# MAKITA AUTOMATIC DRAPERY OPENER SYSTEM

## *Information Guide*


**Smarthome.com, Inc. (800) SMART-HOME (949) 221-9200 http://smarthome.com**

# Table of Contents

# Part 1: Overview

## *Motors*

The Makita Automatic Drapery Opener System offers two different types of motors; the ZZCM101 (Figure I) which is the "Parent" motor, and the ZZCM301 (Figure *2*) which is the "Kid" motor.

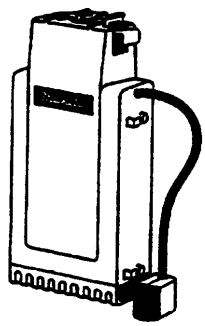


Figure 1

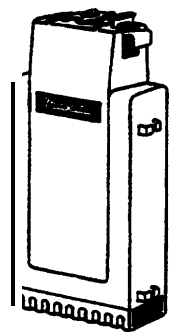


Figure 2

While the motors are identical in power and design, the "Parent" contains the circuitry that allows it to control the command reception and implementation of itself, as well as up to two "Kid" motors. In layman terms, this means that the "Kid" motor(s) will not operate unless connected to the "Parent" motor via the supplied modular wire. The "Parent" motor is the only motor that can receive commands (Open, *Close,* Stop signals). Once it receives these signals it can send them to the "Kid" motor(s) through the modular wire discussed above, allowing the "Kid" motor(s) to function. The "Kid" motor(s) is controlled separately and will work as if it is independent from the "Parent". This can mean a lower cost when multiple motors are used in one room since the "Kid(s)" is lower in cost than the "Parent".

As you can see, Makita provides only two types of motors: "Parent" and "Kid". This is an important statement since it helps to simplify the understanding of the system.

All of the "Parent" motors (ZZCM101) come from the factory addressed to respond to frequency 1. As such, they can receive and send frequencies 2 and 3 to attached "Kid" motor(s). The "Kid" motor(s) receive their command protocols via low voltage 4 conductor wire with male modular plugs which connect to the female modular port located at the bottom of the motors. The "Parent" motor has three ports: 'Timer", "2" and "3". When a 'Kid" motor is attached to the #2 port on the "Parent" motor, it will respond to frequency 2. When attached to #3 it will respond to frequency 3.

While the "Parent" motors come set to address 1 they can be altered to addresses 2-8. "Kids" only know to follow the address of the 'Parent? For example, if the "Parent" is attered to be address #3 the "Kid(s)" would respond to address #4 and #5 respectively. As such, the maximum number of motors that can be controlled per zone is 10; ("Parent" set to #8 with the 'Kid(s)" being #9 and #10). This is the key for understanding the theory of address changes for independent control of multiple units in one room or zone.

The ZZCM101 is controlled by a serial data stream sent via remote control, timer, wall switch or contact closure interface. The binary codes that make up the data streams for the various commands can be seen in (Figure *19*).

*Facts*

- Motor plugs directly into standard 11 OV outlet (no electrician necessary) and clips direct to rod
- 3 year warranty
- UL listed, per ANSI 325-l 985. NEC;NFPA70
- Reliable: In testing over 30,000 openings and closings were achieved; the equivalent of over 40 years of service at twice a day operations
- Timer allows up to 4 opening an closing cycles daily, providing security, energy savings and furniture protection
- Remote control operates up to 33 feet away
- Motor contains thermal overload protector to prevent overheating
- System contains a clutch allowing most draperies to be opened and closed manually
- Track speed is 50 feet per minute
- Infrared signal penetrates most draperies
- Can handle up to a 40 foot window using double motor single track configuration
- System accommodates one way (left or right), center, multiple and reverse operations.
- Each Motor is rated at 60 Lb. of drapery over a 20' span. By using two motors on a single track (one at each end) the ratings are doubled.
- Designed for pinch pleat drapery

- Installs as easily same as a manual traverse rod
- Same quality and reliability you have come to expect from Makita

## Part 2: Methods of Control

The Makita motors can be controlled by the Makiia infrared remote, timer, wall switch or contact closure interface. It can also be controlled by emulating the serial data (figure 19) and sending it over a direct connection.

### *Infrared Remote Control*

There are four models of remote controls. The first number after the "RC" (remote control) denotes the number of motors it controls. Example ZZRC30 = 3. While the motors will accept and respond to all ten frequency signals, the remote control is limited to sending only 1 - 6. As such, the maximum number of motors that can be controlled independently using the remote is six per room.

Figure 3

Figure 4

Figure 5

Figure 6

*The infrared commands that are sent from the **remote** are **10** bit **serial** data streams with no leader codes. The absence of a leader code is somewhat unique to **Makita.** The binary codes that make up the data streams can be seen in* (Figure **19***).*

### *Wall* ***Switch***

The wall switch works on the same principle as the remote control in that it sends the serial data, but is limited to addresses/frequencies 1 - *3. The* wall switch works a maximum of three motors per switch. It is low voltage (5v) and comes with *25'* of wire that connects to the "Parent" motor through the timer port. It can be recess mounted or surface mounted using the supplied sub base. The numbering system is the same as remote controls. Example ZZWS20 = 2.

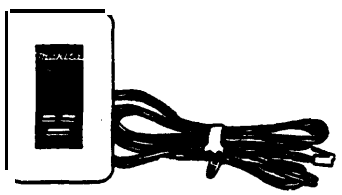


Figure 7

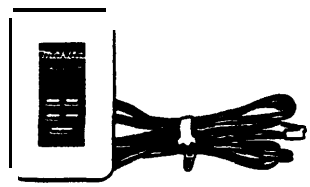


Figure 8

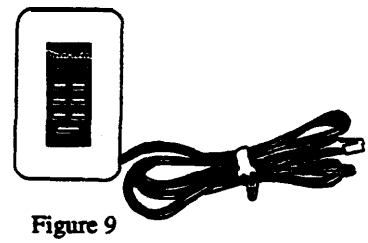


Figure 9

### *Timer*

The timer can be set to open and close the draperies up to four times a day. The timer sends all frequencies (I-I 0) in sequence, thus controlling any motor(s) (regardless of address) it is attached to. It too, is low voltage and plugs directly into the motor via low voltage modular phone type wire. It provides security, energy savings, furniture protection and controlled plant sunning.

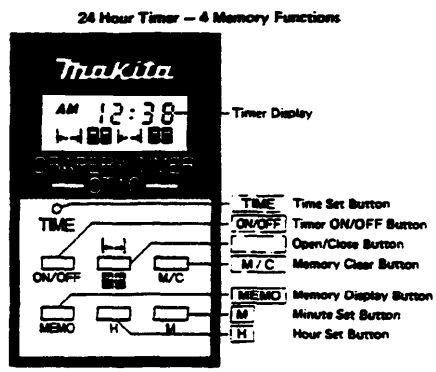



Figure 10

### *Contact Closure* ***Interface***

The Contact Closure Interface (CCI) allows operation of the motors through dry contacts. It takes simple contact closure and converts it to the serial data the motor requires for activation. It can handle momentary or maintained inputs (switch types). It also has home theater masking and multiple preset stop point capabilities. Inputs use 16AWG or smaller wire. Output is a direct connection to the motor using 26AWG phone type wire with RJ9 modular plugs that insert into the "Timer" port of the "Parent". Any or all of the four female modular ports of the CCI can be used. It is not designed to

be used with the "Kid" motor (ZZCM301). Direct connection to the 'Kid" can damage the CCI.

