MillipaK™
SEVCON

SEVCON

STANDARD CONTROLLER FEATURES

- High Frequency – silent operation
- Torque/speed control
- Regenerative braking
- Integrated logic unit
- **Flash** memory
- RS232 and Calibrator interface
- Soft start pump option
- Diagnostic LED

High Power 4 Quadrant PM Applications

The MillipaK series of controllers offer the most compact designs in the PowerpaK range and use new patented power technology and PowerpaK switching principles. The MillipaK range offers a cost effective solution for low to high power applications such as pallet trucks, sweepers, scissor lifts, golf carts and other electric vehicles fitted with Permanent Magnet DC motors.

The most striking characteristic of the MillipaK range is its physical size. The ultra compact design provides an unrivalled power – dimension ratio which optimises the power /size / cost relationship.

The primary benefits of the MillipaK are as follows: -

- **Contactorless Direction Changing** – eliminating delays and the need for contactor maintenance.

- **Adjustable Regen Braking** – Regen braking on a conventional series motor typically requires additional electronic circuitry and a solenoid contactor.

- **Built-in Speed control** – the MillipaK can control the motor in either Torque or Closed Loop speed control modes, selectable using the diagnostic tools.

- **Diagnostic and set**-up tools – adjustments can be made using a handheld calibrator or via an RS232 connection to a computer running the Sevcon PCpaK diagnostic software.

MillipaK 4Q Electrical Specification

Voltage	Armature Current 1 Minute	Armature Current 1 Hour	Sevcon Part Number
24/48V	325A	130A	633T43801

Power Wiring Diagram
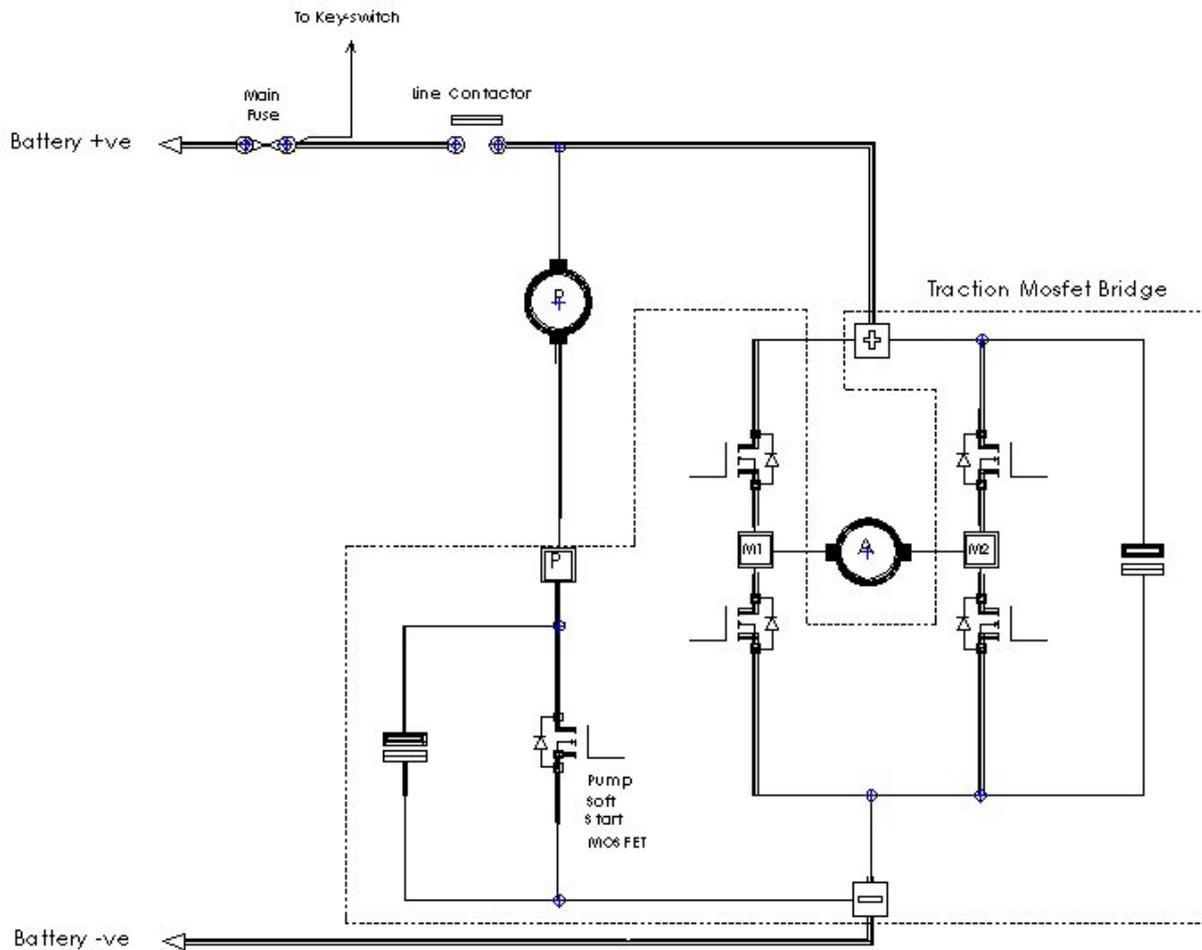
System I/O Configuration Tables

