounding if permissible. In systems where plastic conduits or any other type of wire routing is used, a separate ground wire of sufficient size must be provided.

Gate Raise:

When the gate is in the down position, a pulse or contact closure on pins 3 & 4 will cause the gate to raise. As with the lower input, this should be a “dry contact” of at least 200ms duration but no more than 3 seconds duration. It will not damage the controller if these pins remain shorted, however, it will cause the gate to return to the up position immediately after lowering. This will allow vehicles to pass through the gate at will.

Open Loop:

The normally open presence output of a loop detector will normally be connected to pins 5 & 6. This will cause the gate to raise automatically when a vehicle is detected.

Close Loop:

The pulse on exit output of a loop detector will normally be connected to pins 7 & 8. This will cause the gate to lower automatically when the vehicle has cleared the gate.

Backoff:

The pulse on exit output of an opening or arming loop detector can be connected to pins 9 & 10. This input can be used to cause the gate to automatically return to the down position when the gate has been raised, but the vehicles backs away in an illegal “backout” condition.

Arming Loop:

The normally open presence output of a loop detector can be connected to pins 11 & 12 in order to provide an “arming” signal when a vehicle is detected. When the gate is armed, a relay in the controller provides a contact closure on pins 21 & 22. This signal can be used to activate or enable any ticket machines, card readers, fee computers, etc. that are set up to require arming. The arming will go off when the gate is raised.

Lockup:

Shorting pins 15 & 16 will cause the gate to be locked in the up position. If the gate is down, it will be raised. It will remain raised ignoring any other inputs for as long as these pins are shorted. As soon as pins 15 & 16 are opened, the gate will automatically return to the down position and resume normal operation. The lockup feature is useful for emergency situations or for 7 day timers so that the gate can be opened during pre-set times.

Inhibit:

Shoring pins 17 & 18 will effectively turn the gate off. The gate will ignore any other input. The gate will remain in the position it was in when pins 19 & 20 were shorted. (If the gate was up it will remain up. If it was down it will remain down.) When this contact is opened, the gate will resume normal operation. However, it will not change position until it receives a signal to do so.

Pulse:

Pins 21 & 22 provide a contact closure of 200ms duration. The pulse occurs each time the gate is raised. This signal is primarily used by counters.

Status:

There are 2 status outputs: when the gate is down, pins 23 & 24 are normally open and pins 25 & 26 are normally closed. When the gate is up, pins 23 & 24 are closed and pins 25 & 26 are opened. The status outputs can be used to perform such functions as monitoring the position of the gate or operating a red/green light in conjunction with the gate. These contacts are rated 1A@125VAC.

Rebound Option:

Pins 13 & 14 can be connected to the normally open contacts of the standard rebound assembly. While the gate is moving downward, if the arm senses an object in the lane and there is sufficient pressure to trip the micro-switch on the rebound assembly, the arm will be reversed and returned to the up position. This input is only active while the gate arm is moving down. After the arm returns to the up position, it will remain there until the gate receives a signal to lower.

Heater Option:

A three position switch is placed on the termination panel when a heater and thermostat are installed. This switch can be used to turn the heater on, off or put it on automatic thermostat control.

Gear and Motor Maintenance:

The gearbox is designed for a long continuous duty life and needs no routine servicing. The lubricant installed at the factory should be good for the life of the equipment. There is no need to add to or change this lubricant. The lubricant will perform satisfactorily from 0 degrees F to +110 degrees F. Do not attempt a change of lubricant for various climate or temperature extremes.

A higher than normal motor temperature can be expected during the first few weeks of operation. This is normal during the "break-in" period of the gear assembly. The break-in period will vary with the extent of use the gate is subjected to. After the break-in period, a temperature rise of 100 degrees from the ambient temperature is normal.

Controller Maintenance:

The gate controller is sealed at the factory at the time of manufacturing and should not be opened in the field for maintenance. If service is required on the controller, contact your local PPI representative or PPI if the unit was purchased from the factory. A replacement unit will be provided from inventory at no cost if the equipment is under warranty or for a flat exchange price after the warranty has expired.

Limit Switch Adjustment:

The travel of the gate arm downward is stopped by the LSL limit switch and the upward travel is stopped by the LSR limit switch. These limit switches are pre-adjusted at the factory. If adjustment to change the stopping point is required, the following steps should be taken:

1. The cam secured to the gear assembly should not be moved.
2. Loosen slightly the two #10 screws holding the limit switch mounting plate to the L shaped bracket.
3. Move the limit switch up or down in the slot provided until the proper stopping point is achieved.
4. Tighten the screws until the mounting plate is secure.