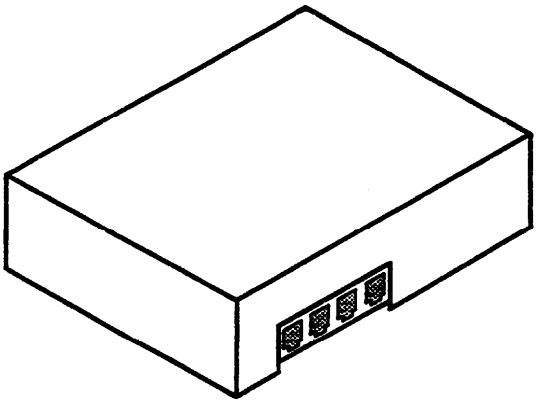


Figure 11

The CCI has the capability to send all ten frequencies to the motor. It also has an *all* feature that sends all frequencies for simultaneous operation of all motors connected to it.

With this interface, virtually any control system can be integrated with the Makiia motors. It will allow the user to work their Makiia Drapery System with any number of companies that incorporate programmable serial data stream or dry contact relay.

For more in-depth information refer to the CCI instruction manual packed With each unit.

The CCI is designed to work in four different switch modes: Momentary, Maintained, Theater and Multiple Presets. Momentary and Maintained refer to switch types; the Theater mode allows for aspect ratio masking and the Multiple Preset mode allows for specific preset stop points for the drapery on the track. The various modes are set using the "mode dip switches".

## Part 3: Address Changes

All of the CM101's come from the factory set to address 1 and will respond to the open, close and stop commands for frequencies 1. They will also accept and pass on the commands for frequencies 2 and 3 to attached 'Kid(s)"

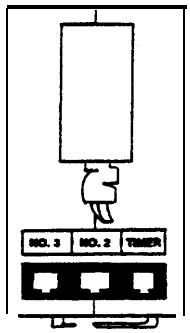



Figure 12

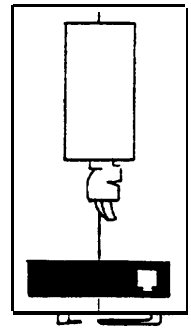


Figure 13

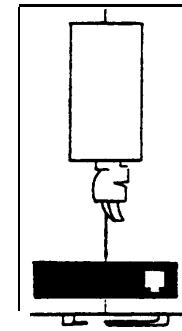


Figure 14

"Parent" motors can be altered to accept commands for up to 10 different frequencies. The highest address a "Parent" can be set to is #8, with attached "Kids" being addresses #9 and #1 0 respectively. Since the parents come from the factory set at the #1 address, you would only alter them when addresses #2 - #10 are needed. In order to have independent control of multiple motors in one room, it would be necessary to set different addresses for each.

An unlimited number of motors can be controlled by hardwiring to our Contact Closure Interface or Wall Switch. One CCI will control up to 10 motors per control station. By using muttiple CCI's and muttiple control stations there are no limitations to the number of motors that can be independently controlled. The same is true for our wall switch with one exception; each wall switch (ZZWS30) will independently control up to three motors. By using multiple wall switches, again there is no limitation. In the case of our IR remote you are limited to 6 different addresses per room, although the addresses can be duplicated in other rooms since IR does not penetrate walls.

To gain a full understanding let's use an example. Suppose a customer wants a drape and sheer to be motorized on two separate windows in the same room. He/she would like to have independent control of each drapery rod. This means we would have four motorized draperies, two per window (Figure *15*).

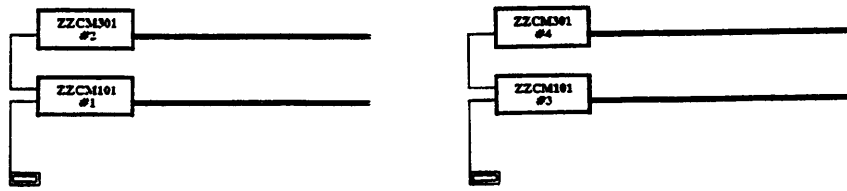



Figure 15

Leaving the motors unchanged from the factory, both 'Parent" motors would respond to the #1 command and both kids would respond to the #2 command. To achieve independent control of all motors it becomes necessary to change one of the "Parent" motors to address #3. Why #3? Since the first "Parent" motor responds to frequency #1 and its "Kid" to frequency #2, the next available address is #3. By changing one "Parent" to address #3, the "Kid" attached to it will automatically be a #4 address. We now have independent control of all Motors in the room. For this application, a ZZRC60 remote control would be required to operate all motors.

### *How to **Change** Addresses*

To alter an address (frequency) on the "Parent" motor (ZZCM101), a connection(s) on the Central Processing Unit must be cut (Figure *17*). The picture shows a CPU and an expanded view of the connection(s) that must be cut to change the address. Remember, only the "Parent" motor needs to have it's address changed. Regardless of the address the "Parent" motor is set to, the "Kid" motor(s) respond to the next higher address(es).

Steps:

1. Lay motor on it's side on a flat surface and remove bottom slide on cover. Open motor by removing all screws and lifting encasement completely off.

   *Hint: As you remove the top half of the housing, hold the spring loaded locking device at the top of the motor in place. This will prevent having to reinstall and pre-load the spring.*

2. Locate Central Processing Board. (Figure *16*)

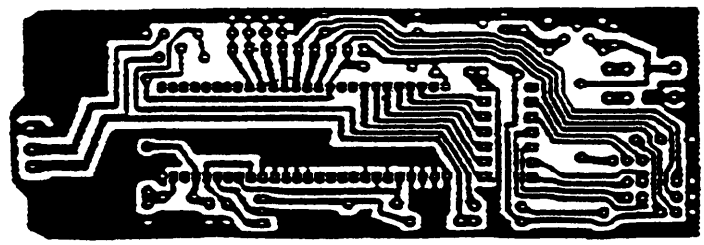


Figure 16

3. Carefully lift board (as far as wires will allow) to give room to work more freely.

4. Locate connections that need to be cut. (Figure 17)

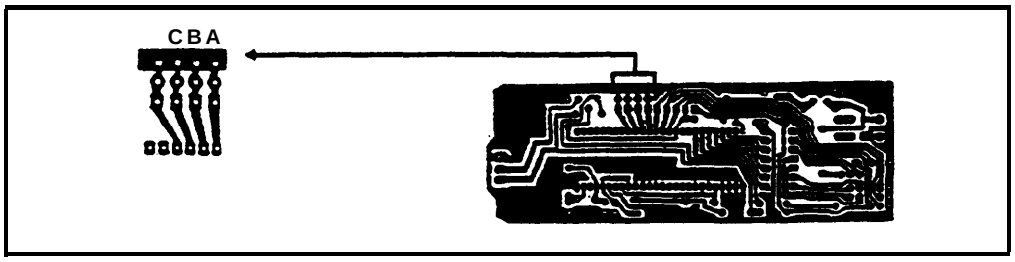



Figure 17

5. Using chart below, find connection(s) to be cut in order to obtain desired address.

ADDRESS →
CONNECTIONS →

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| A | O | X | O | X | O | X | O | X |
| B | O | O | X | X | O | O | X | X |
| C | O | O | O | O | X | X | X | X |

0 = Leave Connection Intact
X = Cut Connection

6. Using a razor blade or Exacto knife, cut the connection(s) between the terminals for the address you have chose (Figure 18). Multiple passes should be made to ensure the connection is broken. Be careful not to slip and cut other connections.

