

# MakroBlind™ Louvered Shades



**HunterDouglasContract**



Nysan Solar Control products by Hunter Douglas optimize management of light and energy at the windowed wall. Nysan systems deliver uncompromising performance backed by unmatched engineering – from roller shades to exterior blinds and sun louvers, to fully automated shade control systems.

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Cover:  
Project: Manitoba Hydro, Winnipeg Canada  
Architect: KPMB Architects  
Product: Motorized MakroBlind™ Louvered Shades

Above: Sample slats of MakroBlind™ Louvered Shades

## Key Features



Designed for both interior and exterior applications, MakroBlind™ Louvered Shades represent one of the most versatile shading systems available today. MakroBlind™ Louvered Shades rank among the most effective solutions for managing solar heat gain and optimizing daylight.

### KEY FEATURES

- Motorization and automation available for raising, lowering, and tilting
- Exterior mounting hardware engineered to withstand load from wind, snow, ice, and other environmental conditions
- Interior features available for maximizing daylight while optimizing shading at the task level
- Hassle-free™ Warranty on all components, including operating mechanisms and controls
- Fully retractable and concealable when not in use
- Tilting of slats provides dynamic shading in response to changing sun angles throughout the day and year
- "Double Omega" tabs provide secure engagement of slats with ladder braid
- Durable lift tapes and ladder braids offer reliable weather- and stretch-resistant lift and tilt operation
- Manual operation - gearbox and crank handle

# System Dimensions

Designed to accommodate a wide range of window sizes and configurations, MakroBlind™ Louvered Shades are an effective solution for projects of any size.

## MINIMUM AND MAXIMUM SYSTEM SIZES

<b>Minimum Width</b>	460mm (18") manual operation 600mm (24") motorized operation
<b>Maximum Width</b>	5000mm (16'4")
<b>Maximum Drop</b>	5000mm (16'4") standard headrail 8500mm (27'10") large headrail
<b>Maximum Area</b>	9m <sup>2</sup> (97ft <sup>2</sup> ) manual operation 35m <sup>2</sup> (376ft <sup>2</sup> ) motorized operation, 230v 20m <sup>2</sup> (220ft <sup>2</sup> ) motorized operation, 110v

## APPROXIMATE STACK HEIGHTS

Table below shows approximate stack sizes based on overall system height (drop) for each slat size.

Drop Size	Slat Size					
	50mm	60mm	80mm flexible	80mm rolled	100mm	150mm
<b>2000mm (6'6")</b>	195mm (7 2/3")	189mm (7 1/2")	185mm (7 1/3")	235mm (9 1/4")	175mm (6 7/8")	165mm (6 1/2")
<b>3000mm (9'10")</b>	230mm (9")	221mm (8 2/3")	215mm (8 1/2")	290mm (11 3/8")	200mm (7 7/8")	185mm (7 1/3")
<b>4000mm (13'1")</b>	265mm (10 3/8")	253mm (10")	245mm (9 2/3")	345mm (13 2/3")	225mm (8 7/8")	205mm (8")
<b>5000mm (16'5")</b>	300mm (11 7/8")	285mm (11 1/4")	275mm (10 7/8")	400mm (15 3/4")	250mm (9 7/8")	225mm (8 7/8")

The MakroBlind™ Louvered Shades hardware set is the result of more than a half century of development and use in Europe. The components' elegant design will compliment modern interiors, and have the durability to withstand the rigorous challenges of exterior applications.

## HEADRAIL BRACKETS

Options include standard swivel brackets, hidden brackets (for systems that are closed to the underside), or custom brackets designed to meet specific project requirements.

### Manufacture & Finish

- Extruded and machined from 6063-T5 aluminum
- Finishes - Clear anodized, mill finish or polyester powder coated in a range of RAL colors

### Bracket Quantities

1300mm (51") or less	2 brackets
1300mm (51") to 2500mm (98")	3 brackets
2500mm (98") to 3700mm (145")	4 brackets
3700mm (145") to 4900mm (193")	5 brackets
4900mm (193") or more	6 brackets

### Attachment Options

The swivel brackets attach to the building structure and provide a mounting surface for the headrail of the blind. In certain cases, it is possible to mount these brackets directly to the façade. In other cases, however, it may be necessary to use intermediate angle brackets. These brackets are manufactured and finished as above.

## FASCIA

For interior applications this may be selected as a decorative option, and to enhance light blocking around the headrail.

### Head Boxes (or Pelmets)

For exterior applications, it is recommended that the façade incorporates a blind pocket. If no structural pocket is available, a head box may be required to protect the blind in the raised position from inclement weather conditions, including wind, snow, or ice. Head boxes are manufactured from sheet aluminum in custom profiles to meet the building aesthetic.

### Dimensions

Minimum dimensions (front to back) are as follows:

50mm and 60mm slats	90mm (3 1/2")
80mm (flexible and rolled edge) slats	110mm (4 3/8")
100mm slats	130mm (5 1/8")
150mm slats	200mm (7 7/8")

### Manufacture & Finish

- Manufactured from 14 or 16 gauge sheet aluminum  
(1.63mm / 0.0411" or 1.29mm / 0.0508" thickness)
- Finishes - Clear anodized, mill finish or polyester powder coated in a range of RAL colors

