

# NOVELAIRE TECHNOLOGIES

## HEAT & MASS TRANSFER PRODUCTS



Energy Conservation Wheel  
Operating and Maintenance Manual

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# SECTION I

## Introduction and Definitions

### Introduction

Your NovelAire Technologies energy conservation wheel (ECW) cassette comes complete and ready to run. The ECW cassette is built to provide many years of trouble free service. With proper installation and performance of the minimal maintenance requirements, your ECW should operate problem free.

Please review these instructions carefully before installing the unit. Most damage occurs due to improper installation. NovelAire is not responsible for a unit that has been improperly installed. The rotor media can be torn or crushed by mechanical means if the unit is improperly treated.

This manual covers operating and maintenance instructions for both the total heat wheels (ECW) and sensible only wheels (SEW).

For questions please call NovelAire Technologies at

**NovelAire Technologies**  
**10132 Mammoth Drive**  
**Baton Rouge, LA 70814**  
**(225) 924-0427(phone)**  
**(225) 930-0340(fax)**

### Definitions

**Bearing, external** - Flanged or pillow block bearing used with rotating shaft models.

**Bearing, internal** - Sealed ball bearing used with fixed shaft models.

**Bulb seal** - The seal used for both the circumferential seal and the inner seal in the NovelAire ECW cassettes. They are constructed of neoprene and configured to seal against the wheel band in the case of the circumferential seal, and against the wheel face in the case of the inner seal. These seals are noncontact in that there is a slight gap between seal and sealing face to allow the wheel to turn at high RPMs without overtorquing motor or causing seal damage. These seals have an integral clip and are clipped to the cassette face panel cutout (circumferential) or to the post(inner).

**Cassette** - The steel structure that houses the rotor. Typically ECW cassettes are of punched sheet metal panelized construction. Large cassettes are of box tubing construction.

**Energy Recovery Unit (ERV)** - The unit that the ECW fits into. Typically this will include two blowers and the ECW cassette all enclosed in a sheet metal housing.

**Enthalpy wheel** - A generic name for an energy conservation wheel. The term enthalpy refers to an air stream's total energy (temperature and humidity level).

**Exhaust air** - The air stream leaving an ECW that is exhausted to the outside. Exhaust air is building return air that has been run through the wheel.

**Heat wheel** - Synonymous with enthalpy wheel, energy conservation wheel, or total energy recovery wheel. Some heat wheels are sensible only wheels and should not be confused with total energy recovery wheels.

**Hub** - The center support of an ECW.

**Latent energy** - Latent energy in the context of wheel discussions is the work done by the wheel to transfer moisture from one air stream to another. Latent work is accompanied by humidity changes in the air streams.

**Media** - The chemical composite part of the wheel which actually performs the latent and sensible exchange.

**Outdoor air** - The air stream entering an ECW that is brought in from outside. Outdoor air becomes supply air after going through the wheel.

**Purge** - A small segment of supply air defined by the gap between the inner seal on the outdoor air edge of the center post and the supply air edge of the center post. The purge angle is adjustable. The purge captures the small amount of supply air captive in the wheel when the wheel moves from return to supply and routes it to return to minimize cross contamination.

**Return air** - The air stream entering an ECW that is returned from the building. Return air becomes exhaust air after going through the wheel.

**Rotor** - The part of an ECW that does the energy exchange and consists of the wheel media, hub, spokes, and band.

**Sensible heat** - Sensible energy in the context of wheel discussions is the work done by the wheel to transfer heat from one air stream to another. Sensible work is accompanied by temperature changes in the air streams.

**Sensible wheel** - A wheel that does only sensible work, i.e., where only heat is transferred from one air stream to another and the resultant moisture level remains unchanged.

**Spoke** - Flat metal member used to support the wheel radially.

**Supply air** - The air stream leaving an ECW that is supplied to the building space. Supply air is outdoor air that has been run through the wheel.

