

## INSTRUCTION MANUAL

# AUTO REEL

## AUTOMATIC CORD REEL



**MODEL # : 091-220-20-120**

**INPUT: 120 Volts, 50/60 Hz, 20 Amps**

File: IM\_091-220-20-120.indd  
Rev:  
Revised By: JM  
Date: 1-8-2015

**2 YEAR WARRANTY**



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# INTRODUCTION

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The Model 091-220-20-120 Auto Reel is a manual extension, spring retract reel containing a 45 foot long, 3 wire cable. The unit is designed to be either ceiling or wall mounted to provide single phase, 120 volt / 20 ampere power to ambulances, fire trucks, service vehicles and other emergency vehicles. Usually but not necessarily, used with a vehicle mounted Auto Eject, the Auto Reel automatically retracts the shoreline to remove it from the floor and eliminate the tripping hazard. Automatic retraction occurs whenever the load current through the reel drops to zero either due to an automatic ejection of the shoreline by the Auto Eject, or by a manual disconnect initiated by the vehicle's operator.

## SYSTEM DESCRIPTION

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The Model 091-220-20-120 Auto Reel consists of 2 major components:

- 1. Auto Reel Cord Windup Assembly**
- 2. Auto Reel Control Assembly**

### **1. Auto Reel Cord Windup Assembly**

The Cord Windup Assembly is a commercially available spring retract cord reel modified with an electromechanical release. In normal operation, the operator manually pulls on the cord to extend it slightly longer than required. When released, the cord retracts slightly to a stop. To fully retract the cord, the operator pulls the cord further and then releases it to wind up the cord. This type of mechanism is simple, robust and widely used. Kussmaul Electronics Co. has added an electromechanical hold release to eliminate the requirement of pulling the cord to initiate the windup sequence.

### **2. Auto Reel Control Assembly**

The Control Assembly consists of the following electronic components to sense and operate the Auto Reel:

- a. Low voltage power supply for the logic functions.
- b. High voltage power supply to operate the rewind solenoid.
- c. Current detector to sense when the shoreline is disconnected from the vehicle.
- d. A microcontroller to control the solenoid voltage and timing.

## OPERATION

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The Auto Reel coils up the wire with torque supplied by a spring. This spring is housed in the reel and extended when the coiled power cord is manually extended and held in position by a “cam” and “locking pawl”. When the power cord is disconnected, the current in the cord decreases to zero. Electronics in the Auto Reel Control Box monitor this current. The sudden decrease of current energizes a solenoid which moves the locking pawl to permit the spring to retract the power cord. The cord retracts until it encounters a “stop” that limits the amount of cord wound on the reel.

When power is again required by the vehicle, the driver grasps the connector on the cord reel and pulls a length sufficient so that the connector can be plugged into the vehicle and the lock on the reel is engaged. The vehicle receives power and its battery charger and other loads are energized. When the vehicle is equipped with an Auto Eject, the driver need only to start the engine. Engine starting will automatically disconnect the shoreline, drop the current to zero causing the Auto Reel to retract the cord.