# Components

## HEADRAIL

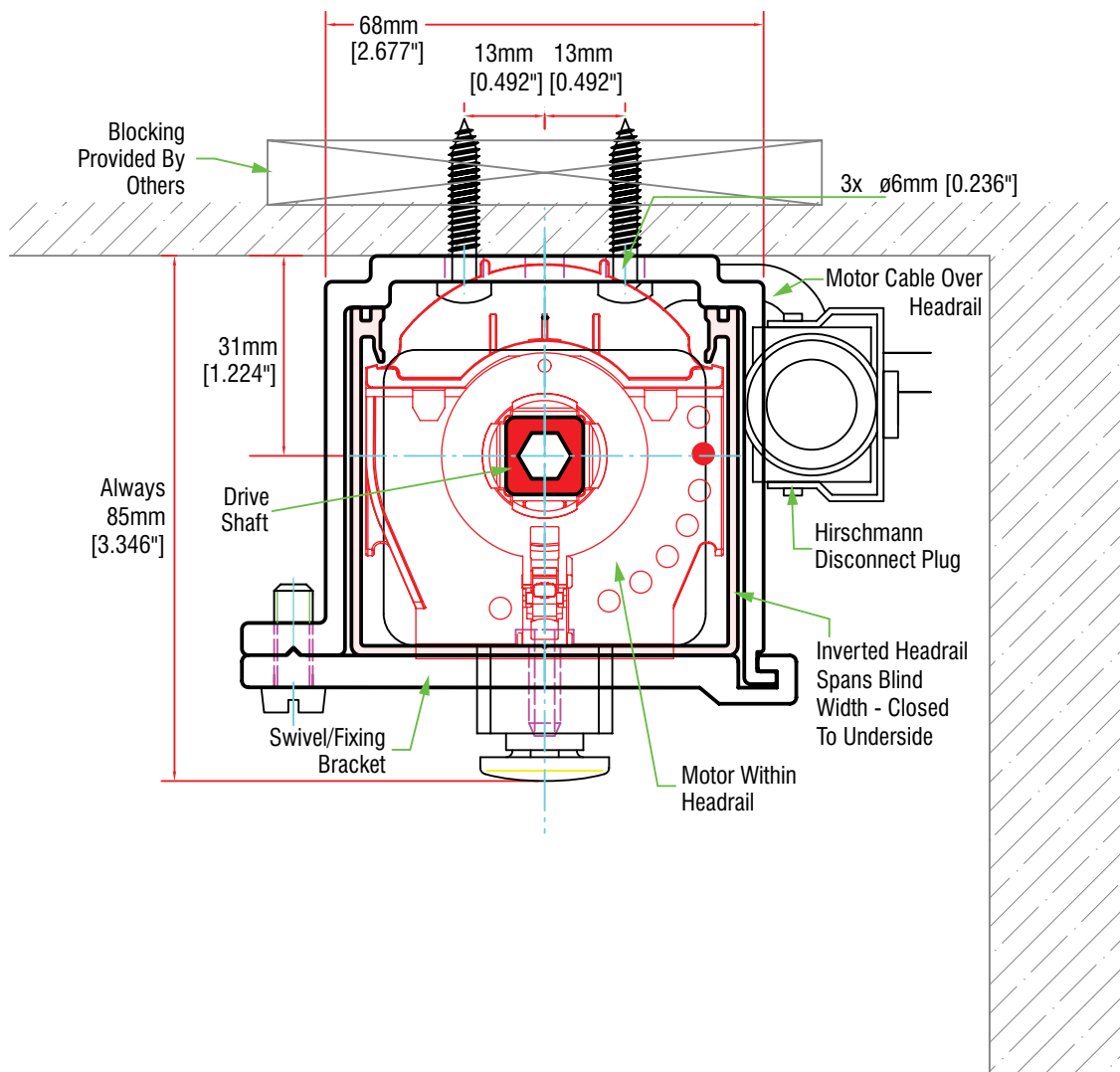
The headrail incorporates the motor or gearbox, tape spools and driveshaft, and side guide wire fixings, if applicable. The headrail can be open to the underside or the top side, but generally is closed to the underside for interior applications. The tilting and raising/lowering mechanism is manufactured from durable, maintenance-free plastic that allows smooth movement of the blinds and accurate adjustment of the slat tilt.

### Dimensions

Standard	60mm wide x 54mm tall (2 3/8" x 2 1/8")
Large	80mm wide by 75mm tall (3 1/8" x 3")

### Manufacture & Finish

- Extruded and fabricated from 6063-T5 aluminum with a wall thickness of 1.5mm (1/16")
- Finishes - Clear anodized, mill finish or polyester powder coated in a range of RAL colors.



# Components

## BOTTOM BAR

The bottom bar profile combines form and function. It adds stability to the deployed slat pack and also serves as an aesthetically pleasing terminating element for the blind stack.

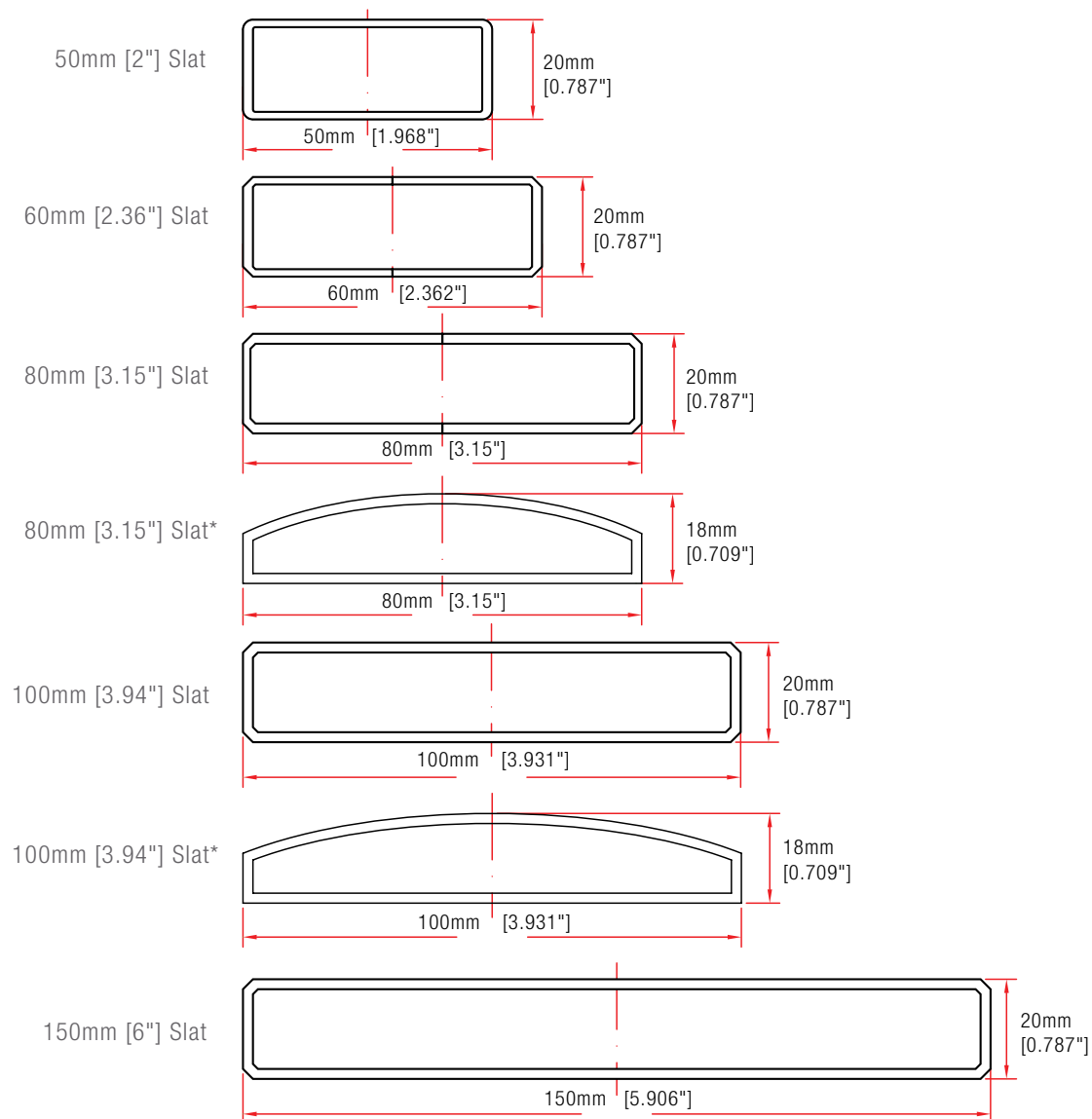
### Dimensions

The standard bottom bar options are shown below. Custom bottom bar profiles can be produced, subject to project size.