Trouble Shooting:

The Universal Gate is designed for minimal maintenance and little or no down time. The function of any parking gate is to raise and lower at the appropriate time. Most problems will manifest themselves by the failure of the gate to raise or lower when expected. Below is a list of problems and the most probable causes should a failure occur and their possible solutions.

1. Loss of power:

A) Check for proper input voltage at TB1.

B) Make sure all circuit breakers feeding power to the equipment are turned on.

C) When the gate controller is on, the green LED at the top of the controller is lit. If the LED is off, exchange the controller with a working controller from another gate in order to establish if the controller is defective.

2. Gate fails to lower:

A) The controller may be bad; if possible, exchange the controller with a working controller from another gate in order to verify this.

B) The closing loop detector may not be signaling the gate to close. Check the presence indicator light on the detector. The light must be red when no vehicle is present and green when a vehicle occupies the loop. (The presence of a vehicle can be simulated by placing the door of the gate over the loop in the roadway.) If the light remains red, exchange the detector with a working detector from another gate. A flashing loop detector indicates a loop failure condition. This is most commonly due to shorting of the loop wire embedded in the roadway. The loop wire may need to be replaced. Consult with PPI before taking further action.

C) The gate is in the locked up state. Make sure pins 15 & 16 are not shorted.

D) If the gate is connected to a differential counter or other control system, make sure pins 17 & 18 are not shorted.

E) The limit switches are not making contact. Check the limit switches to make sure the NO contacts are open and the NC contacts are closed.

3. Gate fails to raise:

A) The controller may be bad; if possible, exchange the controller with a working controller from another gate in order to verify this.

B)The opening loop detector may not be signaling the gate to open. Check the presence indicator light on the detector. The light must be red when no vehicle is present and green when a vehicle occupies the loop. (The presence of a vehicle can be simulated by placing the door of the gate over the loop in the roadway.) If the light remains red, exchange the detector with a working detector from another gate. A flashing loop detector indicates a loop failure condition. This is most commonly due to shorting of the loop wire embedded in the roadway. The loop wire may need to be replaced. Consult with PPI before taking further action.

C)The gate is not getting a signal to raise from a device such as a ticket machine or card reader. Check all connections from these devices and make sure they are functioning properly.

D) If the gate is connected to a differential counter or other control system, make sure pins 17 & 18 are not shorted.

E)The limit switches are not making contact. Check the limit switches to make sure the NO contacts are open and the NC contacts are closed.

A. Feeder Wire Size Chart (FC -101-100-01)

It is very important to provide adequate voltage to the equipment. Improper wire size will result in an excessive voltage drop which can lead to malfunctions, e. g., erratic operation, inaccurate counting etc.

Under no circumstances should the voltage drop exceed 10 volts under load conditions from the nominal 115 volts.

The following chart is a guide to determine the input wire size.

LOAD	DISTANCE IN FEET (2 CONDUCTOR)							BREAKER
UP TO 10A NO GATE	0-196	197-500	501-1000					15A OR 20A
1 GATE	0-128	129-196	197-312	313-500	501-800	801-1120	1121-1500	15A OR 20A
2 GATES		0-98	99-156	157-250	251-400	401-560	561-750	30A
3 GATES			0-117	118-187	188-300	301-420	421-560	40A
4 GATES				0-125	126-200	201-280	281-375	50A
WIRE SIZE	12A WG	10AWG	8AWG	6AWG	4AWG	2AWG	0AWG	

- A. The first column is the equipment to be installed.
- B. For all standard systems without gates (10 amps or less) use the first row.
- C. For all standard systems with gates, use the row indicating the number of gates on that circuit. (Associated equipment is included.)
- D. Distances are in feet from power panel to the equipment terminals.

Note: National and local electric codes require proper grounding of all equipment enclosures. In system installations where rigid metal conduits are used, the conduits can be used for grounding if permissible. In systems where plastic conduits or any other type of wire routing is used, a separate ground wire of sufficient size must be provided.

B.

Warranty

PPI warrants to the original buyer that this product is free from defects in workmanship and material. Unless otherwise agreed to in writing, PPI's obligation under this warranty shall be limited to furnishing a replacement for, or at PPI's option, repairing this product or any part or parts thereof which, in PPI's opinion prove to be defective for one year from the date of shipment by PPI provided all Standard Terms and Conditions are complied with. No product or part may be returned without PPI's prior approval. In no event will any claim for labor in removing or replacing a defective product or part or for consequential damages be allowed.