## SECTION 2

### Receiving and Inspecting

#### Receiving

Upon arrival of your ECW, please inspect cartons, pallets, and packaging for any damage that may have occurred during shipping. Neither NovelAire nor its customer is responsible for shipping damage, and it is important to identify any such damage before the unit is offloaded. Report any shipping damage immediately to shipper and NovelAire Technologies so that the proper remedies may be taken.

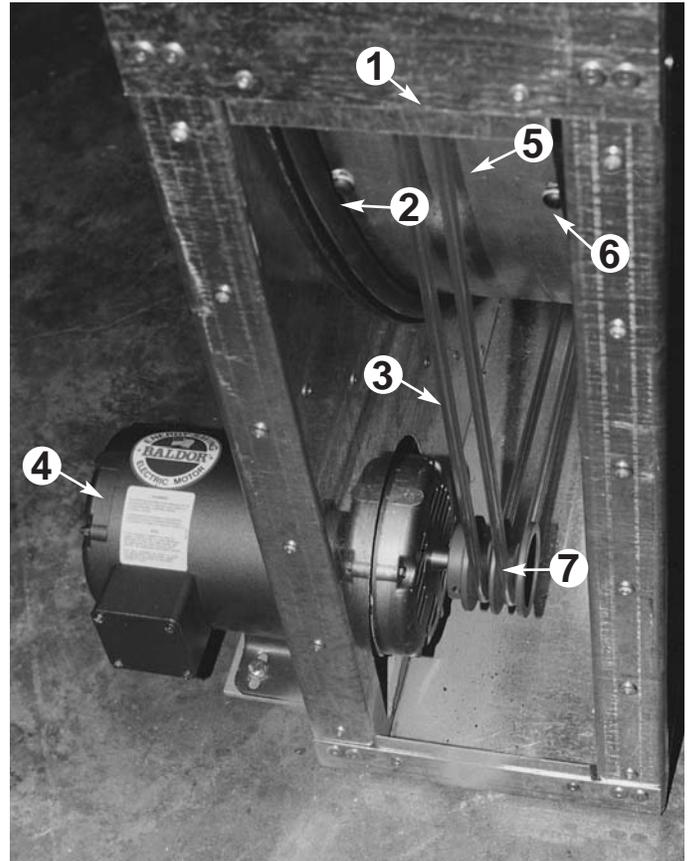
If the unit has come shipped on a pallet, please use proper fork lift procedures to offload the pallet. The media can be easily damaged by the forks on the fork lift.

#### Lifting and Handling

The ECW comes complete with lifting lugs. Lugs are located on top of the unit housing. Large ECWs have 4 lift points and small ECWs have 2. Use only the lifting lugs to off load an ECW that is not palletized. If the unit is palletized, it may be lifted either by the lifting lugs or with the forks placed underneath the pallet. In no case should the unit be lifted by any other means. Small ECW units do not typically come with lifting lugs and can be lifted by hand.

#### Storage

The unit should be stored out of the weather. If the unit is equipped with outboard bearings, grease these before installation(see Section 6 for greasing instructions). Make sure the unit is covered to prevent dust and dirt collection on wheel face during long periods of storage.



**Figure 1**

- 1- Cassette Housing**
- 2- Peripheral Seal**
- 3- Drive Belt**
- 4- Drive Motor**
- 5- Wheel Outer Band**
- 6- Spoke End Bolt**
- 7- Drive Sheave(s)**

## Section 3 Installation

### Identification Markers

Look for any identification markers that have come with your ECW. Rotational direction and/or air stream orientation will be marked on your unit. The air flow orientation should be identical to that of the general arrangement drawing which was provided to you during initial placement of the order. Check to make sure that air flow orientation is as requested. Consult the general arrangement drawing provided earlier. It is important that the unit be installed with the right rotational directions. It is also important that air flows be oriented as designed to allow the purge to function as designed. Consult NovelAire Technologies if you have problems with either of these instructions or if the unit is improperly marked.