### Manufacture & Finish

- Extruded and machined from 6063-T5 aluminum
- Finishes - Clear anodized, mill finish or polyester powder coated in a range of RAL colors
- Supplied with plastic end caps and guide wire rivets, as appropriate

### For Use With:



All Bottom Rail Wall Thickness = 2mm [0.0787"]

\* Special order only. May require minimum order quantities and extended lead times.

## SIDE GUIDE WIRES AND ANGLE BRACKETS

Side guide wires are only required when there is significant air flow near the blind, or if the system is installed on a sloped surface. These are standard for exterior applications.

Standard guide wire brackets generally attach to a vertical surface (e.g. mullions, walls, etc.). It is possible to use alternative hardware to allow connection to the sill or floor. Guide wires are tensioned to approximately 50 lbs.

### Dimensions

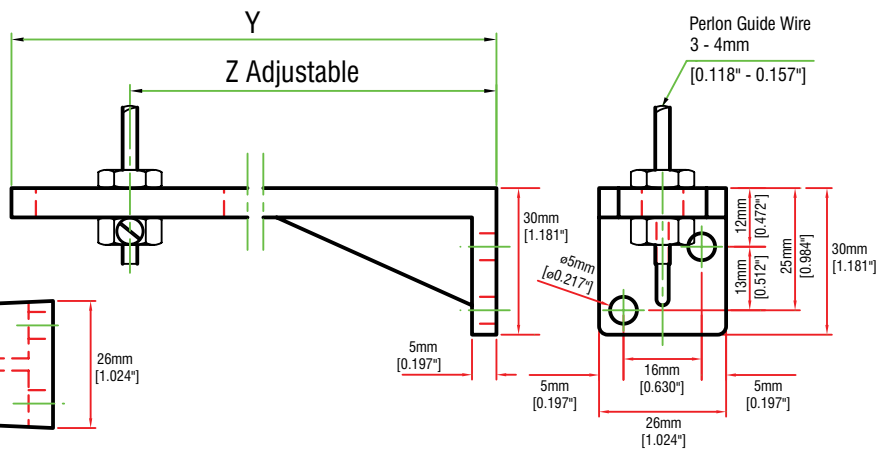
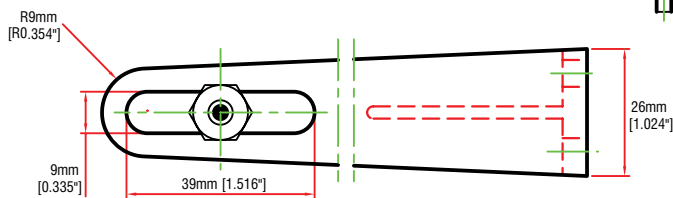
In normal circumstances, guide wires are only required at each end of the blind, 15mm (0.591") from the slat edge. If blinds are wider than 2500mm - 2700mm (8'3"-8'9"), an intermediate guide wire is required. If blinds are wider than 3750mm - 4000mm (12'3"-13'0"), two intermediate guide wires are required. Spacing is always specified by the manufacturer and product requirements.

### Manufacture & Finish

- Guide wires are available in Perlon and PVC coated stainless steel
- Angle tension brackets are cast from 6063-T5 aluminum
- Finishes - Clear anodized, mill finish, or polyester powder coated in a range of RAL colors

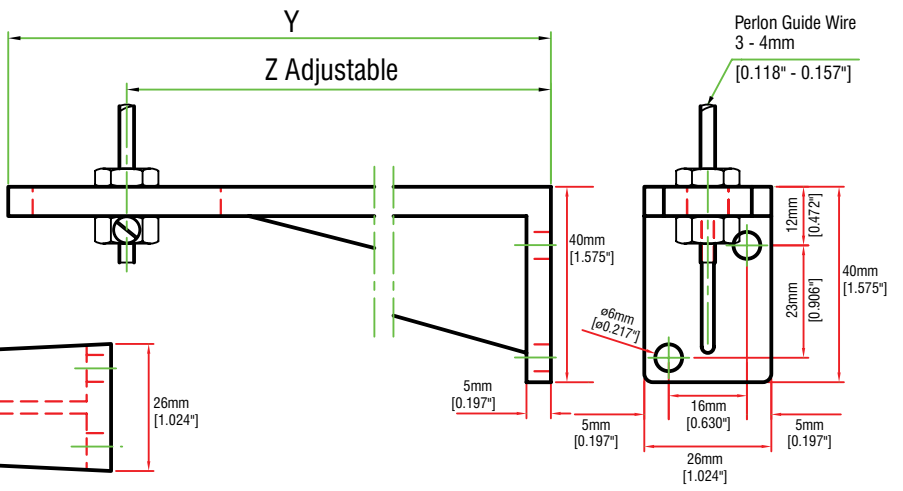
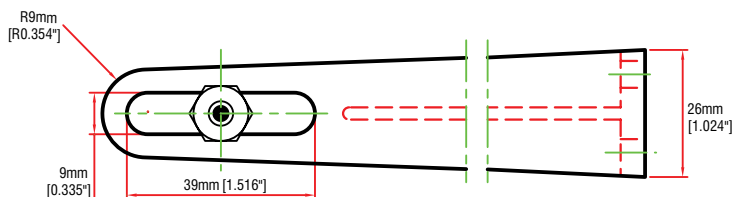
Tension Angle Type 1 & 2

Typ	Y	Z
1	69mm (2.72")	30mm - 60mm (1.18" - 2.36")
2	99mm (3.90")	60mm - 90mm (2.36" - 3.54")



Tension Angle Type 3 & 4

Typ	Y	Z
3	134mm (5.28")	90mm - 125mm (3.54" - 4.92")
4	169mm (6.65")	125mm - 160mm (4.92" - 6.30")





MakroBlind™ Louvered Shades feature large profile slats, which are the key element in optimizing daylight while reducing solar heat gain.