Standard Terms and Conditions:

No warranty is made as to this product or part which has not been sold by PPI or installed or operated or maintained in accordance with instructions conveyed by PPI or the instructions contained in this manual or which have been subject to misuse, abuse, accident, vandalism, alteration or to improper maintenance, storage, transportation or handling.

This warranty is in lieu of all other warranties, expressed or implied and PPI neither assumes nor authorizes any person or firm to assume for it any other or further obligations or liability in connection with the sale, installation or use of this product.

The following items are excluded from the warranty:

1. Replace fuses or reset circuit breakers.
2. Replace light bulbs or indicator lights.
3. Replace inking ribbons.
4. Replace equipment heaters.
5. Replace gate arms.
6. Change tickets, splice tickets or feed tickets into ticket machine.
7. Remove ticket jams.
8. Set or reset differential or total counters.
9. Set or clean time-heads for ticket mechanisms or time clocks.
10. Remove or install quick-change plug connected components.
12. Set or update computer software or program parameters.
13. Change computer program from original function.
14. Rectify any problems due to wrong connections or faulty installation. (If not installed by PPI.)

BILL OF MATERIAL 101-101-00

UNIVERSAL GATE MODEL 1-141

ITM	QTY	PART NUMBER	DESCRIPTION
1	1	AS101-101-01	Limit Switch Assembly
2	1	AS101-102-01	Motor & Gear Reducer Assembly
3	1	AS101-103-00	Universal Gate Controller
4	1	AS101-403-08	Termination Panel
5			
6			
7	1	100-100-00	Base
8	1	100-100-00/D	Door
9	2	AS100-100-03	Spring Latch Assembly
10	1	101-100-01	Hood
11	1	101-100-02	Mounting Plate
12			
13	1	100-101-02	Treaded Rod
14A	1	101-304-05	Gate Arm Bracket & Shaft Assembly
14B	1	101-304-10	Gate Arm Bracket - Clamping Plate
15	1	101-104-03	Connecting Plate - Gate Arm Bracket
16	1	101-104-04	Connecting Plate - Motor Shaft
17			
18	1	199-001-24	Standard PPI Name Tag
19	2	101-104-11	1/4" SQ Key
20	1	101-107-01	Limit Switch Cam
21	2	600-000-01	Pillow Block
22	1	500-400-02	Lock Assembly with Cam
23	2	600-001-01	Rod End Bearing
24			
25	2	500-232-03	Retaining Ring
26	4	500-230-01	Pop Rivet
27			
28	2	500-031-01	5/8 - 11 X 2 1/2 Hex Head Bolt
29	2	500-023-08	3/8 - 16 X 1 1/2 Hex Head Bolt
30	4	500-027-01	1/2 - 13 X 1 1/2 Hex Head Bolt
31	4	500-021-02	5/16 - 18 X 1 3/4 Hex Head Bolt
32			
33	2	500-019-17	1/2 - 20 X 1 1/2 Socket Head Screw with Nylok
34	2	500-016-02	#10 - 32 X 1/2 Rd Head Screw
35	2	500-011-30	#6 - 32 X 1/4 Socket Set Screw with Cup
36	1	500-011-01	#6 - 32 X 1/4 Rd Head Screw
37	2	500-010-01	5/8 - 11 Hex Nut
38	12	500-021-04	5/16 - 18 X 3/4 Hex Head Bolt
39	6	500-086-01	#10 - 32 Hex Nut

40	4500-211-01	5/8 Flat Washer		
41	4500-207-01	1/2 Flat Washer		
42	2500-161-01	5/8 Split Lockwasher		
43	4500-157-01	1/2 Split Lockwasher		
44	16500-151-01	5/16 Split Lockwasher		
45				
46	4500-145-02	#10 Internal Lockwasher		
47	2500-145-03	#10 External Lockwasher		
48	1500-225-01	Plastic Bushing		
49	1199-001-25	Product ID Label		

BILL OF MATERIAL 101-101-01
LIMIT SWITCH ASSEMBLY 1-141

ITM	QTY	PART NUMBER	DESCRIPTION		
1	1	101-106-01	Limit Switch Support Bracket		
2	2	101-106-02	Limit Switch Mounting Plate		
3	2	800-005-01	Micro Switch		
4	2	800-005-02	Switch Actuator		
5	3	800-011-05	Tie Wrap Holder		
6	6	800-011-01	Tie Wrap		
7	3	500-016-06	10-32 X 3/8" Pan Hd Screw		
8	4	500-016-04	10-32 X 3/8" Soc Hd Screw		
9					
10					
11	7	500-145-03	#10 External Lockwasher		
12					