### Installing

1. Make sure that the installation plan is consistent with identification markers.

2. Locate the purge side of the unit. The ECW accomplishes “purging” by removing a small wedge of supply air and routing it to return air. Thus when the wheel is in rotation, the small amount of stale return air that is trapped in the wheel section rotating from building to outdoor air side is isolated and routed to the exhaust air stream.

3. The installation requires ducting to 4 air streams.

4. It is good practice to include means for accessing the ECW cassette on all sides. This can be done either using 4 access doors, or 2 access doors with provisions for a removable section of front and back duct. NovelAire recommends including a removable plenum section(see Figure 2) in the front and back of the cassette for expedient repair and/or wheel removal. Alternatively, the cassettes can be installed on a slide out track for easy access.

5. Before installation, inspect the cassette for loose screws or bolts. Tighten any loose connections.

6. Small units(under 42 inch) can be installed in either a horizontal or vertical orientation. Larger units must be preengineered to run in the horizontal position as they require thrust bearings. If the unit was not pre-ordered to run horizontally, do not install the unit hori-

zontally. Vertical units should be supported from the bottom in the installed position. Horizontally mounted units should be supported at all four comers and in the center.

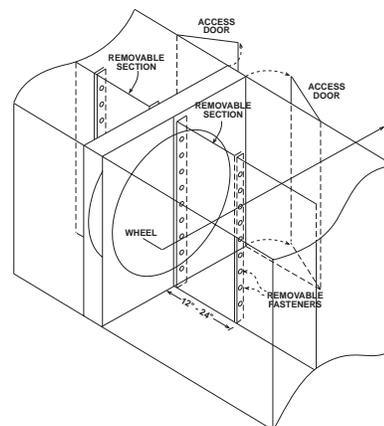
7. Before installing, turn the wheel by hand in the direction of rotation to insure that the wheel alignment was not altered in shipping. If severe binding occurs, it could be due to excessive seal contact. In this case, adjust the seals according to the instructions given in the seal adjustment procedure in section 5.

8. The ECW seals were preadjusted before leaving the factory. If upon inspection excessive clearance between seals and sealing surfaces is found, adjust the seals according to the procedure given in section 5 .

9. Inspect the drive belt and make sure that it is securely fastened around the drive sheaves and wheel. If possible test run the wheel before installation.

10. Install the unit. Once the unit is in place, secure the ductwork to the cassette with sheet metal screws, bolts, welding, or alternate method of attachment. Gasketing may be used at the joints, but it must be installed securely so that it can not detach and cause rotor damage. The duct work should be securely fastened to the cassette at all locations.

11. The wheel should be protected using an ASHRAE 30% filter installed in both the outdoor air and return air streams.



**Figure 2**

Suggested access doors and removable panels to facilitate wheel removal

## Section 4

### Controls and Wiring

#### Drive Motor

The ECW comes standard with a constant speed drive motor. Usually this motor is 220V, 1 Ph, but it can be customer specified. ECW motors are standard motors, and should be wired like any standard motor. They have been prewired to turn the proper direction. Follow the directions on the motor schematic accompanying the motor. Some motors can accommodate either 220V or 440V operation. Once the motor is wired, test run the ECW and check for proper rotation.

#### Variable speed frequency control

If the variable speed option has been supplied, the variable frequency controller's power rating, power supply, and motor selection have all been matched up by the manufacturer. The unit can accept either a 4-20ma or 0-20ma control signal or a 0-5VDC or 0-10VDC. The unit has also been programmed for the range of wheel speed operation recommended by the manufacturer. Typical wheel speed is 45 RPM, but the programming can allow for wheel speeds above or below 45 RPM. Check all factory settings to make sure they are consistent with the application. Consult NovelAire for any help in achieving the right setup for the application.

The VFD may have been shipped loose for flexibility in mounting. Locate the VFD where it can be read and reached easily. Mount the VFD where it is protected from the weather.