Table 1 shows the predetermined vehicle configurations, with tables 2 and 3 giving the switch functions:

Table 1   Vehicle Type Description

Digital I/O Value	Description
1	Walkie vehicle with Speed Cutback 1 switch, Pump Trigger switch and Electromagnetic Brake. Pump Trigger activates Pump Soft Start function.
2	Walkie vehicle with High Mast switch, Pump Trigger switch and Pump Contactor.
3	Walkie vehicle with High Mast switch, Pump Trigger switch and Electromagnetic Brake. Pump Trigger activates Pump Soft Start function.
4	Walkie vehicle with Speed Cutback 1 switch, Pump Trigger switch and Pump Contactor.
5	Walkie vehicle with Quick Pick switch, High Speed switch, Electromagnetic Brake and Hours Counter Drive.
6	Walkie vehicle with Pump Trigger switch, Brake Override switch, and Electromagnetic Brake.
7	Ride On vehicle with Speed Cutback 1 and 2 switches and external LED drive.
8	Ride On vehicle with Speed Cutback 1 switch, Handbrake switch and external LED drive.
9	Ride On vehicle with Handbrake switch, Power Steer Trigger switch and Power Steer Contactor.
10	Ride On vehicle with Speed Cutback 1 switch, Power Steer Trigger switch and Power Steer Contactor.
11	Ride On vehicle with Handbrake switch, Pump Trigger switch and Pump Contactor.
12	Ride On vehicle with Handbrake switch, Pump Trigger switch and Pump Contactor.
13	Ride On vehicle with Power Steer Trigger switch, Pump Trigger switch and Power Steer Contactor. Pump Trigger activates Pump Soft Start function.
14	Ride On vehicle with Traction Motor Overtemperature switch, Handbrake switch and external LED drive.
15	Ride On vehicle with Power Steer Trigger switch, Footbrake switch and Power Steer Contactor.
16	Ride On vehicle with Speed Cutback 1 and 2 switches and Reverse Alarm Buzzer drive.

Light Wiring Diagram
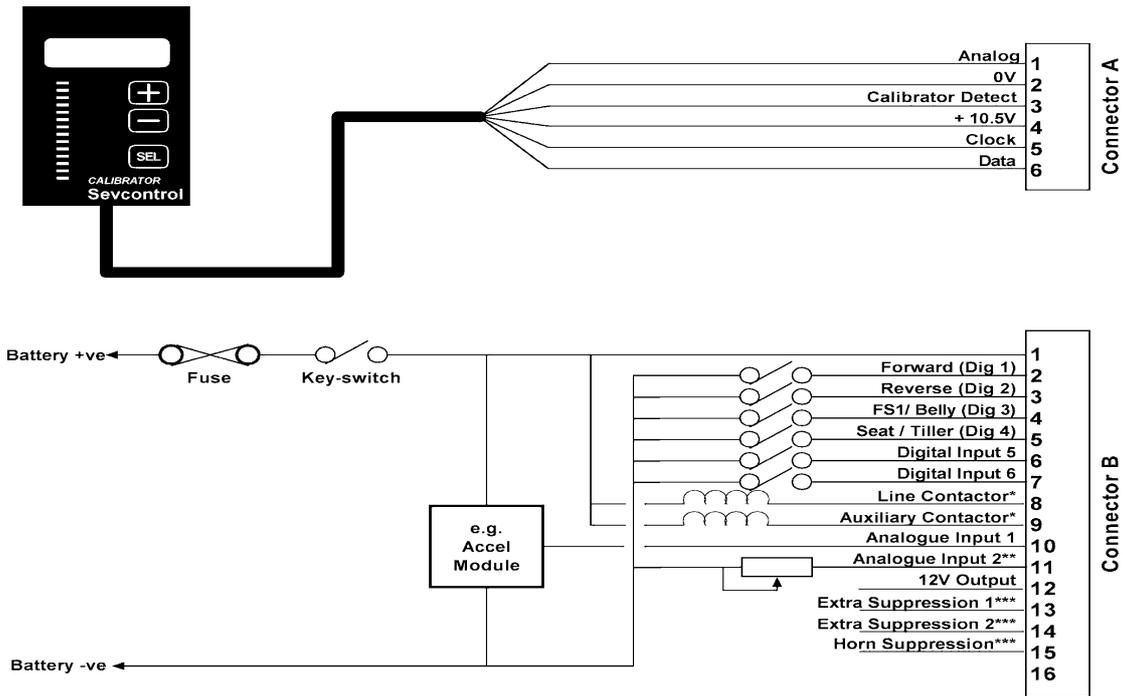
NOTES:
*Contactor Coil Suppression fitted internally.
**Analogue Input 2 can also be configured as a digital input.
***Extra Suppression and Horn Suppression inputs to be used as shown below:
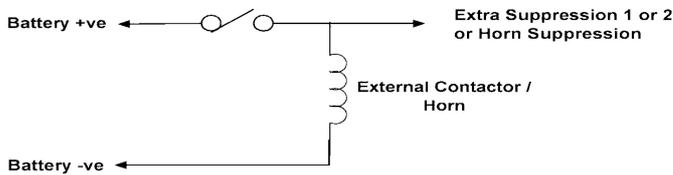
Table 2   Digital Functions (Switches and Contactor Drives)