BILL OF MATERIAL 101-102-01

GATE MOTOR ASSEMBLY

ITM	QTY	PART NUMBER	DESCRIPTION		
1		1800-006-63	8 Position Terminal Block Plug		
2		1800-000-12	1/3 HP Motor		
3		1800-000-19	Gear Reducer		
4		1800-066-09	1.5Ohm 25 Watt Resistor		
5		1101-199-05	Heat Sink		
6		1101-199-06	Wire Cover		
7		2500-230-01	Pop Rivet		
8					
9					
10					
11	1	199-001-25	Product ID Label		
12					

BILL OF MATERIAL 101-403-08
UNIVERSAL GATE PANEL

ITM	QTY	PART NUMBER	DESCRIPTION		
1	1	101-403-12	Gate Panel & Back Plane		
2	1	800-100-15	35mm DIN Rail		
3	1	800-006-67	3 Position Terminal Block		
4	1	800-100-14	2 Gang Electrical Outlet		
5	1	800-100-02	2 Gang Outlet Box		
6	1	800-100-09	2 Gang Outlet Cover		
7	1	500-380-05	1/2" Gromet		
8	1	800-023-08	15A rail mount circuit breaker		

BILL OF MATERIAL 101-103-02

GATE CONTROLLER MODEL 1-349AAA

ITM*	QTY	PART NUMBER	DESCRIPTION		
SW1	1	800-105-12	on-off-on miniture toggle switch		
LED1	1	800-036-10	T1 3/4 green LED		
T1	1	800-080-23	12.6 V 6VA transformer		
FUSE	1	800-023-03	500mA resettable fuse		
BN1	1	800-042-07	bridge rectifier 1A 200PRV		
C1	1	800-045-37	470uF 35V radial capacitor		
C2	1	800-045-12	10uF 35V radial capacitor		
REG1	1	800-039-09	7805 5V pos. regulator		
R1	1	800-055-15	330Ohm 1/4W resistor		
J7	1	800-109-82	6 pos. right angle header		
RN3	1	800-067-07	10K bussed resistor network (10pin SIP)		
RN1	1	800-067-06	1K resistor network (16pin DIP, isolated)		
RN2	1	800-067-08	47K bussed resistor network (10pin SIP)		
C3,C4	2	800-045-38	.1uF 35V tantalum capacitor		
R2	1	800-055-25	4700Ohm 1/4W resistor		
U1,U2	2	800-029-29	18 pin DIP socket		
K3-5	3	800-028-40	5V DPDT PCB miniture relay		
K1,K2	2	800-028-39	5A 3-15VDC SSR		
J3	1	800-006-54	10 pos. rt angle 5mm header		
J2,4,5	3	800-006-53	8 pos. rt angle 5mm header		
J7	1	800-006-70	6 pos. SIP connector		
J1	1	800-006-63	3 pos. rt angle 5mm header		
X1	1	800-041-05	4MHz ceramic resonator		
U1	1	800-037-13	PIC16F84 uP		
U2	1	800-037-12	UNL2803 driver IC		
	1	101-403-02	PC board		