The control signal to the VFD is customer supplied, but typically it will be either a temperature or a humidity reading. Typical wheel speed will be controlled either by exhaust humidity or exhaust temperature measurement. Some applications for sensible wheel exchangers in desiccant cooling systems may call for wheel speed controlled by supply temperature.

#### Frost Prevention Measures

During extremely cold winter time conditions, frost formation becomes a possibility. The stream that is under risk from frost formation is the exhaust air stream. Frost formation will basically act to plug or reduce air flow and will not hurt the wheel itself.

Wheel speed control works to limit frost formation by reducing wheel performance to a level where the exhaust air temperature is kept above the dew point. Proper dew point control of exhaust air can be determined using psychometrics by:

- 1) Locating the winter time design return air condition and outdoor air condition and connect the two points on a psych chart.
- 2) Determine the dry bulb temperature at which this line intercepts the saturation curve.
- 3) Add 2 degrees and set dew point control at this point and vary wheel speed downward to control at or above this point.
- 4.) Audit performance of the wheel during actual operation. If frost formation is never evident, it may be because design conditions are never reached in which case it may be possible to gradually work dew point control down.

Other control strategies for preventing frost formation include preheating outdoor air, preheating return air, face and bypass control, or differential pressure control.

## Section 5

### Startup and Operation

#### Prestartup checks

Before starting up the unit, check the following:

1. Does the rotor rotate freely by hand? If not, recheck the seal to determine whether or not it is binding and if so adjust seals following the instructions below.

2. Is the motor rotation correct? This can be checked by detaching the belts from the drive sheave and bumping the motor. The sheave should be rotating in the direction such that the belt will result in rotation per the exterior markings. If not, rewire the motor.

3. Does the air flow orientation match up to design? See the identification markings on the cassette and/or refer to the general arrangement drawing to check the four duct connections to the unit.

4. Are the belts on correctly and sufficiently tight? Belt length is set by the manufacturer. Consult NovelAire if the belt appears too loose.

5. Is the VFD programmed to control the unit and to prevent frost formation? If not, follow the instructions in the manual accompanying the VFD and/or consult NovelAire.

#### Sealchecks

The ECW is provided with a neoprene bulb seal which provides not only an effective seal in both the peripheral and side-to-side sealing directions but also one which is easily adjusted to compensate for seal run-in, shipping misalignment, etc. The neoprene bulb is attached to a metal reinforced U-shaped neoprene grip. The metal/neoprene grip allows for an expandable grip range which can be moved closer or further from the sealing face as needed. The peripheral bulb seals against the wheel outer band and the inner bulb seals against the wheel face. With the wheel stopped, move seals as close to the sealing surface as possible but without exceeding grip range of bulb seal and without pressing the bulb down against the seal face. Bump the motor. If the motor will not turn, the seal is too close and should be nudged back where needed. The seal will seek its equilibrium position based on the closest part of the sealing face. Because the seal is meant to be a noncontact seal, small gaps may be seen between seal and sealing surface

once the equilibrium position is reached. Seal leakage is meant to be under 5% at 1 inch of differential between supply and exhaust.

Some seal run-in is to be expected, so don't be alarmed by small amounts of wear in the neoprene.

#### Variable speed drive(VFD)

Check the power supply for proper rating. Make sure that the proper jumper orientation is used for the specific control input. Make sure that the unit is programmed for proper input voltage and output voltage.

## Section 6

### Maintenance

#### Bearings

Small ECWs(smaller than ECW666) are provided with no maintenance inboard bearings. These bearings should require no maintenance during the life of the equipment. Larger ECWs come equipped with an external flanged bearing which should be greased annually. Use a petroleum based lubricant.

#### Drive Motor

The drive motors should require no maintenance. Replacement motors may be purchased from normal motor distributors such as Grainger, or directly from NovelAire if preferred.