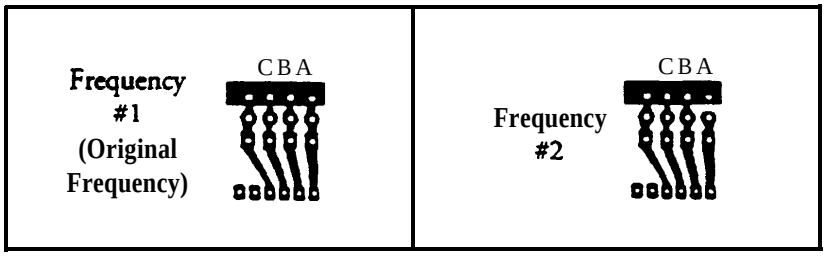



Figure 18

7. Reposition processing board in lower half of case and replace cover. Make sure all wires are clear of encasement and the female modular ports are fitted into their key way to ensure a clean fit.

8. Screw cases back together. Be careful not to over-tighten since the screws are self-tapping and can strip.

9. Test change using remote control

*Binary Codes*

*The* ZZCM101 **"Parent" motor is controlled by signal sent in 10 bit serial data streams with no leader codes. The data configurations can be seen in binary code format below.**

**First Pulse Time = 248uS**
**Length = 21 mS**
**Carrier = 40 KHz**

**Repeat Count = Continuous**
**"0" = 1 milliseconds**
**"1" = 2 milliseconds**

**Note: Stop is always the same regardless of Open or Close**

**Data stream configurations for 10 frequencies (open/close/stop)**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Stop** | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| **Open 1** | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 |
| Close 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| **Open 2** | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| **Close 2** | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| **Open 3** | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| **Close 3** | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| **Open 4** | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| **Close 4** | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |
| **Open 5** | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| **Close 5** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| **Open 6** | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| **Close 6** | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |
| **Open 7** | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| **Close 7** | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| **Open 8** | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 |
| **Close 8** | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |
| **Open 9** | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 |
| **Close 9** | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 |
| **Open 10** | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 0 |
| **Close 10** | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |

**Figure 19**

## Part 4: Accessories

All accessories discussed in this section plug into the 'Timer" port of the "Parent" motor. When using more than one accessory, the 'Splitter" (22654001-A) must be used. While the port is labeled Timer" a more accurate description is "Input".

### *Extended IR Receiving Eye*

In cases where the IR receiving attached to the "Parent" motor is hidden behind a wall, cornice box, or valance that impedes the signal from reaching it, there are two extended eyes: 5' lead (Model 22631101-A) and 10' lead (Model 22631102-A) that plug into the Timer" port of the "Parent" motor and can placed anywhere in the room using the supplied Velcro.

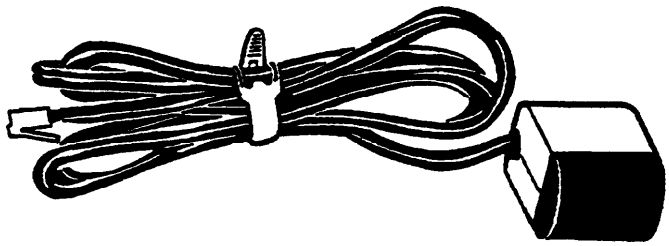


Figure 20

### *Splitter*

*The* "Splitter" (Model 22654001-A) is needed when using more than one of the following control devices or accessories.

1. Makita Wall Switch
2. Timer
3. Contact Closure Interface
4. Extended IR Receiving Eye
5. Multiple motors on the same frequency for simultaneous operation.

### *Modular Connecting Wires*

Makita offers four different modular connecting wires:

Model ZZ22CW: 22' length, four wire flat phone type, 26AWG (7 X 34) stranded bare copper conductor with RJ9 modular plugs on each end and all four wires connected. *(Figure 21)*

Model ZZ22CW-2: 22' length, four wire flat phone type, 26AWG (7 X 34) stranded bare copper conductor with RJ9 modular plugs on each end and only two of the four wires connected. *(Figure 22)*

**Model ZZ42CW:** 42' length, four wire flat phone type, 26AWG (7 X 34) stranded bare copper conductor with RJ9 modular plugs on each end and all four wires connected. (Figure *21)*

**Model ZZ42CW-2:** 42' length, four wire flat phone type, 26AWG (7 X 34) stranded bare copper conductor with RJ9 modular plugs on each end and only two of the four wires connected. *(Figure 22')*

Other than the length, the wires look identical. The difference lies in the number of the conductors (wires) that are connected in the RJ9 modular plugs on each end of the wires. The models with (-2) at the end of the model number denotes only two of the conductors (wires) are connected in the plug.

The (-2) models are used when two "Parent" motors are connected for the purpose of simuttaneous operation. In this application the +5V wire and the IR disable are not needed *(Figure 22*). If left connected it may cause damage to the motors.

The models without the (-2) are used for connecting "Parent" motors to "Kid" motors and connections to the CCI *(Figure 21)*

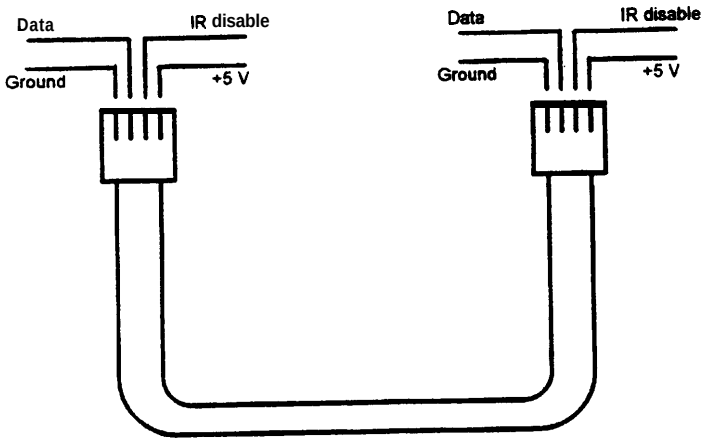



Figure 21

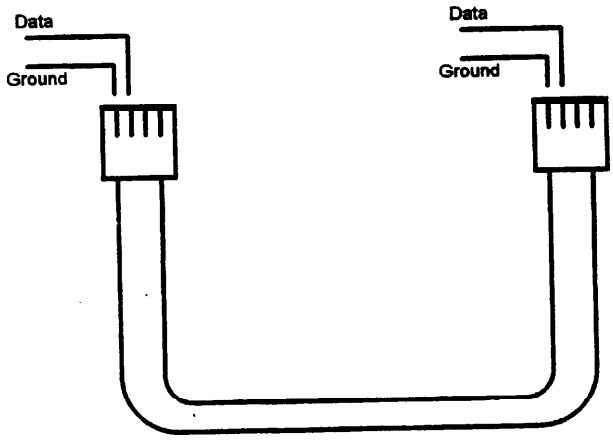
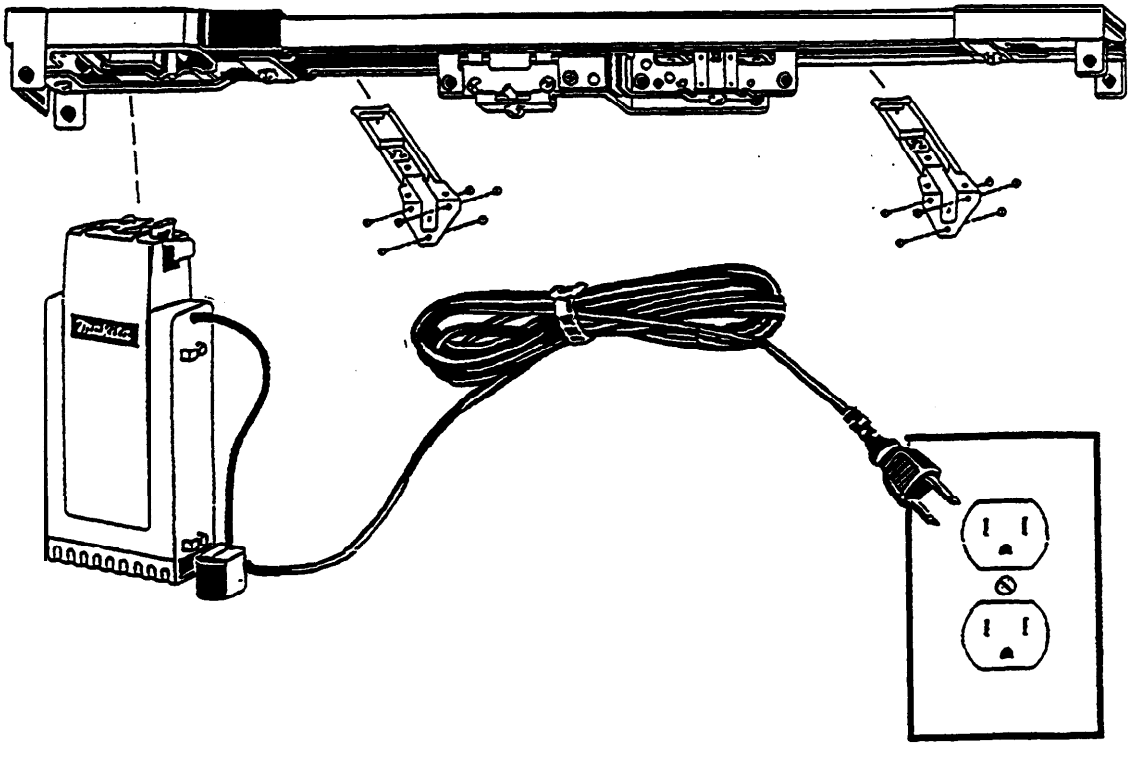