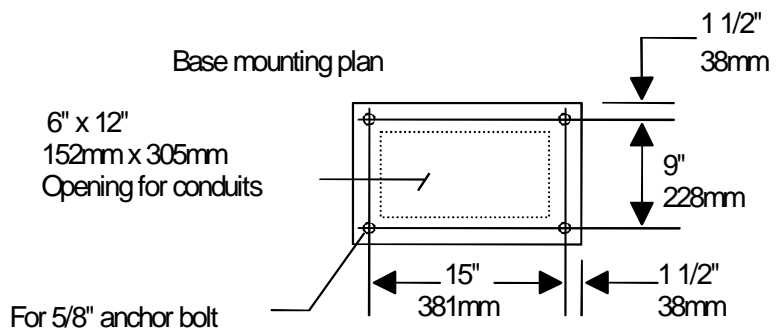
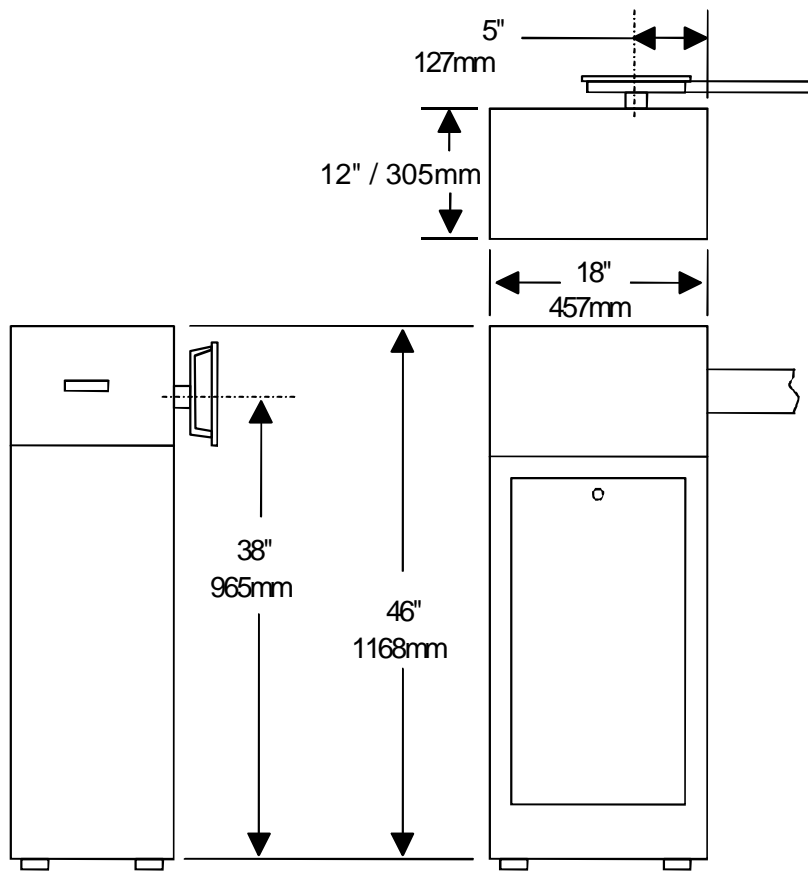
*ITM refers to labels on Gate Controller Board Layout.

BILL OF MATERIAL 101-105-00
FOLDING GATE ARM ASSEMBLY

ITM	QTY	PART NUMBER	DESCRIPTION		
1	1	101-009-07	Front Arm		
2	1	101-009-08	Rear Arm		
3	2	101-009-01	Main Plate		
4	2	101-009-02	Side Plate		
5	1	101-009-03	Support Bracket		
6	1	101-009-04	Support Bracket		
7	1	101-009-05	Back Plate		
8	1	101-009-06	Treaded Rod		
9	2	600-001-01	Rod End Bearing		
10	1	101-009-10	Bearing		
11	3	500-031-01	5/8 - 11 X 2 1/2 Hex Head Bolt		
12	4	500-027-02	1/2 - 13 X 2 1/2 Hex Head Bolt		
13	4	500-021-01	5/16 - 18 X 1 1/4 Hex Head Bolt		
14					
15	3	500-101-01	5/8 - 11 Hex Nut		
16	4	500-097-01	1/2 - 13 Hex Nut		
17	4	500-091-01	5/16 - 18 Hex Nut		
18	8	500-211-01	5/8 Flat Washer		
19	3	500-161-01	5/8 Split Lock Washer		
20	4	500-157-01	1/2 Split Lock Washer		
21	4	500-151-01	5/16 Split Lock Washer		

BILL OF MATERIAL 101-208-00
REBOUND LINKAGE ASSEMBLY

ITM	QTY	PART NUMBER	DESCRIPTION		
1	1	101-208-03	Rebound Piston Assembly		
2	1	101-208-07	Switch Mounting Plate		
3	1	101-208-08	Rod End Bearing w/set screw		
4	1	600-001-01	Rod End Bearing		
5	1	500-229-16	DIE Spring 1 1/4" D X 1 1/2" L MHD (red)		
6	1	800-005-78	Switch Actuator		
7	1	800-005-01	Micro-switch		
8					
9	1	500-019-22	Soc. Hd Shoulder Screw 1/4" X 1"		
10	2	500-013-20	#8-32 X 3/8" Flat Hd Screw		
11	1	500-016-19	#10-32 X 3/8" Soc. Set Screw		