#### Drive Belts

NovelAire ECW belts are multilink belts with individual links constructed of a high performance polyurethane elastomer reinforced with multiple plies of polyester fabric. This belt provides a strong, yet flexible belting. The multilink feature provides quick, easy servicing or replacement. See the Appendix for belt repair/replacement instructions.

#### Seals

The seals are designed to be durable and require no maintenance other than adjustment, but if seals become worn or damaged they may easily be replaced. The seals are made to clip on the cassette or post metal easily. Call NovelAire for servicing information.

#### Wheel

The wheel is designed to last the life of the equipment. It should be protected by an ASHRAE 30% filter to keep dust and dirt from the heat transfer surface. The wheel is somewhat self cleaning through its normal action of rotating in and out of countercurrent air flow streams. If the wheel becomes dirty, it may be cleaned by blowing out the unit with compressed air(20 psig maximum). In cases of severe uncleanliness, the wheel may be removed from the cassette and washed with water following wheel removable procedures outlined below:

1. Remove air handler plenum sections so that the front or back of the cassette may be easily accessed and cleared.

2. Support the wheel from the bottom.

3. If the unit is equipped with an external flanged bearing, loosen the allen screws in the bearing housing that keeps the shaft affixed in the horizontal plane on both bearing , front and back. Remove the shaft clips at the face of the hub from both sides of the shaft. Unbolt one post completely and remove post with bearing completely out. Remove the shaft. Roll the wheel carefully out.

4. If the unit is equipped with an internal bearing, unbolt the shaft screw on both sides of the shaft. Unbolt one post completely and remove post. Remove the shaft clips at the face of the hub from both sides of the shaft. Remove the shaft. Roll the wheel out carefully

5. With the wheel out, wash the media carefully with water. Once clean, allow the media to dry out for several hours or days if necessary.

6. Reinstall using the reverse procedure. Run the unit. It may take several hours for the desiccant to dry out and for the wheel to perform normally.

#### Variable frequency controller

No maintenance should be required on the VFD. Should problems with the VFD develop, consult the VFD service manual. that accompanied your order or call NovelAire for service information.

## Section 7

### Troubleshooting

Use the following chart to diagnose and correct problems:

Symptom	Cause
Inadequate Wheel Performance	Check wheel rotation speed
	Check for wheel integrity and adjust seals or replace worn seals
	Check entering air conditions and compare to design
	Check ducting for leakage and fix any leaks
	Check media for dirt and clean per cleaning instructions
Improper Wheel Rotation	Check drive belts for engagement with sheave
	Check drive motor
	Check drive motor wiring for proper voltage
	Check VFD programming
	Check VFD input sensor (temp/RH) for malfunctioning
High Pressure Drop	Check air flow compare to design
	Check filters and clean/replace as necessary
	Check media for pluggage and clean per cleaning instructions
Noise	Check seals and adjust as necessary
	Check the bearings for source of noise
	Check the belts for slippage