Figure 22

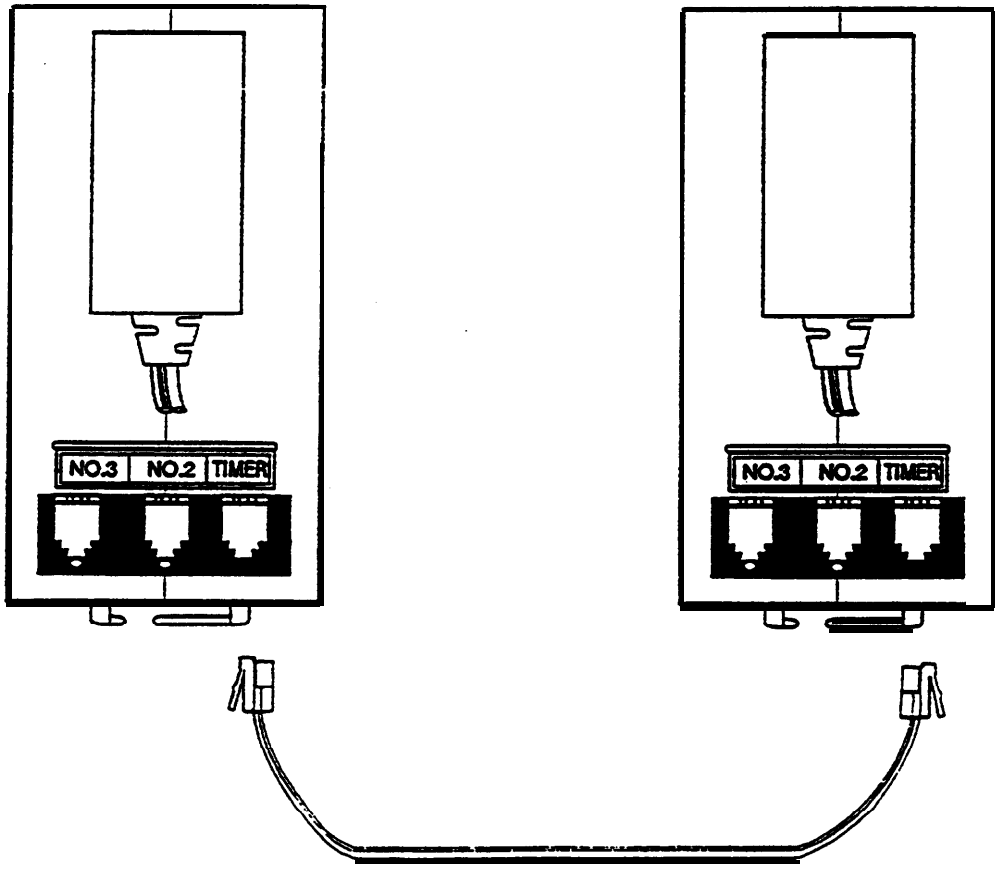
## Part 5: Wiring and Application Diagrams and Product Spec Sheets

# Assembly Diagram



110V
wall Receptacle

# Simultaneous 2 Motor Operafion Connection

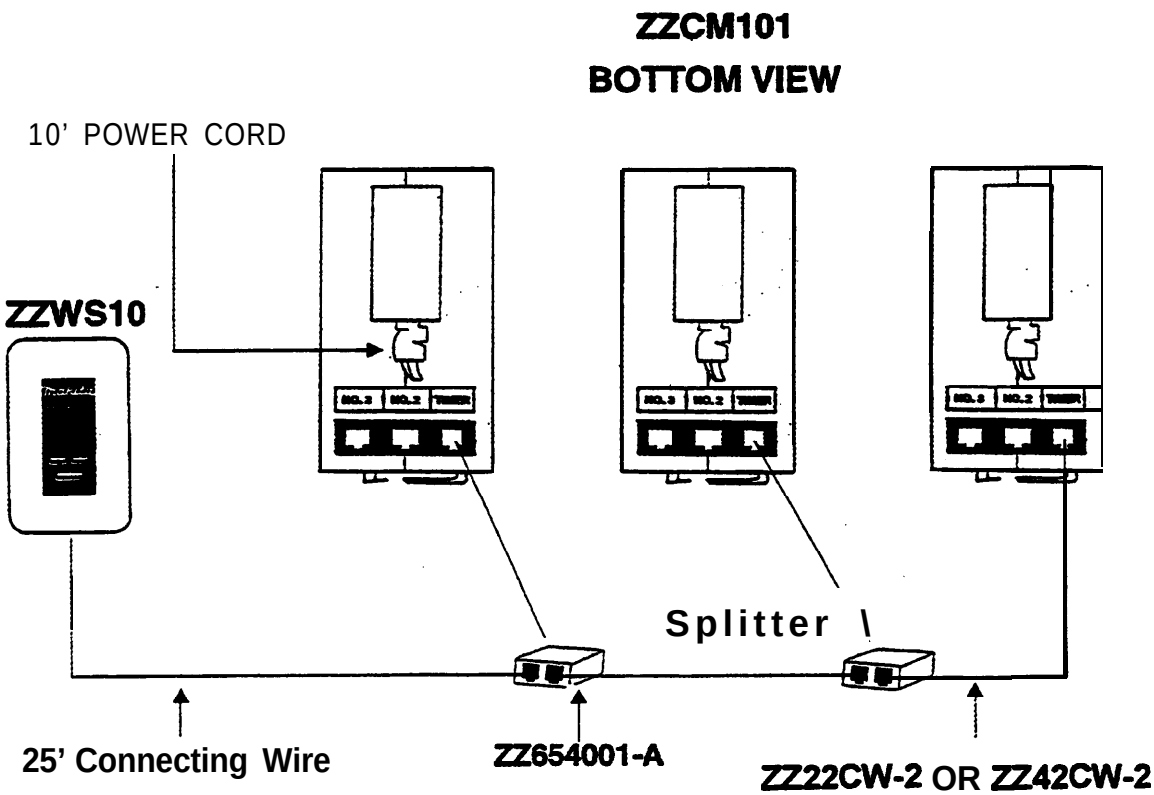



Simultaneous operation of two "Parent" motors can be achieved by connecting them from "Timer" port to "Timer" port using connecting wire ZZ22CW-2 or ZZ42CW-2. Both of these connecting wires have only two of the four wires connected; data and ground. Both motors work simultaneously regardless of which IR receiving eye the remote is pointed toward.