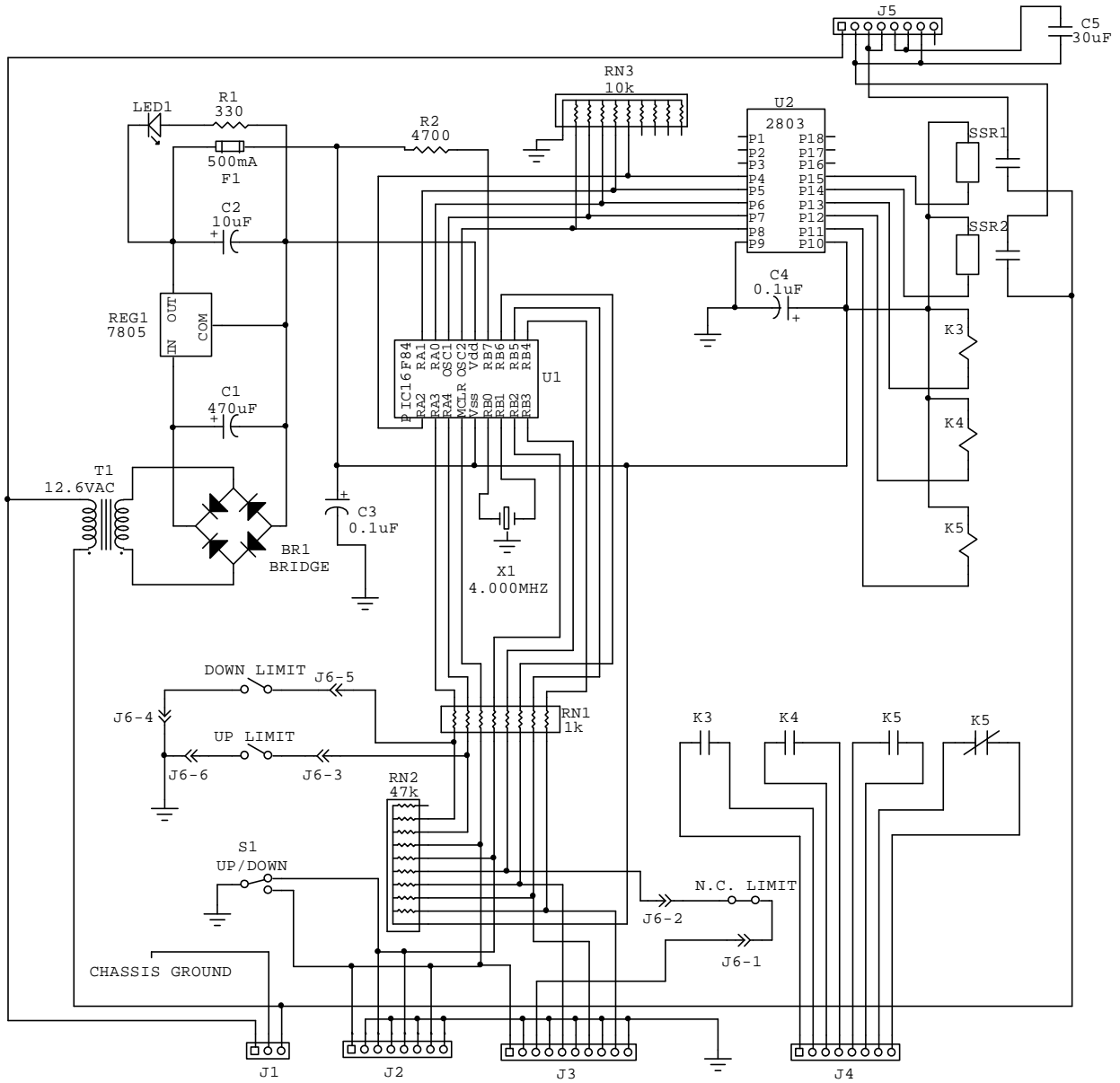
PPI reserves the right to make technical changes at any time without prior notice.