## SLAT SIZES

### Profile Options

- 50mm (2") flexible (special order for exterior applications)
- 60mm (2 3/8") flexible
- 80mm (3 1/8") flexible, or rolled edge
- 100mm (4") flexible
- 150mm (6") flexible

### Dimensions

Slat pitch: Vertical distances between slats:

50mm (2") slat	42mm
60mm (2.36") slat	54mm
80mm (3.15") slat	72mm
100mm (4") slat	87mm
150mm (6") slat	132mm

### Manufacture & Finish

- Manufactured from aluminum with a thickness of 0.2mm (50mm slats) or 0.4mm (all other slats)
- Finishes - Precoated with Anorcoat® primer, and double-stoved enameled to match RAL colors
- Daylight options available, including varying gloss factors for use on upper and lower slat sections.

### Color Options

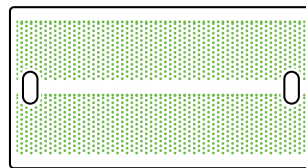
- Visit our website for a list of standard color options
- Additional colors may be available for large projects

## PERFORATIONS

A number of options are available (as shown below): solid (unperforated), fully perforated, fully perforated with a solid central section, or half perforated. The standard openness is generally between 4% and 9% based on a fully perforated slat. Custom patterns may be available for larger projects. Perforation sizes and spacing vary by slat size (enlarged detail shown to the right).



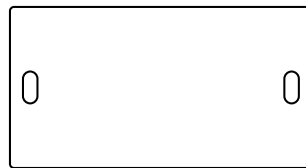
1 - Full Perforation



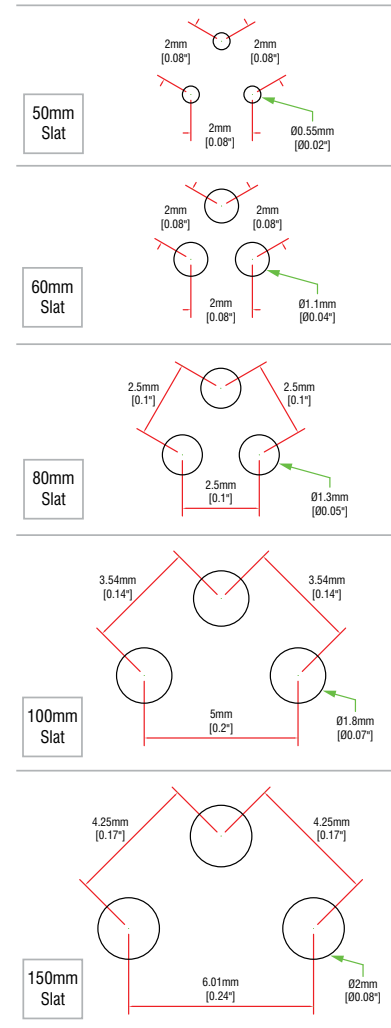
2 - Full Perforation With Unperforated Sides and Middle Section



3 - Half Perforation



4 - No Perforations



## LADDER BRAID AND LIFT TAPE

Ladder braids and lift tapes are made from durable, weather- and UV-resistant material. They facilitate movement of the blinds. The lift tape raises and lowers the slats, while the ladder braid ensures appropriate slat spacing and provides tilt function.

For exterior applications, the slats are mechanically fixed to the ladder braid using double omega tabs to ensure they stay securely in place and do not move or vibrate in strong winds.

### Dimensions

The maximum spacing between ladders and lift tapes is 800mm (31 1/2"). This may need to be reduced with large drop blinds. The standard distance from the edge of the slat to the first ladder and lift tape is 270mm (10 5/8"). Lift tape has approximate dimensions of 6 x 0.33mm (0.25 x 0.015").

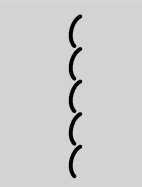


### Manufacture

- Ladder braids are made from woven weather- and UV-resistant nylon, available in gray (standard) or black
- Lift tapes are made from a durable, pre-shrunk weather- and UV-resistant polyester, available in gray (standard) or black

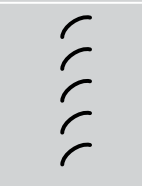

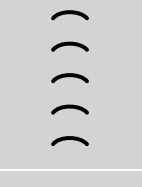
## SLAT POSITIONS & ANGLES

Slats are lowered in the closed position, and can then be tilted from closed to fully open. They are raised in the fully open position. Other methods of operation are available, including the "work setting" method shown below. It is also possible to tilt the slats in both directions, for example from fully closed in one direction to fully closed in the other. This is not a standard method of operation for exterior shades

### Standard MakroBlind™ Louvered Shades

Exterior		Interior
Lower ↓		The blind lowers with closed slats.
Tilt ↔		The angle of the slats can be adjusted when the blind is in any intermediate position. The slats can also be adjusted from fully closed* in one direction to fully closed* in the other.
Raise ↑		The blind is raised with horizontally open slats.

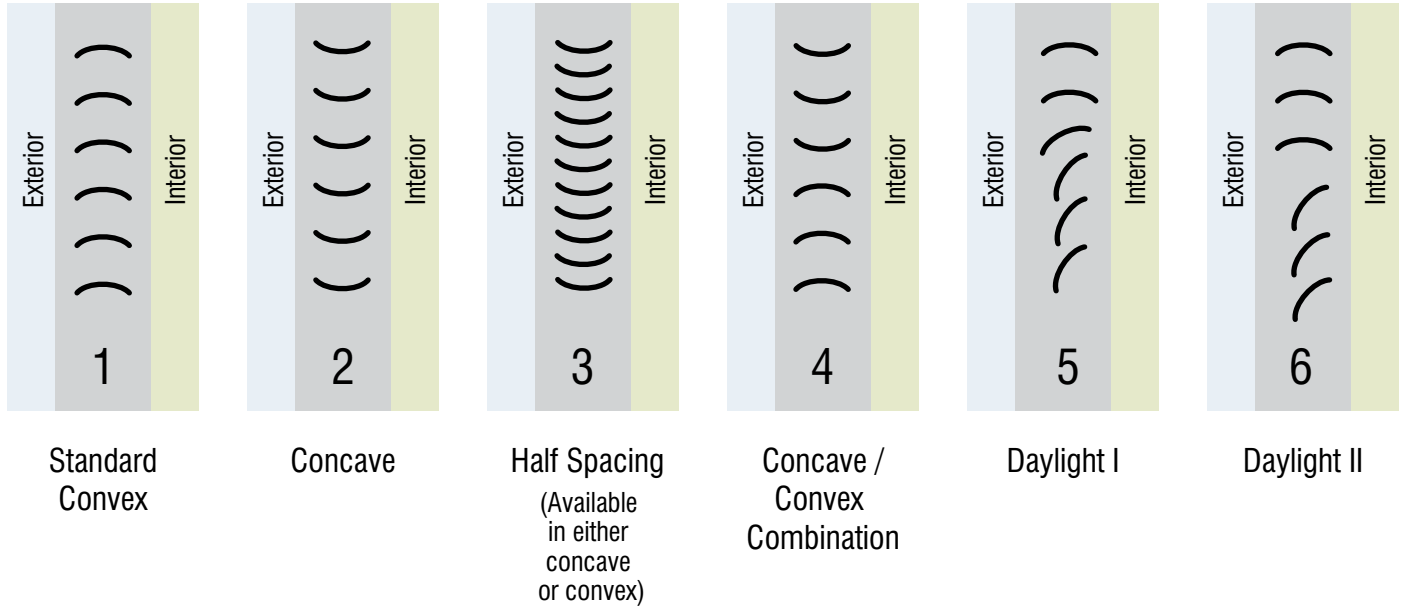
### MakroBlind™ Louvered Shades With Work Setting