# Application Sheet

## *"Daisy-Chain " - Multiple motors operating simultaneously*

**As shown: Three motors linked together operated by one wall switch.**
**Up to ten (10) motors can be wired in sequence**



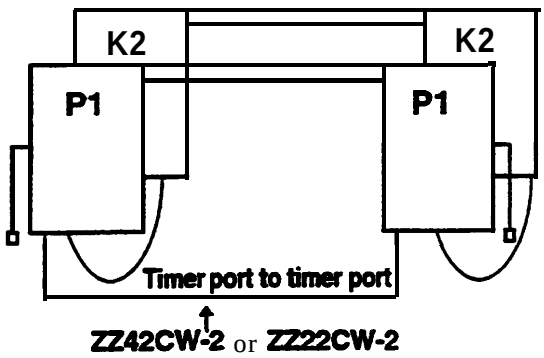

***Necessary Components:*** **(1) ZZWS1 0, (2) 22654001-A (Splitter), (3) ZZCM1 01, (2) ZZ22CW-2 or ZZ42CW-2**

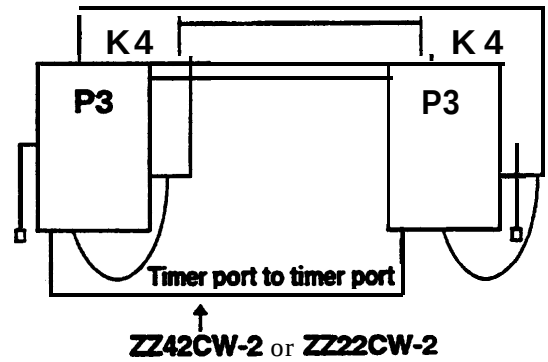
***Recommended Components: 22782001*** **-A Modular Crimping Tool w/ (10) Male Moduiar Plugs for customizing 22' & 42' connecting wire lengths**

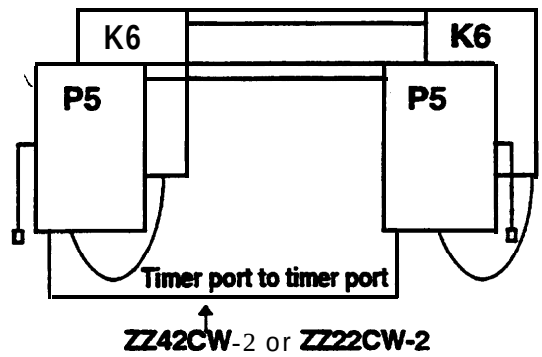
# Application Sheet

## *Maximum Doubles using RC60*

**with simultaneous over-drapery independent from simultaneous under-drapery**



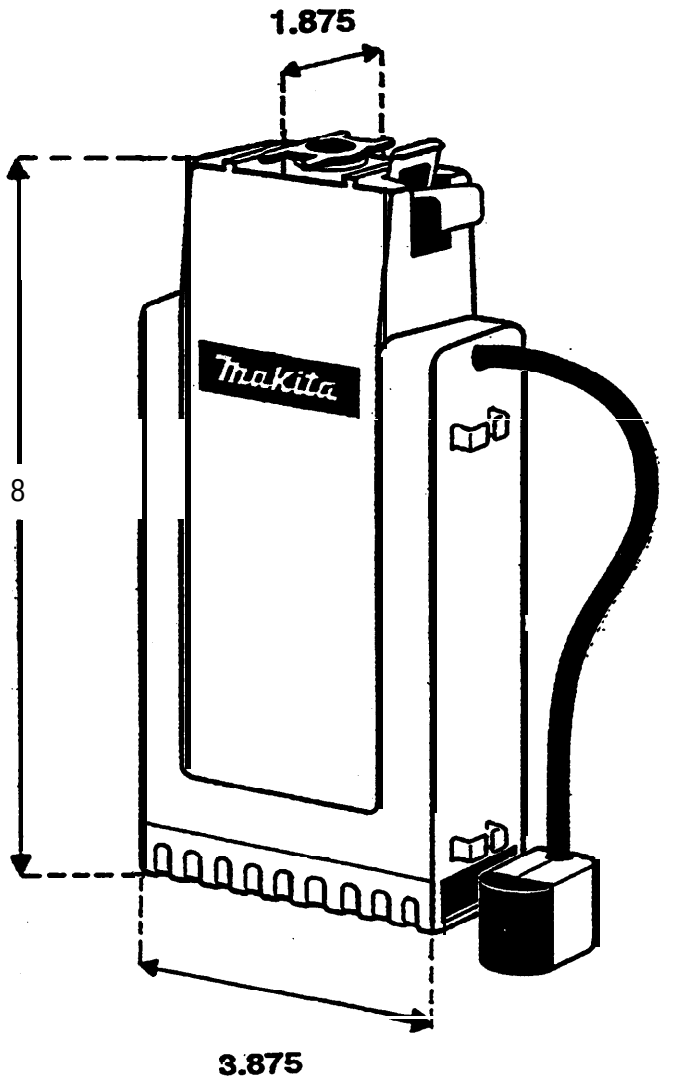

*Necessary Components:* *(8)* ZZCM101, Change of address needed on 4 motors; twc @ #3 and two @ #5, (8) ZZCM301 and (4) ZZ42CW-2 or ZZ22CW-2

*Recommended Components:* *22782001-A* Modular Crimping Tool w/ (10) Male Modular Plugs for customizing 22' & 42' connecting wire lengths

*Optional Components:* Splitter - allows use of wail switches or timers

# Motor Specifications

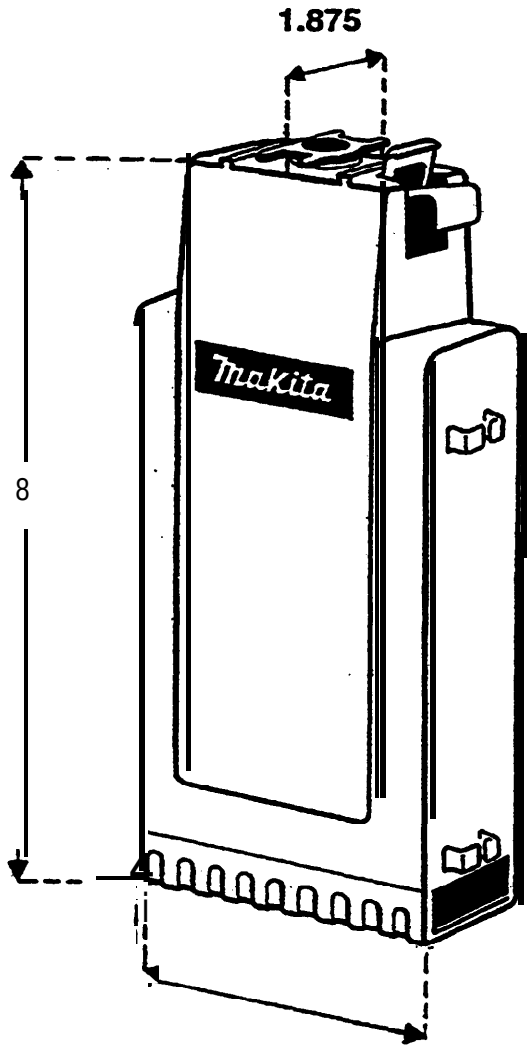
**Model ZZCM101**




| | | | |
|---|---|---|---|
| (H)x(W)x(D) | 8" x 3-7/8" x 1-7/8" | Remote Range | 35 FT. |
| Weight | 2.3 LBS. | Max. Drape Weight | 60 LBS. |
| Voltage | 120 VAC | Power Cord Length | 10 FT. |
| Amperage | .31 Amp. | Power Cord Type | SPT-2 18/2 AWG |
| Cycle | 60 HZ | Voltage Surge Suppressor | Yes |
| U.L. Listed | Yes | Thermal Overload Protector | Yes |