UNIVERSAL GATE MODEL 1-141

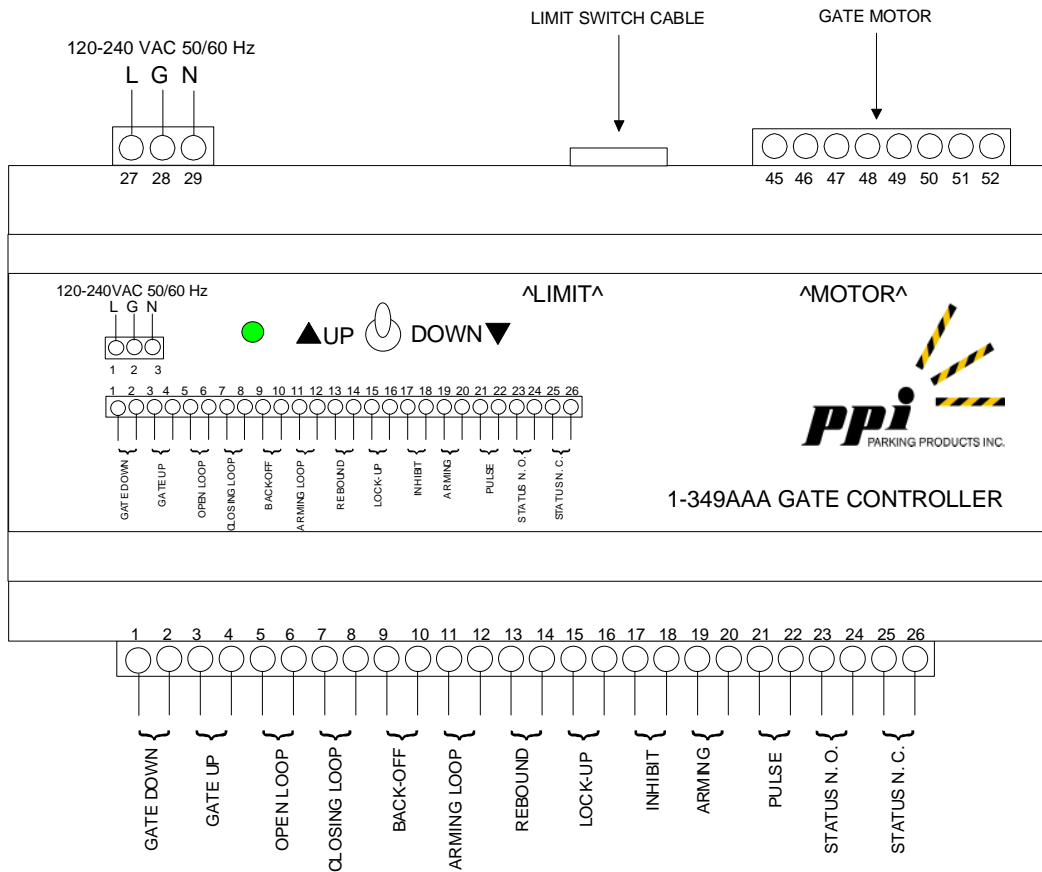
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SHEET 1 OF 1