# Appendix 1

## VFD Schematics

Model	XCBU	230V 3-phase	20P1	20P2	20P4	20P7	21P5
Output characteristics	Max. applicable motor output HP (kW)*		0.13 (0.1)	0.25 (0.2)	0.5 (0.4)	1 (0.75)	2 (1.5)
	Inverter capacity (kVA)		0.3	0.6	1.1	1.9	2.6
	Rated output current (A)		0.8	1.5	3.0	5.0	7.0
Power supply	Max. output voltage (V)	230V 3-phase 240V single/ 3-phase	200 to 230V (proportional to input voltage)				
	Max. output frequency (Hz)		200 to 240V (proportional to input voltage)				
Control characteristics	Rated input voltage and frequency	230V 3-phase 240V single/ 3-phase	3-phase: 200 to 230V, 50/60Hz single-phase: 200 to 240V, 50/60Hz 3-phase: 200 to 230V, 50/60Hz				
	Allowable voltage fluctuation		±5%				
Protective functions	Control method		Sine wave PWM w/ full-range automatic torque boost				
	Frequency control range		0.5 to 400Hz				
	Frequency accuracy (temperature change)		Digital command: ±0.01% (14 to 122°F, -10 to +50°C) Analog command: ±1% (77°F ± 18°F, 25°C ± 10°C)				
	Frequency setting resolution		Digital operator reference: 0.1Hz (< 100Hz), 1Hz (100Hz or more) Analog reference: 0.06Hz/60Hz (1/1000)				
	Output frequency resolution		0.1Hz				
	Overload capacity		150% of rated output current for 1 minute				
	Frequency reference signal		0 to +10VDC (20kΩ), 4 to 20mA (250Ω) selectable				
	Accel/decel time		0.1 to 999 sec (accel/decel times are set independently)				
	Braking torque		Short-term average deceleration torque:** 0.13HP 0.25HP (0.1kW, 0.2kW): 150% 0.5HP, 1HP (0.4kW, 0.75kW): 100% 2HP (1.5kW): 50% or more Continuous regenerative torque: approximately 20% (150% w/ optional braking resistor, braking transistor built-in)				
	V/f characteristics		Custom V/f pattern is possible				
Motor overload protection		Electronic thermal overload relay					
Instantaneous overcurrent		Motor coasts to a stop at approx. 250% of inverter rated current					
Overload		Motor coasts to a stop after 1 min. at 150% inverter rated output current					
Overvoltage		Motor coasts to a stop if DC bus voltage exceeds 410V.					
Undervoltage		Motor coasts to a stop when DC bus voltage is 200V or less (approx. 160V or less for single/3-phase series)					
Momentary power loss		The following operations are selectable: Not provided (stops if power loss is 15ms or longer) Automatic restart at recovery from 0.5s power loss Automatic restart					
Heatsink overheat		Protected by electronic circuit					
Current limit level (stall prevention)		Independently programmable during accel and constant speed running. Provided/not provided selectable during decel.					
Ground fault		Protected by electronic circuit (overcurrent level)					
Power charge indication		Run LED stays ON or digital operator LED stays ON					

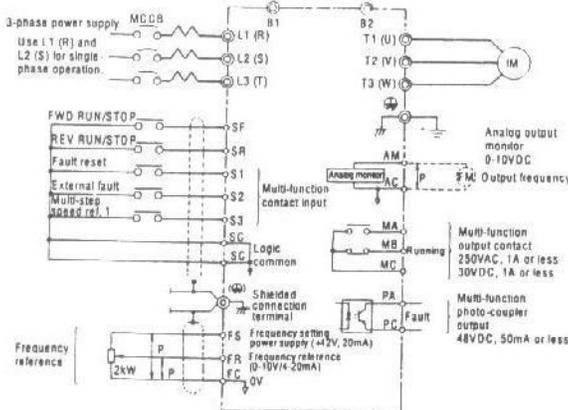
Model	XCBU	230V 3-phase	20P1	20P2	20P4	20P7	21P5
Input signals	Run/stop input		Two signals (forward run/stop, reverse run/stop)				
	Multi-function input		Three of the following input signals are selectable: forward/reverse run (3-wire control), fault reset, external fault (N.O./N.C. contact input), multi-step speed operation, jog command, alternate accel/decel time selection, external baseblock (N.O./N.C. contact input), speed search command, accel/decel hold command, LOCAL/REMOTE selection, UP/DOWN command				
	Multi-function output		Two of the following output signals are selectable (1 N.O./N.C. contact output, 1 photo-coupler output): fault, running at frequency, zero speed, frequency detection (output frequency < or > set value), during overvoltage detection, during baseblock, during undervoltage detection, during speed search, operation mode				
	Analog monitor		0 to +10VDC output, programmable for output frequency or output current				
	Standard functions		Full-range automatic torque boost, fault retry, upper/lower frequency limit, DC injection braking current/time at start/stop, frequency reference gain/bias, jump frequency, analog meter calibrating gain, S-curve accel/decel, slip com.				
	Status indicator LED		Run and ALARM LED's provided as standard				
	Digital operator (JVOP-120)		Monitors frequency reference, output frequency, output current, FWD/REV selection				
	Terminals		Screw terminals for both main circuit and control circuit				
	Wiring distance between inverter and motor		100m or less				
	Enclosure		Open chassis (IP 20)				
Environmental cond.	Cooling method		Self-cooling				
	Ambient temperature		14 to 122°F (-10 to 50°C)				
	Humidity		95% RH or less (non-condensing)				
	Storage temperature***		-4 to 140°F (-20 to 60°C)				
	Location		Indoor (free from corrosive gases or dust)				
	Elevation		3,280 ft (1,000m) or less				
	Vibration		Up to 9.8m/s <sup>2</sup> (1G) at less than 20Hz, up to 1m/s <sup>2</sup> (0.2G) at 20 to 50Hz				