Digital Function	Value of Digital I/O Configuration Item															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Forward	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2	B2
Reverse	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3
Belly	B4	B4	B4	B4	B4	B4										
Tiller	B5	B5	B5	B5	B5	B5										
FS1							B4	B4	B4	B4	B4	B4	B4	B4	B4	B4
Seat							B5	B5	B5	B5	B5	B5	B5	B5	B5	B5
Speed Cutback 1	B6	B6					B6	B6		B6		B6				B6
Speed Cutback 2							B7									B7
Handbrake								B7	B7		B7			B7		
P. Steer Trigger									B6	B7			B6		B7	
Pump Trigger	B7	B7	B7	B7		B7					B6	B7	B7			
High Mast			B6	B6												
Motor Over Temp													B6			
High Speed					B6											
Quick Pick					B7											
Brk Override Sw						B6										
Footbrake Sw															B6	
Line Contactor	B8	B8	B8	B8	B8	B8	B8	B8	B8	B8	B8	B8	B8	B8	B8	B8
P. Steer Contactor									B9	B9			B9		B9	
Pump Contactor		B9		B9							B9	B9				
Electro Brake	B9		B9			B9										
External LED							B9	B9						B9		
Bypass					B9											
Hours Counter																
Reverse Buzzer																B9

Table 3 Analogue Functions

Analogue Function	Value of Analogue Input Configuration Item			
	1	2	3	4
Accelerator	B10	B11	-	B10
Footbrake			-	B11

Notes:
1. Bx refers to Socket B pin numbers.
2. All vehicles have an Accelerator input.

Analogue Input 3 is reserved for future use.

MillipaK 4Q Outline Specification
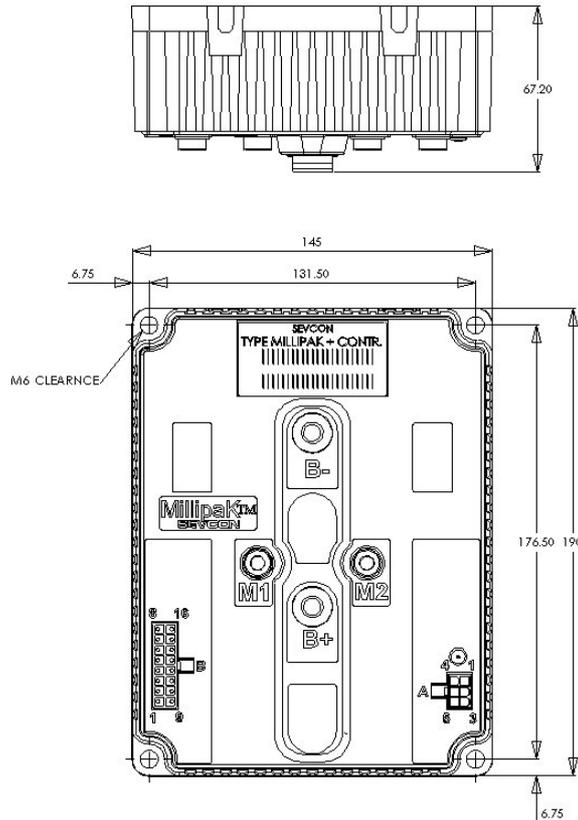
Enclosure protected to IP66
Vibration 6G, 40 – 200Hz, 1 hour in x, y, and z planes
Operating temperature – 30°C to +40°C
Storage temperature – 40°C to +70°C
Frequency 16KHz
Dimensions 190.35 (L) * 145.35 (W) * 67.2 (H) mm (325A models)

Systems and Accessories

Additional equipment for use with the MillipaK and MillipaK HP controllers:

Accessory	Part Number
Calibrator	662/14036
PCpaK	661/30090
Loose Equipment kit	661/27077