SC-101-405-01 GATE CONTROLLER SCHEMATIC

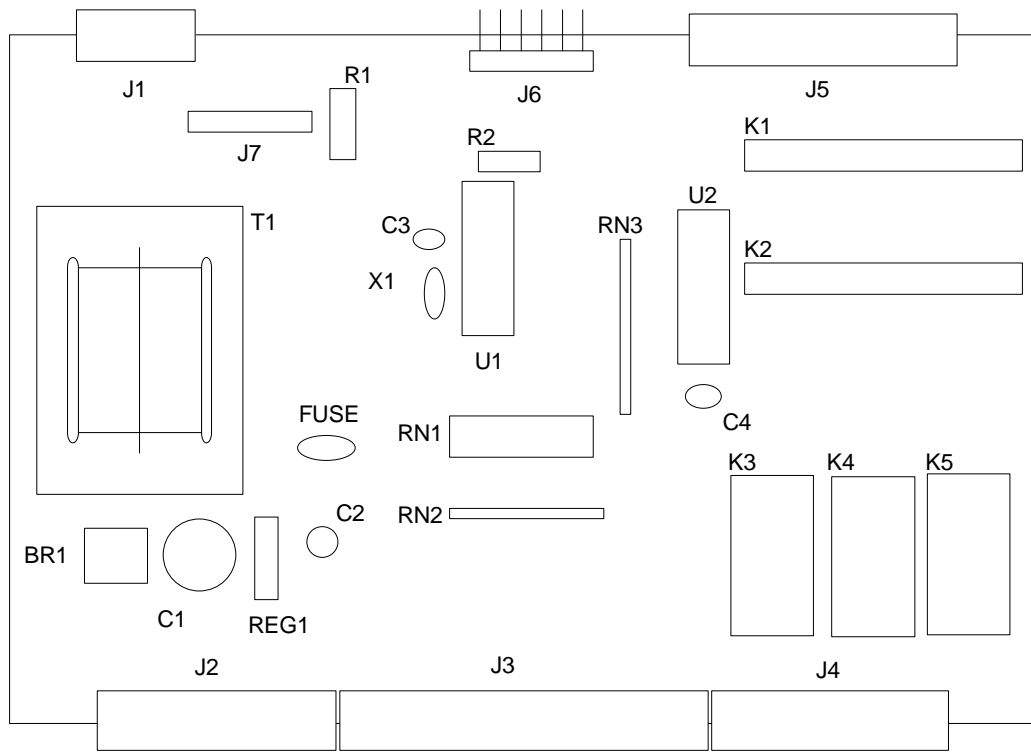


GATE CONTROLLER CONNECTION DIAGRAM

FC101-405-01

SHEET 1 OF 1



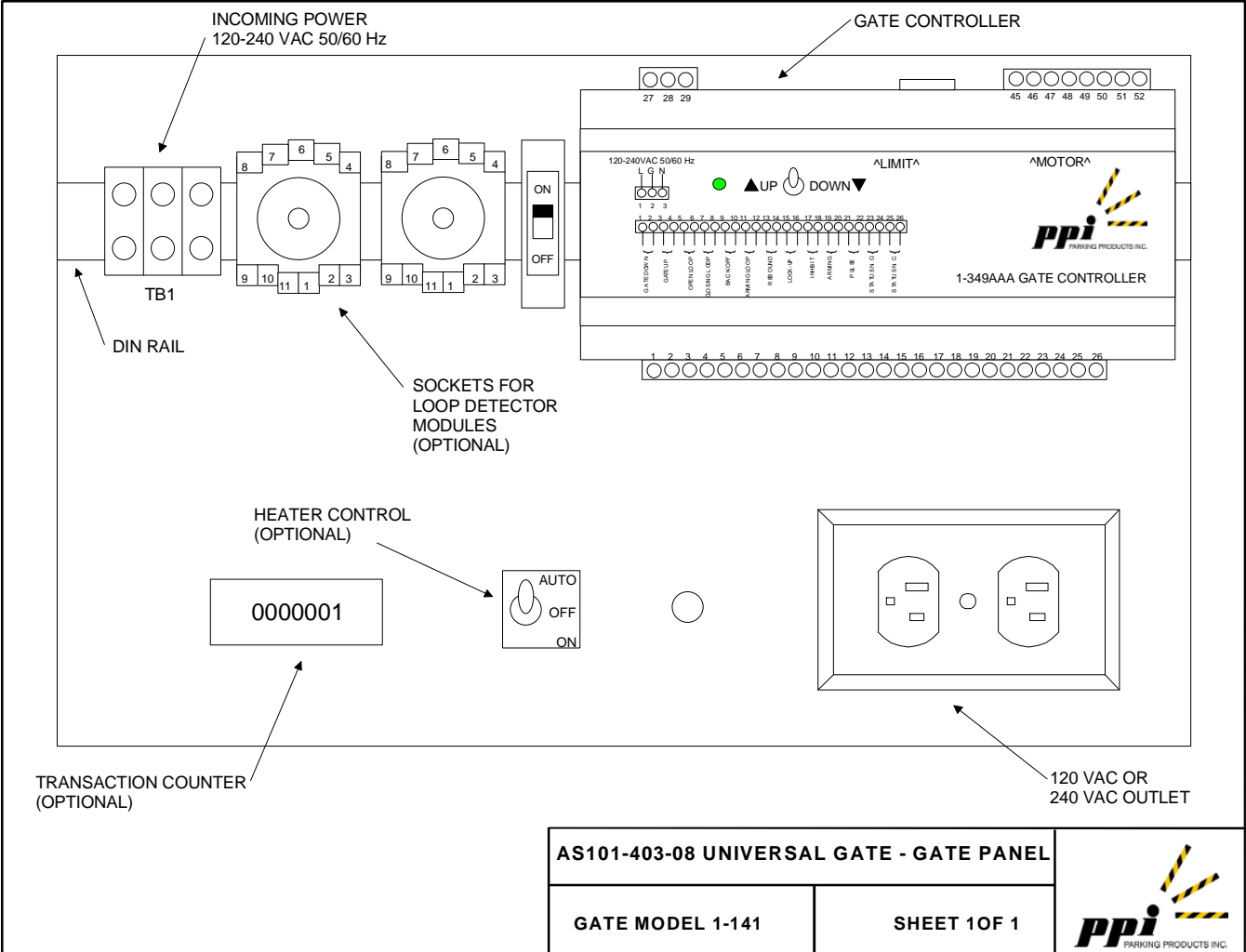


GATE CONTROLLER - BOARD LAYOUT

AS101-405-01

SHEET 1 OF 1





AS101-403-08 UNIVERSAL GATE - GATE PANEL

GATE MODEL 1-141	SHEET 1 OF 1
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