Exterior		Interior
Lower ↓		The blind lowers with the exterior side of the slats tilted down approximately 38°. This is known as a "work setting". The interior is lightly shaded but not completely darkened.
Tilt ↔		The slats can be tilted from 38° to horizontal when in an intermediate position. Only in the fully lowered position can the user fully adjust the tilt angle.
Raise ↑		In order to avoid darkening the room, the blind ascends with slats at maximum openness to allow maximum interior light.

\* In the fully closed position, the slat angle is approximately 70 degrees, providing horizontal cutoff of direct sunlight, but allowing indirect light penetration.

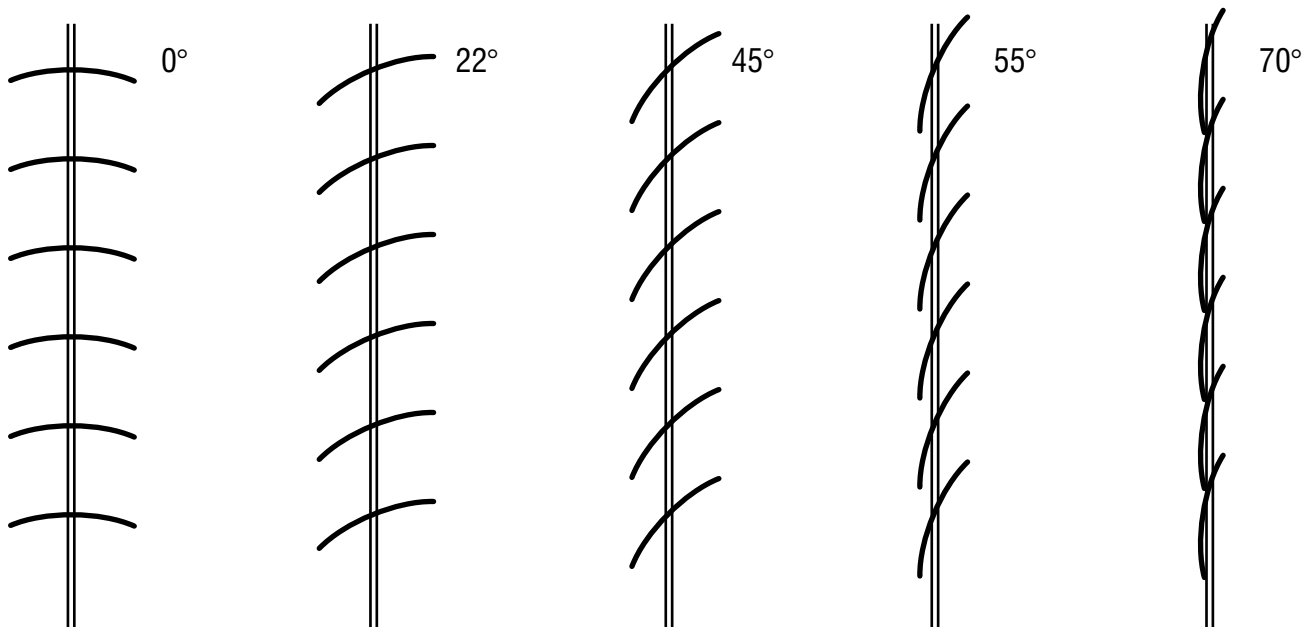
## SLAT CONFIGURATIONS

Slats are available in many configurations. One option is Daylighting (shown in drawings #5 and #6), where the slats in the upper section of the blind stay at a different angle to those in the lower part. This arrangement allows sunlight penetration through the upper part of the blind and reflects it into the room off the ceiling. The slats in the lower part of the blind remain more closed, offering better light control where people are working. Some configuration options are shown below:



## SLAT CONTROL

Automated shades are generally programmed with the five slat tilt positions shown below. However, these angles can be adjusted for specific project requirements.



Offered with manual or motorized operation, MakroBlind™ Louvered Shades can be specified to meet the precise needs of any project.

## MANUAL OPERATION

Systems using any slat size can be manually operated using a gear box and crank handle. The crank handle length can be specified based on project requirements. Manual systems are not recommended for exterior applications.