**NOTE:** There must be a minimum 0.050 ampere load on the vehicle in order for the Auto Reel to operate.

## WIRING

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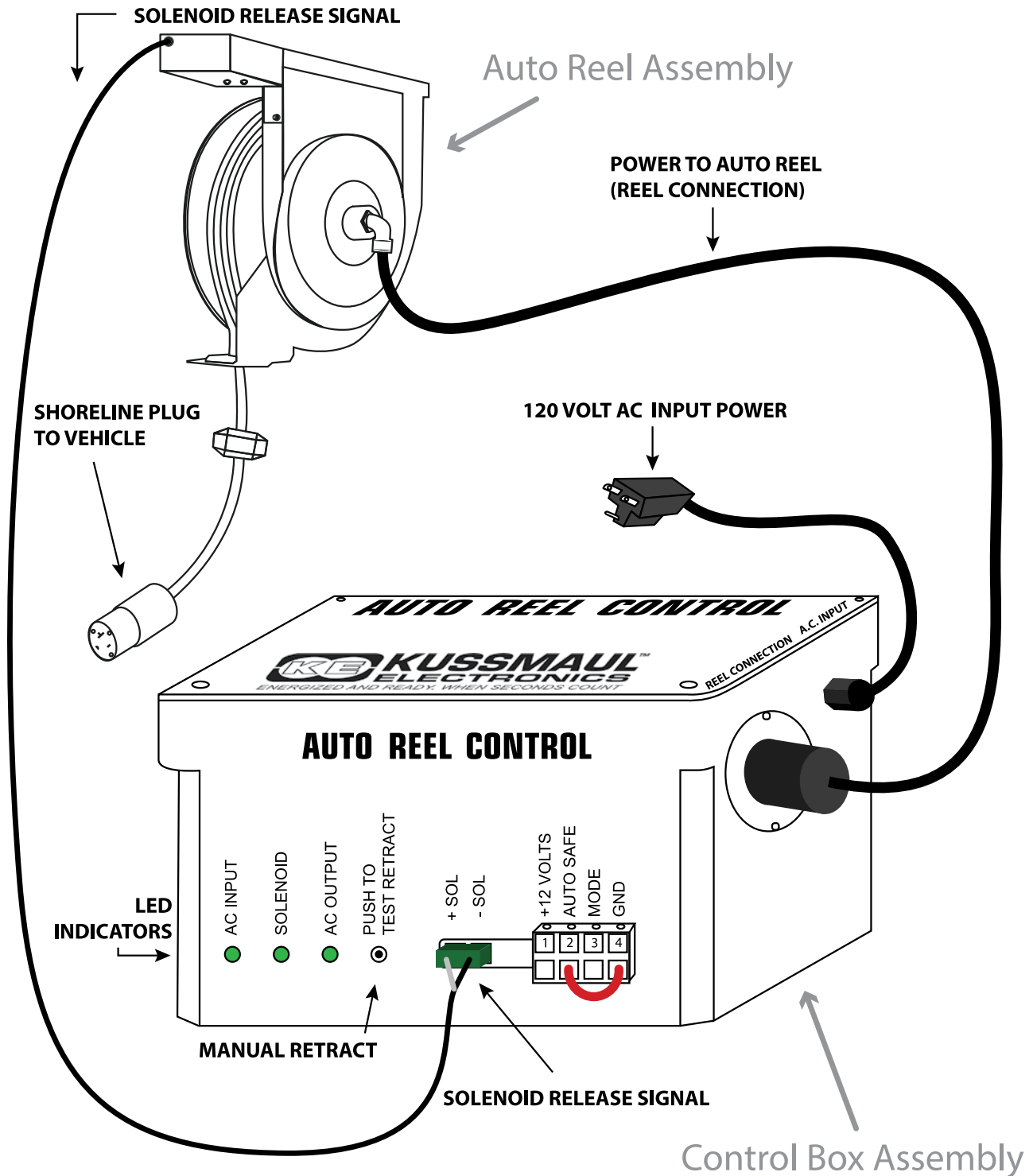
Mount the Auto Reel to a sturdy structure either by a ceiling mount or a wall mount. Be certain that when extended, the power line reaches the intended destination on the vehicle. The shoreline must be extended by manually pulling it slightly further than the required length so that sufficient length remains to reach the vehicle, without being pulled taut, when the spring mechanism retracts to the locked position.

Mount the Auto Reel Control Box in a convenient location close to the Reel, then:

1. Be certain that the LED indicators on the control box are visible.
2. Wire the control box input cable to provide 120 volts, 20 amperes from a dedicated 20 ampere circuit breaker. (Installation Wiring Diagram pg. 4)
3. Connect the Auto Reel Control Box power output connector to the 120 volt inlet of the Auto Reel.
4. Wire the solenoid release signal, from the Control Box to the Auto Reel.

This completes the wiring of the Control Box and Auto Reel Assemblies.

# INSTALLATION WIRING DIAGRAM



# TESTING

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## Preliminary Test

1. Perform a visual inspection checking that all mounting fasteners are securely tightened and that wiring is in accordance with the wiring diagram. (Installation Wiring Diagram pg. 4)
2. Measure the input voltage to be certain that the voltage is between 105 and 125 volts AC.
3. Turn on the 120 volt power to the system.
4. Check that the green indicator labeled AC POWER on the Control Box is illuminated.  
This completes the Preliminary Test.