# Motor Specifications

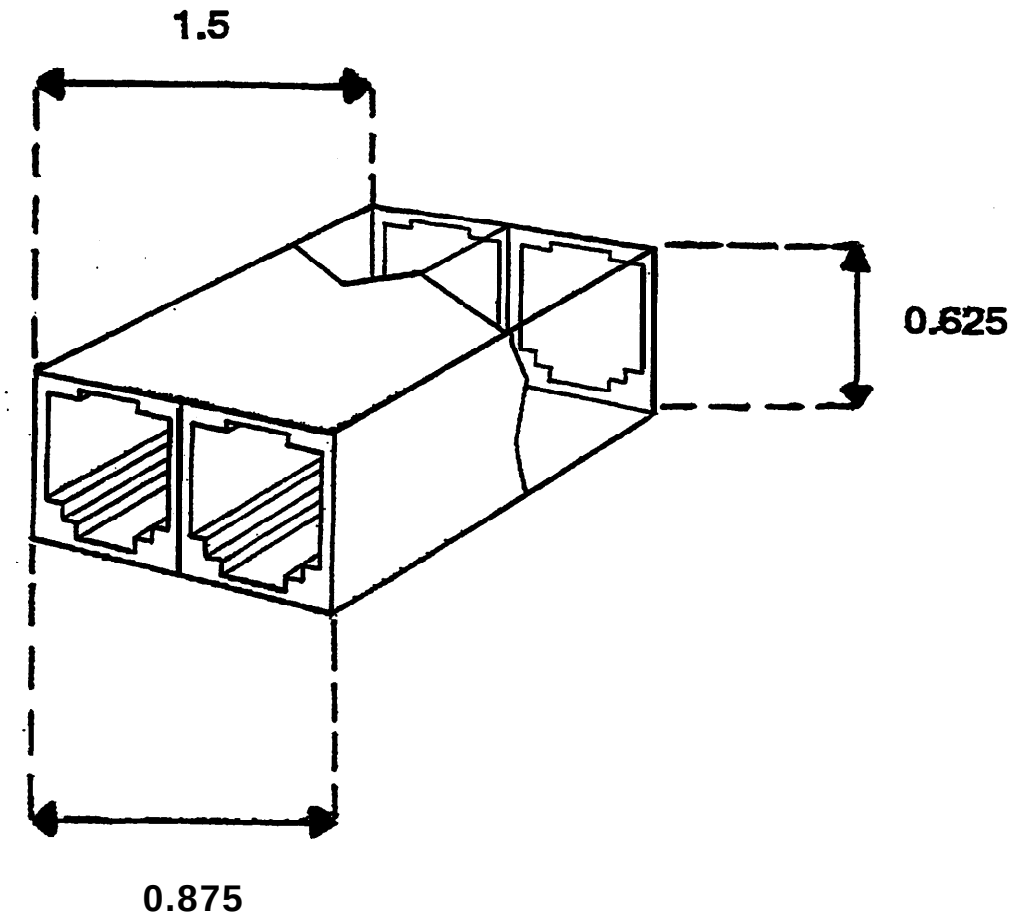
**Model ZZCM301**




| | | | |
|---|---|---|---|
| (H)x(W)x(D) | 8" x 3-7/8" x 1-7/8" | Remote Range | 35 FT. |
| Weight | 2.3 LBS. | Max. Drape Weight | 60 LBS. |
| Voltage | 120 VAC | Power Cord Length | 10 FT. |
| Amperage | .31 Amp. | Power Cord Type | SPT-2 18/2 AWG |
| Cycle | 60 HZ | Vottage Surge Suppressor | Yes |
| U.L. Listed | Yes | Thermal Overload Protector | Yes |