## MOTORIZED OPERATION

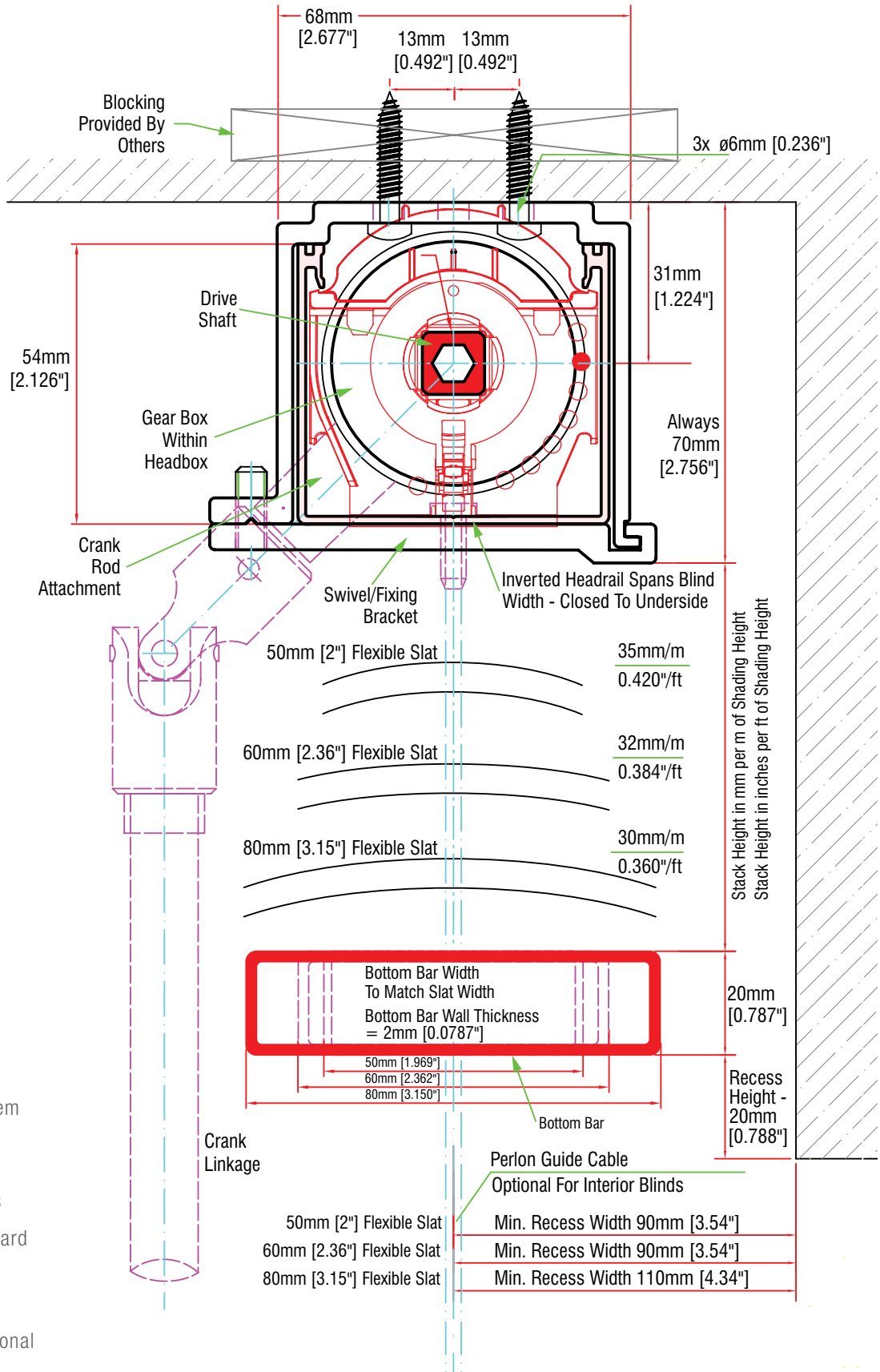
- Electric motor is concealed within the headrail
- Limit switches and an integrated manual override button prevent damage from uneven or excessive take-up
- Motors incorporate internal thermal protection against over-heating

For all exterior applications, the warranty requirements state that the blinds must be motorized and have a control system that incorporates anemometer (wind speed) control.

## MOTOR SPECIFICATIONS

Parameter	Type 1	Type 2
Nominal voltage	110 V	110 V
Frequency	60 Hz	60 Hz
Nominal current	1.25 A	2 A
Nominal input power	135 W	218 W
No load current	1.22 A	1.82 A
Starting current	1.78 A	3 A
Nominal output power	24.2 W	50.1 W
Nominal efficiency	17.9 %	23 %
Capacitance	16 $\mu$ F	30 $\mu$ F
Nominal AC-voltage of capacitor	200 V	200 V
Nominal speed	28 min <sup>-1</sup>	28 min <sup>-1</sup>
Nominal torque	2x4 Nm	16 Nm
Nominal power factor	0.97	0.991
No load speed	31.4 min <sup>-1</sup>	31.7 min <sup>-1</sup>
Slope of speed / torque curve	0.3 min <sup>-1</sup> /Nm	0.3 min <sup>-1</sup> /Nm
Winding resistance	29 $\Omega$	16 $\Omega$
Gear ratio	110.6	110.6
Starting torque	2x5 Nm	24 Nm
Holding torque of the break	2x6 Nm	17.5 Nm
Pull-in voltage of the break	91 V	92 V
Backlash angle	30°	30°
Rotor inertia	209 gcm <sup>2</sup>	333 gcm <sup>2</sup>
Temperature rise of the winding	115 K	115 K
Insulation test voltage	1400 V	1400 V
Weight	2 kg	2.6 kg