\* Based on a standard 4-pole motor for max. applicable motor output.

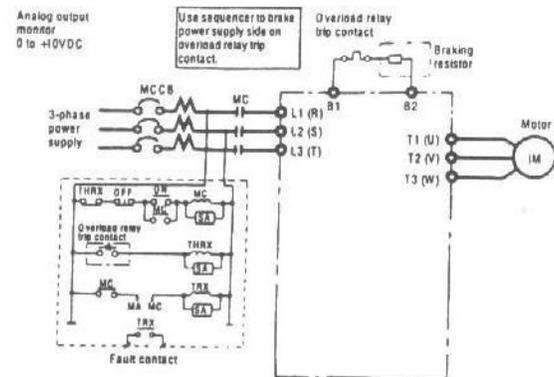
\*\* Shows deceleration torque for an uncoupled motor decelerating from 60Hz w/ shortest time.

\*\*\* Temperature during shipping (for short periods of time)

### Standard Connection Diagram



### Braking Resistor Connection Example



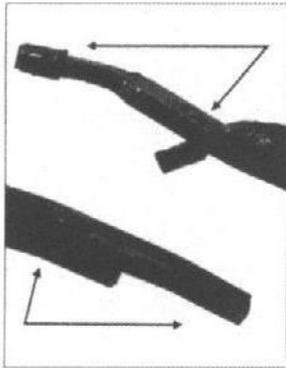
### Terminal Description

Type	Terminal	Terminal Name	Terminal Function (Signal Level)	
Main Circuit	L1(R), L2(S), L3(T)	AC power supply input	L1 (R) and L2 (S) for single-phase power supply	
	T1(U), T2(V), T3(W)	Inverter output	For inverter output	
	B1, B2	Braking resistor connection	For braking resistor connection	
Control Circuit	E (G)	Ground	For grounding (Class 3 grounding - 100W or less)	
	Input	SF	Forward Run/Stop	Runs when "closed", stops when "open"
		SR	Reverse Run/Stop	Runs when "closed", stops when "open"
		S1	Multi-function contact input 1	Factory preset is "fault reset"
		S2	Multi-function contact input 2	Factory preset is "external fault (NO contact) input"
		S3	Multi-function contact input 3	Factory preset is "multi-step speed reference 1"
	Frequency Reference	SC	Sequence common	Common terminal for sequence input
		FS	Frequency setting power supply	+12V (allowable current 20mA maximum)
		FR	Frequency reference input	0 to 10VDC (20kΩ) or 4 to 20mA (250Ω)
	FC	Frequency reference input common	0V	
Output	AM	Analog monitor output	Factory preset is "output frequency"	
	AC	Analog monitor output common	0V	
	MA	N.O. contact output	Factory preset is "during running"	
	MB	N.C. contact output	Factory preset is "fault"	
	MC	Contact output common	Contact capacity: 250VAC, 1A or less	
	PA	Photocoupler output	Factory preset is "fault"	
PC	Photocoupler output common	Photocoupler output: 48VDC, 50mA or less		