# Splitter Specifications

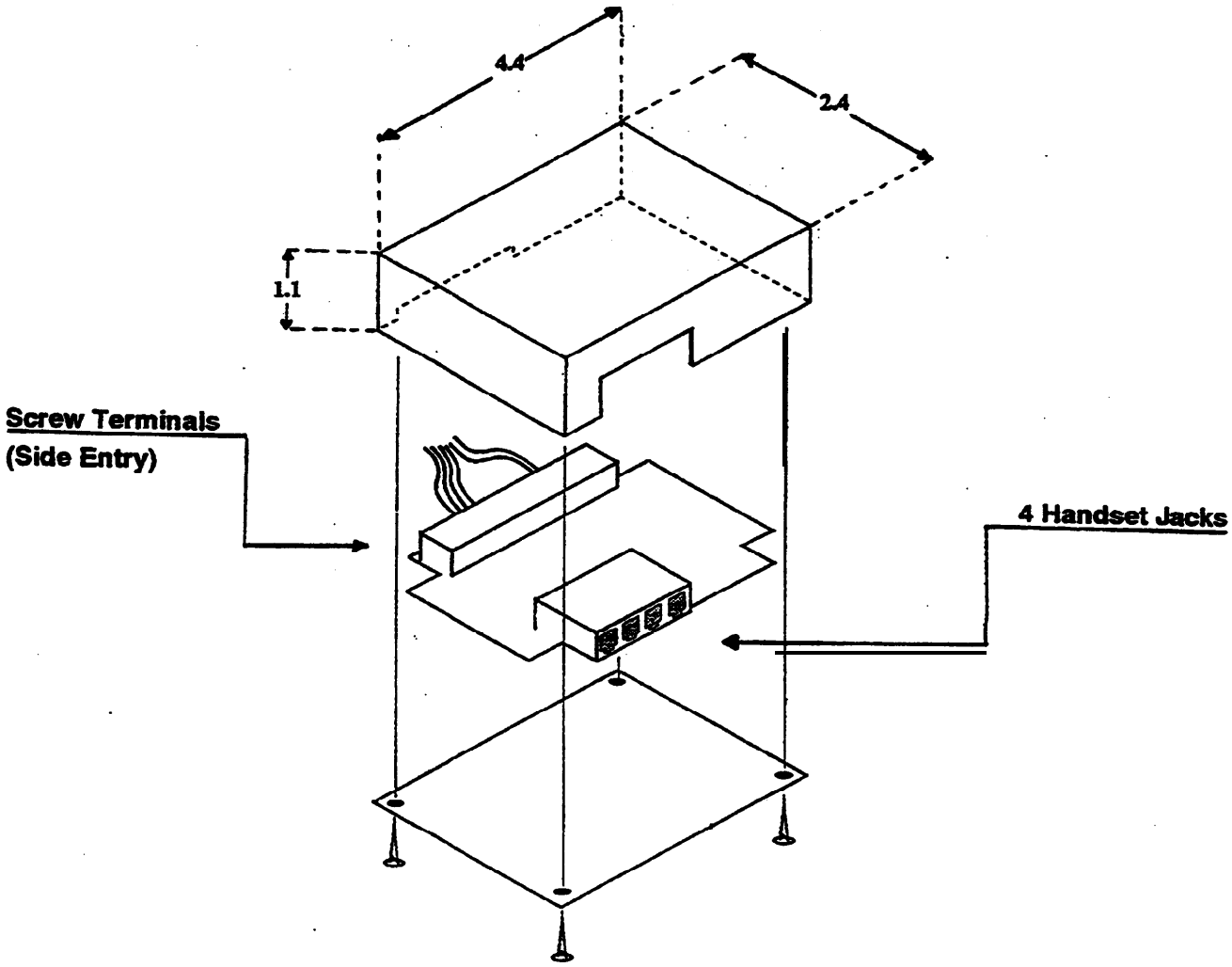
**Model 22654001-A**




| | | |
|---|---|---|
| (H)x(W)x(D) | 5/8" x 7/8" x 1 -1/2" | For use with multiple controls e.g. |
| Connecting Cord | 6 Inches | Timer, Wall Switch, Extended I.R. |
| Voltage | Low / +5 volts | Receiver or "Chaining Motors". |
| Wiring Type | Class 2 | |

# Contact Closure Interface

**Model 22631103-A**

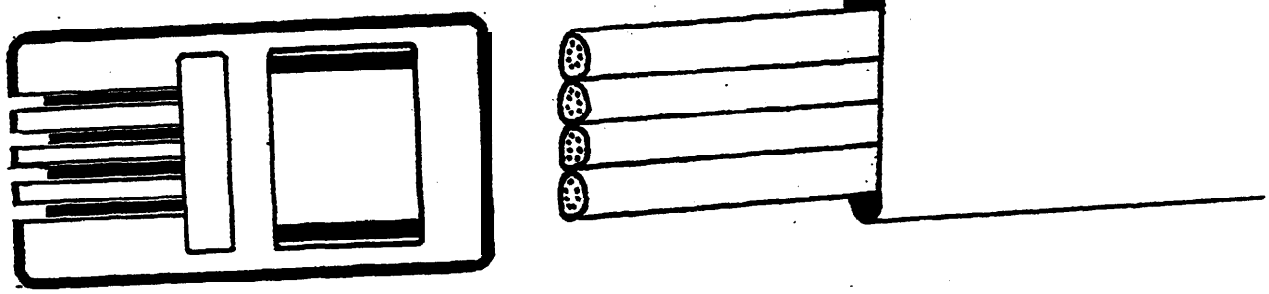



| | |
|---|---|
| (H)x(W)x(D) | 4-13/32" x 2-13/32" x 1-3/32" |
| Voltage | Low / +5 volts |
| Out-Put Wiring | Class 2 - Flat 4 wire (phone type) 26 AWG |
| In-Put Wiring | Gage not exceed 18 AWG |
| ABS Case Flame Rating | 94V-0 |

# Connecting Wire Specifications

**Part Number ZZ22CW, ZZ42CW**

**26 AWG (7x34) Stranded Bare Copper Conductors - 4 Conductor Wire**

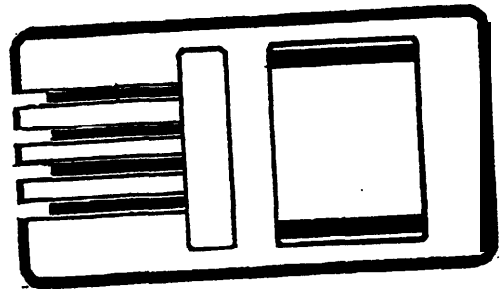


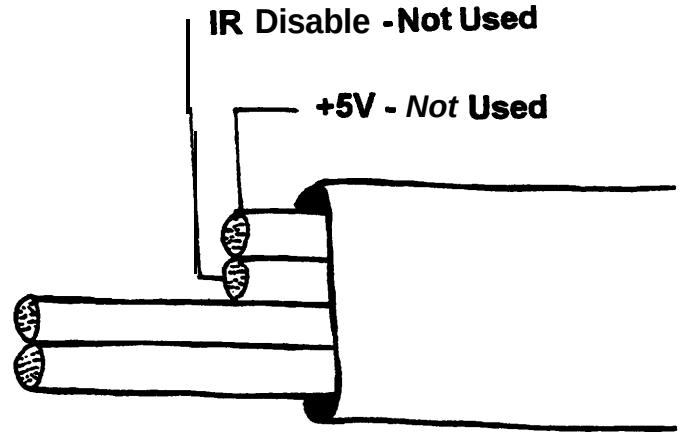
| | |
|---|---|
| Outside Diameter | 2.3mm x 4.9mm/.090" x .193" |
| Jacket Thickness | .55mm/.02" |
| ***Insulation Construction*** | |
| Avg. Thickness | 24 (+/-) 0.05 |
| Min. Thickness | .13 |
| ***Physical Properties*** | |
| Cold Bend Test | No Crack at 10 Degrees C/H |
| Flame Test | *Self* Extinguish 60S |
| Flexible Bend Test | No Fracture 100 Degrees C 168H |
| ***Conductor Construction*** | |
| Diameter of Wire | .158 |
| Number of Wires | 7 |
| Lay Length of Strand | 20 |
| ***Electrical Properties*** | |
| Resistance of Conductor | 0.1367 Ohms/M @ 20 Degrees C |
| Resistance of Insulation | 1000M Ohms/KM @ 20 Degrees C |
| Dielectric Test | 500V/1 MIN. AC |
| Spark Test | 2Kv |

# Connecting Wire Specifications

**Part Number ZZ22CW-2, ZZ42CW-2**

**26 AWG (7x34) Stranded Bare Copper Conductors - 4 Conductor Wire**






| | |
|---|---|
| Outside Diameter | 2.3mm x 4.9mm/.090" x .193" |
| Jacket Thickness | .55mm/.02" |
| ***Insulation Construction*** | |
| Avg. Thickness | 24 (+/-) 0.05 |
| Min. Thickness | .13 |
| ***Physical Properties*** | |
| Cold Bend Test | No Crack at 10 Degrees C/H |
| Flame Test | Self Extinguish 60S |
| Flexible Bend Test | No Fracture 100 Degrees C 168H |
| ***Conductor Construction*** | |
| Diameter of Wire | .158 |
| Number of Wires | 7 |
| Lay Length of Strand | 20 |
| ***Electrical Properties*** | |
| Resistance of Conductor | 0.1367 Ohms/M @ 20 Degrees C |
| Resistance of 'Insulation | 1000M Ohms/KM @ 20 Degrees C |
| Dielectric Test | 500V/1 MIN. AC |
| Spark Test | 2KV |