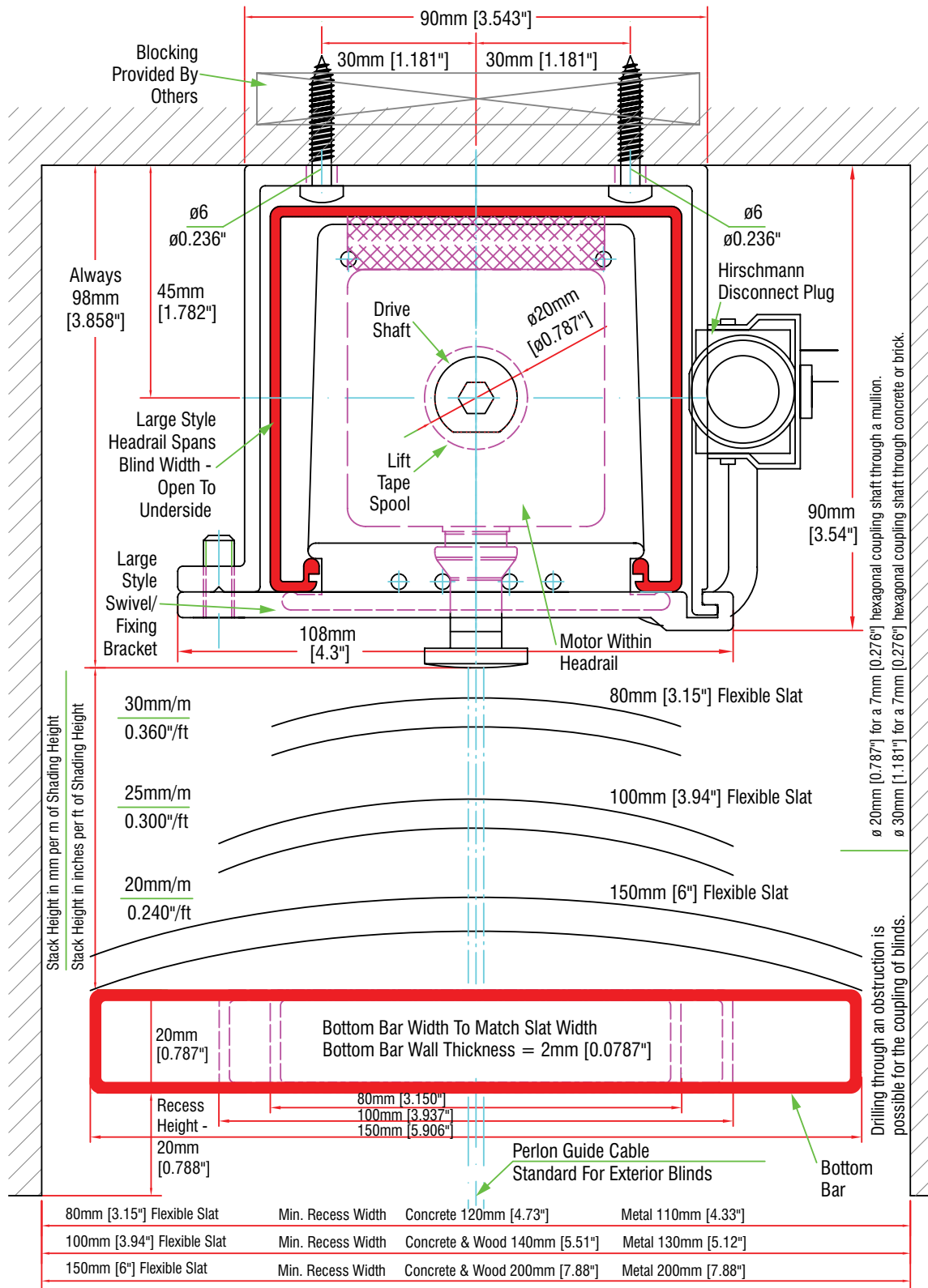
## INTERIOR SYSTEM



### Options Shown:

- Manually operated system with crank handle
- Dimensions for 50mm, 60mm, and 80mm slats
- Top mounted with standard swivel brackets
- Standard bottom bar
- Perlon guide wires (optional for interior systems)

## POCKET MOUNTED EXTERIOR SYSTEM



### Options Shown:

- Motorized system with UL disconnect plug
- Dimensions for 100mm and 150mm slats
- Top mounted with standard swivel brackets
- Standard bottom bar
- Perlon guide wires (standard exterior configuration)
- Oversized head rail (option used with long drop systems)

## MAKROBLIND™ LOUVERED SHADE COUPLING

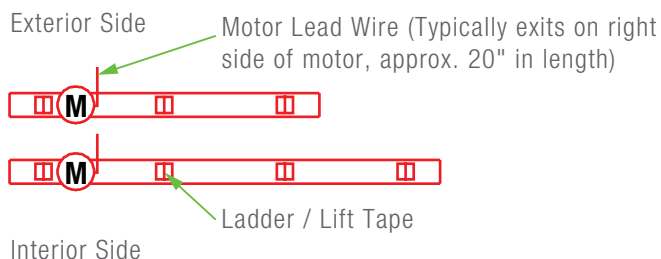
Up to four units can be coupled to a single motorized system, reducing the quantity of motors required for a given group of blinds. While coupling eliminates the opportunity for individual control, the reduction in cost may be advantageous if a group of blinds will always be operated in tandem.

When blinds are coupled, the maximum area driven by a single motor should not exceed approximately 220ft<sup>2</sup> (20m<sup>2</sup>), although this will depend on the specific project conditions.

## POSITION OF VENETIAN BLIND MOTORS

### Individual Blind - Motor At Left

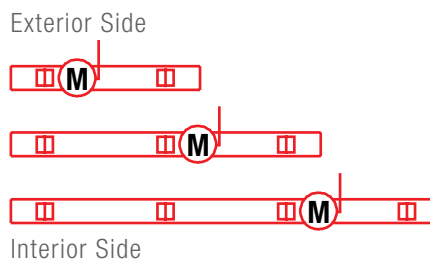
Motor is placed at the left side of the head rail



Even number of lift tapes: Motor between the two central lift tapes.  
 Uneven number of lift tapes: Motor to the right of the central lift tapes.

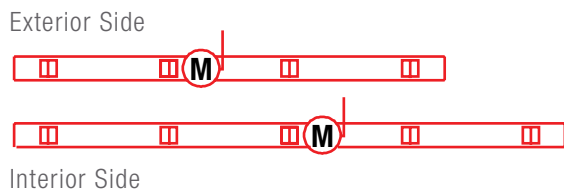
### Individual Blind - Motor At Right

Motor is placed at the right side of the head rail



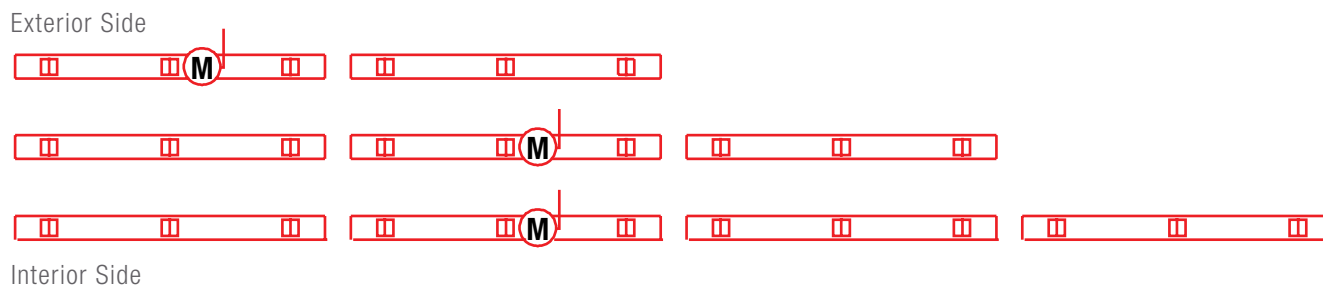
### Individual Blind - Central Motor

Motor is placed in the middle of the top rail



Even number of lift tapes: Motor between the two central lift tapes.  
 Uneven number of lift tapes: Motor to the right of the central lift tapes.

## Coupled Unit - Recommended Position Of The Central Motors



Even number of blinds: Motor located in the left (shown) or right blind.  
 Uneven number of blinds: Motor in the center blind.  
 Motor in the drive blind: See above Individual blind details.



The power of MakroBlind™ Louvered Shades lies in intelligent Nysan SolarWare™ controls, which enable numerous scenarios from autonomous operation to full BMS integration.

## CONTROL CONFIGURATIONS

From individual user interfaces to fully automated autonomous control, MakroBlind™ Louvered Shade systems offer a broad spectrum of control options.

In addition to basic switch operation of the binds, the MakroBlind™ system offers a number of different control scenarios, as follows:

- Option 1 – Input Control
- Option 2 – Context Control
- Option 3 – Managed Control

Control components may include a control point module, interface board, brightness sensor and MSTP BACnet router (for option 3), depending on system configuration.

## BASE BOARD

Each base board requires a 120 volt power source. Two output line voltage connections are provided, one to each motor the system is controlling. Control board architecture provides each board with  $\pm 10\%$  over current protection. All boards should be connected into a distributed network created by linking the controllers through a low-voltage 3 wire connection. In most cases CAT 5 or twisted pair cable is used.