## Manual Rewind Test

1. Extend the shoreline by pulling it from the Auto Reel an appropriate length.
2. Depress the TEST RETRACT button on the Control Box.  
This will energize the latch release solenoid in the reel and permit the spring to rewind the shoreline.
3. Repeat steps 1, 2 & 3 several times extending the shoreline at different lengths to ascertain that retraction is complete at any length.  
This completes the Manual Rewind Test.

## Automatic Rewind Test

1. Manually extend the shoreline and plug it into a vehicle. The vehicle must have a battery charger or some other loads that require power from the AC line.
2. To confirm that the current sensor functions, manually disconnect the shoreline from the vehicle and note that the AC power is interrupted, the latch release solenoid is momentarily energized, and after a brief interval, the cord is retracted.
3. Confirm this test by extending the shoreline, inserting it into the Auto Eject and starting the engine.
4. Observe that on engine start the shoreline is ejected and the cord is retracted  
This completes the Automatic Rewind Test.

**NOTE:** There must be a minimum 0.050 ampere load on the vehicle in order for the auto reel to operate

## SPECIFICATIONS

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### Auto Reel

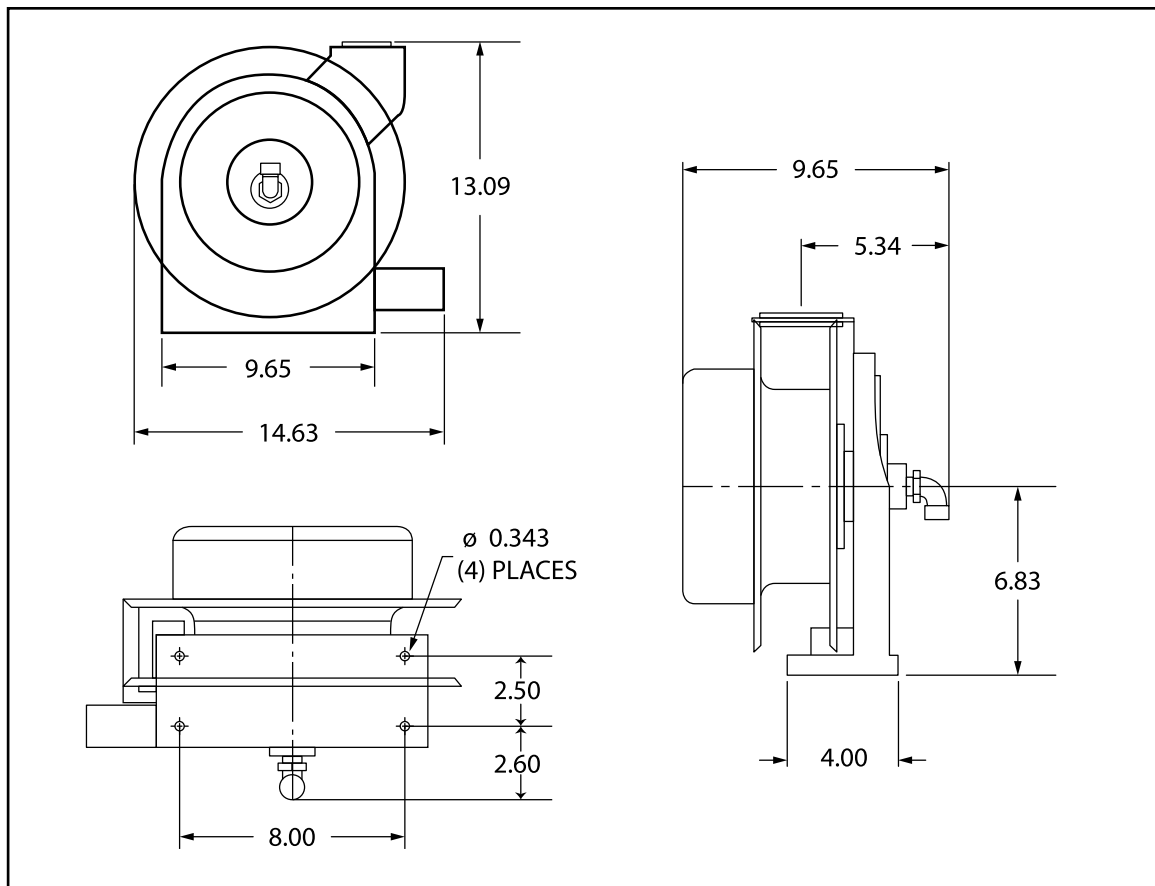
**Reel Cord Length:** 45 ft.  
**Max Reel Amps:** 20 Amperes  
**Min Reel Amps:** 0.050 Amperes  
**Volts:** 105-125 VAC  
**Cord:** #12 AWG  
**Cord Type:** SJO  
**Length:** 14 5/8 in.  
**Width:** 9 3/8 in.  
**Height:** 13 1/4 in.  
**Weight:** 30 lbs