# Wall Switch Specifications

## Model ZZWS10, ZZWS20, ZZWS30

### WALL SWITCH OPERATION

**Models: ZZWS10 single, ZZWS20 doubk. ZZWS30 triple.**

Denotes button to open drapery

Denotes button to close drapery

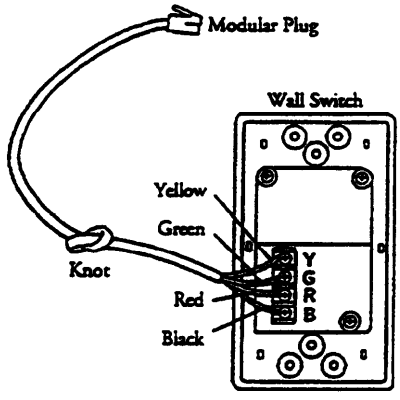
STOP

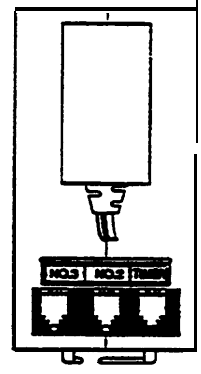
Denotes button to stop in any position

Model ZZWS10
for one motor

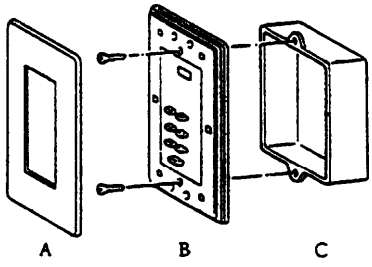
Model ZZWS20
for two motor

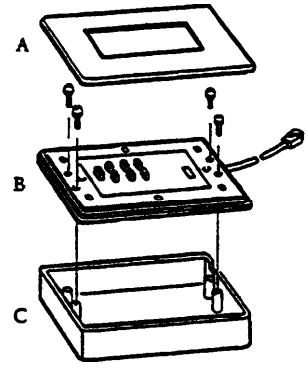
Model ZZWS30
for three motors



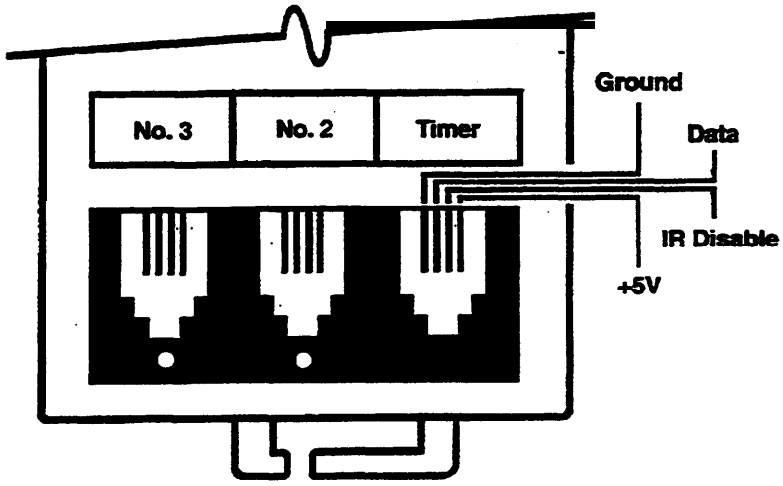

ZZCM101

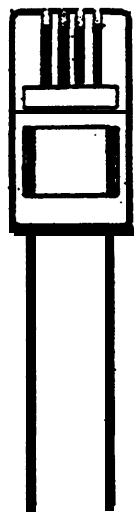



**Comes with 25', 26 AWG flat phone wire with spade lugs for attachment to wall switch and male modular plug that connects to the "Timer Port" of ZZCM101 motor.**

# Timer/Input Port



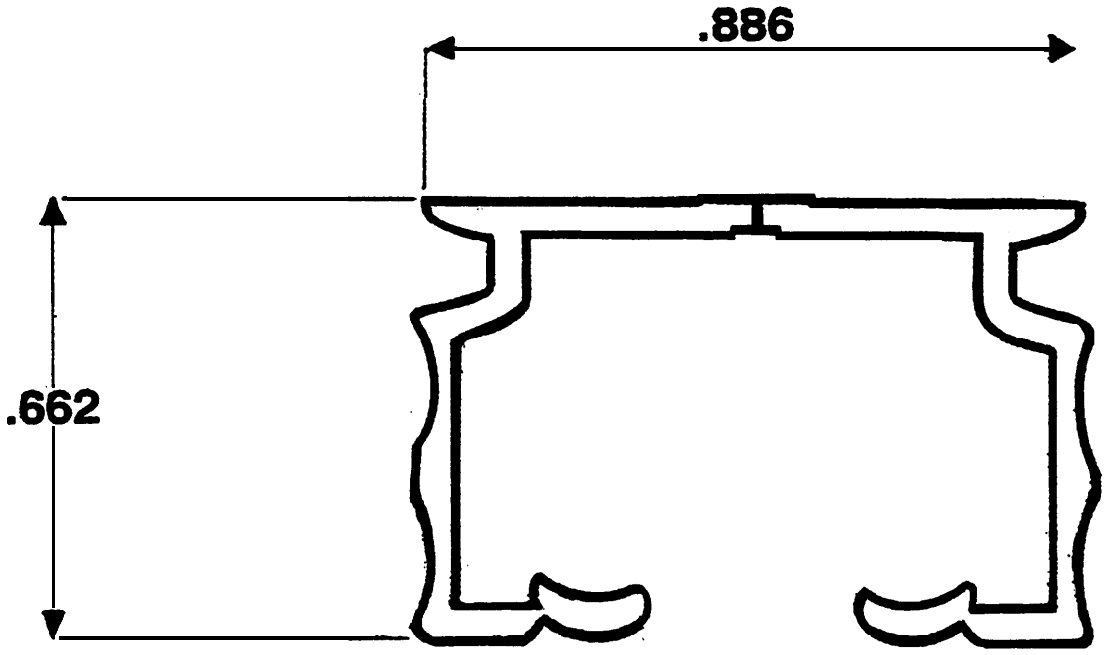



Labeled timer port, better described as the *Input Port* for controls.

Used for the timer, wall switch, contact closure interface and multiple parent motor connections.

# Track Specifications

**Model ZZ09TK, ZZ09TK-WH, ZZ20TK, ZZ20TK-WH**

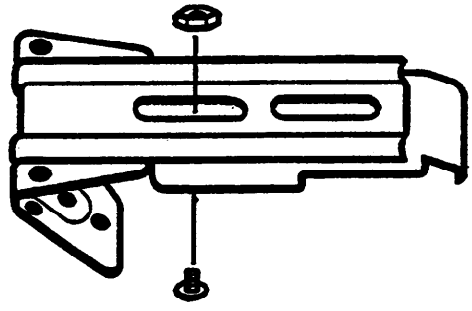



| | | | |
|---|---|---|---|
| Material | 6063-T5 | Finish | Powder Coat White or Clear Anodized |
| Neight per Foot | 2.3 Lbs. | Typ Wall | .050 |

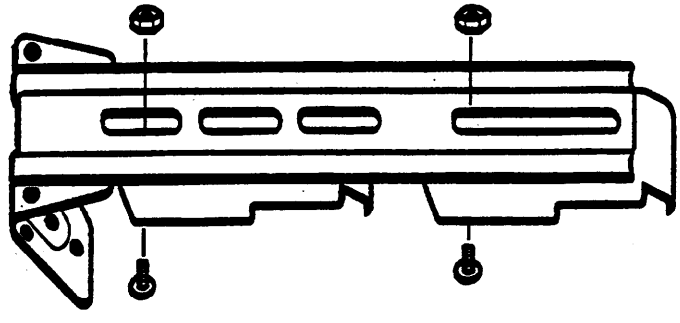
# Bracket Specifications

**Models ZZ3SWCB, ZZ3SWCB-WH, ZZ6DWCB, ZZ6DWCB-WH**

**Universal for Wall or Ceiling Mounting**



**ZZ3SWCB & ZZ3SWCB-WH**



**ZZ6DWCB & ZZ6DWCB-WH**

ZZ3SWCB (Zinc) & ZZ3SWCB-WH (White) for Single Tracks. Adjustable wall projection from 2-3/8" to 4-1/8".

ZZ6DWCB (Zinc) & ZZ6DWCB-WH (White for Double Tracks. Adjustable wall projections (inside track) 2-1/2" to 4-1/8", (outside track) 5-3/8" to 7-3/8"