## INCLUDED PROGRAMMABLE LAYERS

Each of the control boards is programmed to work as a standalone control unit that can carry out the following functions:

### OPTIONS 1, 2, & 3

- a) Pre-set Stops:** Each board can be programmed with a maximum of 64 pre-set stops. These pre-set stops assign stop locations anywhere within the full length of travel of the blind. The system supports up to five tilt angles.
- b) Grouping:** Each blind motor has the ability to work independently or with other motors as part of a group. Each group can then be addressed by individual wall switches or remote user interface.
- c) Input Control:** The system can operate on any individual or combination of inputs from any analog switch or sensors.

### OPTIONS 2 & 3

- d) Sun Tracking:** Each SolarWare™ controller will carry out a calculation of the daily sun path, thereby determining the sun's angle of incidence. With this information, blind slats will be adjusted to ensure that they maintain a 90° angle to the sun, based on preset locations. This will ensure the maximum amount of ambient light penetrates the building, while not allowing direct solar energy to enter the space. In order to maintain the highest level of natural light, all blinds will be completely retracted once the system determines that the facade will no longer experience any direct solar exposure.

The system has the ability to act on inputs from an omni-directional brightness sensor mounted on the building's roof. The sensor measures the luminance level of the sky, creating an overcast threshold setting of 40,000 lux (approximately 3700 foot candles).

# Control Options

In the event that the sensor determines an overcast condition, the blinds will retract. A time lapse ensures that no action occurs until overcast light levels have been steadily maintained for 20 minutes.

Should the measured light level change from overcast to sunny conditions, the shades will immediately revert back to their optimized position to ensure that any direct sunlight is prevented from entering the interior space.

- e) **Scheduling:** The system offers full scheduling capabilities complete with a software generated user interface, allowing monitoring and editing of scheduled events to be carried out by an on-site facility staff member. The scheduled function will be supplied pre-programmed with two specified daily system reset times
- Morning – All shade motors will be set into automatic sun tracking mode.
  - Evening – All shades will be retracted.

## OPTION 3

- f) **System Specific Software:** Nysan SolarWare™ is dedicated software to be installed on a PC. Customized to the specific needs of the project, this software provides access to the control network and serves as a means to monitor, override, reconfigure and maintain the control system through the use of a floor plan that reflects the actual building model. The computer can store logging files generated by the software program that are viewable in locked spreadsheet format. An alarm function ensures that any system alarms are forwarded to a designated person via email. The PC allows remote access via Virtual Personal Network (VPN), as a means of maintenance and repair by Nysan or Nysan trained dealers.

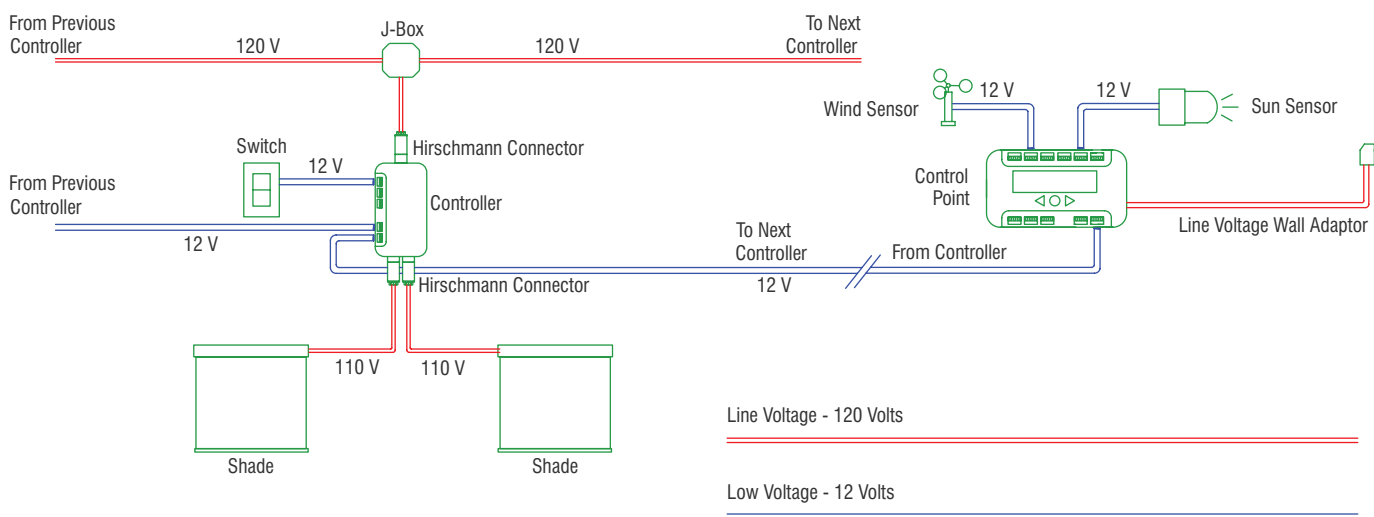
## SYSTEM AUXILIARIES

**Control Point Module:** Standard sensor expansion can piggyback onto a pre-determined control board to act as a sensor input. Sensor inputs can include, but are not limited to a multi-directional brightness sensor and an anemometer (wind sensor).

**Interface Module:** Standard interface boards are designed to be piggybacked onto a pre-determined control board to enable the system to perform actions based on input signals from audiovisual systems and building management systems.

**Omni-Directional Brightness Sensor:** BACnet SMTP compatible brightness sensor.

**Wall Mounted Override Switches:** Single Pole, Double Throw Momentary switches as needed to be supplied by others.





## ABOUT HUNTER DOUGLAS

For the past 60 years, we've been fortunate enough to help turn countless innovative sketches into innovative buildings. Architects and designers from around the world have taken advantage of Hunter Douglas' unmatched project development, service, and support.

Chances are, you've seen more of Hunter Douglas than you think. Just look around. With major operation centers in North America, Europe, Latin America, Asia, and Australia, we've contributed to thousands of high profile installations, from retail and commercial facilities to major transit centers and government buildings.

Not only are the world's architects and designers our partners, they're our inspiration. As they continue to raise the bar for excellence, we're creating projects to bring their visions to life.

## FOR MORE INFORMATION

- 800.727.8953
- [www.nysan.com](http://www.nysan.com)

Left:  
Project: University of Toronto, Toronto Canada  
Architect: architectsAlliance and Behnisch Architekten  
Product: MakroBlind™ Louvered Shades

# HunterDouglasContract

WINDOW COVERINGS

CEILING

SOLAR CONTROL

FAÇADES



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