### Auto Reel Control Box

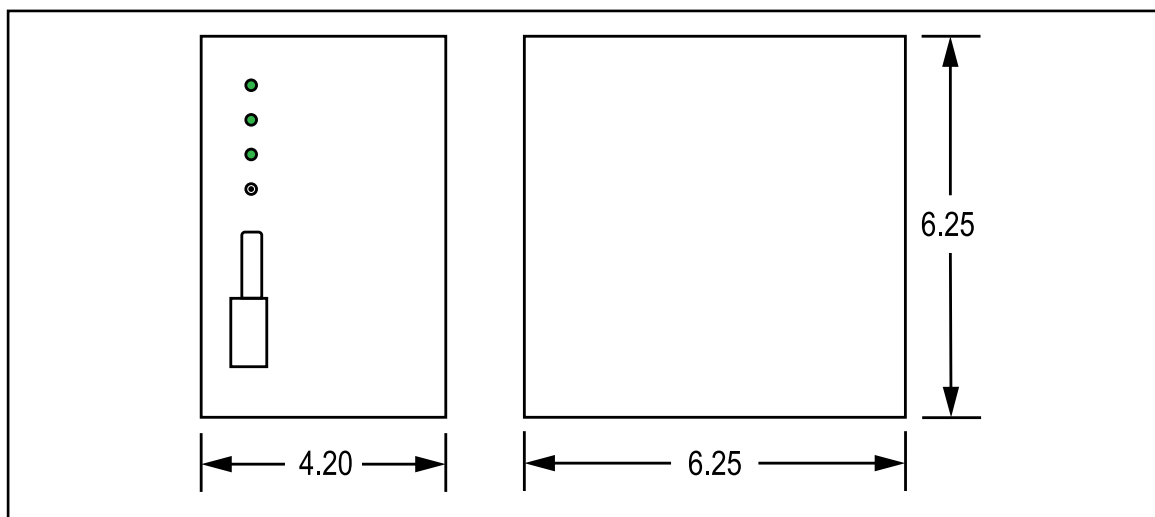
**Length:** 6 1/4 in.  
**Width:** 6 1/4 in.  
**Height:** 4 3/16 in.

# OUTLINE DRAWING

## Auto Reel



## Auto Reel Control Box



## OPTIONAL ACCESSORIES

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### I. AUTO SAFE, MODEL #: 091-220-025

- Cuts power to shoreline when the vehicle is unplugged or ejected
- Allows for selection between Automatic and Manual Cord Retract modes
- Safely removes power from the shoreline when the vehicle is unplugged or ejected. The interruption of AC power to the shoreline, once disconnected from the vehicle, prevents electric shock if the cord is severed or gets wet.



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### II. CONNECTOR PROTECTOR, MODEL #: 091-55-069

- Shock-resistant rubber jacket protects connector when dropped
- 1/8" wall thickness rubber jacket fits over cord connectors





## INSTALLATION RECORD

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DATE INSTALLED \_\_\_\_\_

INSTALLED BY \_\_\_\_\_

VEHICLE IDENTIFICATION \_\_\_\_\_

VEHICLE OWNER \_\_\_\_\_

## WARRANTY POLICY

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All products of Kussmaul Electronics are warranted to be free of defects of material or workmanship. Liability is limited to repairing or replacing at our factory, without charge, any material or defects which become apparent in normal use within 2 years from the date the equipment was shipped. Defective products should be returned to Kussmaul Electronics with shipping charges prepaid. Upon repair, products will be returned to customer with shipping charges paid.

Kussmaul Electronics shall have no liability for damages of any kind to associated equipment arising from the installation and/or use of the Kussmaul Electronics products. The purchaser, by the acceptance of the equipment, assumes all liability for any damages which may result from its installation, use or misuse, by the purchaser, his or its employees or others.



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