Technology in Motion

**HOW TO MEASURE,  
 ASSEMBLE & INSTALL**



**I. HOW TO MEASURE**

Pull belt tight around sheaves to check hand tight length, overlapping the last two tabs with two holes in matching links as shown. Count the number of links and remove one link for every 24 of O/3L, A/4L and B/5L Sections, and one link for every 20 of C and D Sections. This gives the correct installed belt length and will ensure optimum belt tension when running. Note: Every tenth link is designated with an arrow (←). For multiple belt drives, ensure that each belt has the same number of links.

**COMMENT MESURER,  
 MONTER ET INSTALLER**

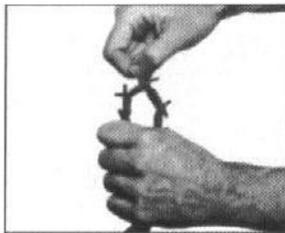
**I. COMMENT MESURER**

Serrez la courroie autour des poulies pour vérifier la longueur correcte, en chevauchant les deux dernières languettes avec deux trous dans les maillons correspondants, comme l'indique la photo. Comptez le numéro de maillons et enlevez un maillon pour tous les 24 de Sections O/3L, A/4L, et B/5L, et un maillon pour tous les 20 des Sections C et D. Cela donne la longueur correcte de la courroie installée et assure la tension optimale de la courroie pendant le fonctionnement. Nota: Tous les dix maillons sont marqués avec une flèche (←). Pour les transmissions à courroies multiples, assurez-vous qu'il y a le même numéro de maillons sur chaque courroie.

**COMO MEDIR,  
 MONTAR Y INSTALAR**

**I. COMO MEDIR**

Apriete la banda alrededor de las poleas para verificar la longitud correcta, traslapando las dos últimas lengüetas con los dos agujeros en los eslabones correspondientes como muestra la foto. Cuente el número de eslabones y quite un eslabón por cada 24 de Secciones O/3L, A/4L y B/5L, y un eslabón por cada 20 de las Secciones C y D. Esto da la longitud correcta de la banda montada y asegura la tensión óptima de la banda durante el funcionamiento. Nota: Cada diez eslabones están marcados con una flecha (←). Asegúrese de que cada banda tiene el mismo número de eslabones en las transmisiones de bandas múltiples.



**II. DISASSEMBLY**

Hold belt upside down. Bend back as far as possible; hold with one hand. Twist one tab 90° parallel with slot.

**II. DEMONTAGE**

Tenez la courroie à l'envers. Pliez en arrière autant que possible; tenez-la avec une main. Tournez une languette 90°, parallèle à la rainure.

**II. DESMONTAJE**

Sujete la banda con la parte de arriba abajo y doble hacia atrás tanto como puede. Sujete con una mano, haciendo girar una lengüeta 90°, paralelo a la ranura.



Pull end of link over tab.

Tirez le bout du maillon sur la languette.

Tire del extremo del eslabón, sobre la lengüeta.



Rotate belt end with tab 90°.

Tourner le bout de la courroie 90° avec la languette.

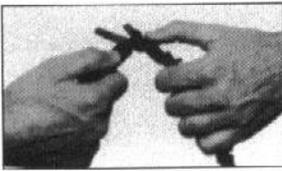
Haga girar el extremo de la banda 90° con la lengüeta.



Pull belt end through two links.

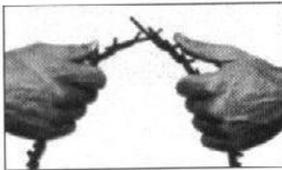
Faites passer le bout de la courroie à travers deux maillons.

Tire del extremo de la banda a través de dos eslabones.



### III. ASSEMBLY

Hold belt with tabs pointing outward.



Place end tab through two links at once.

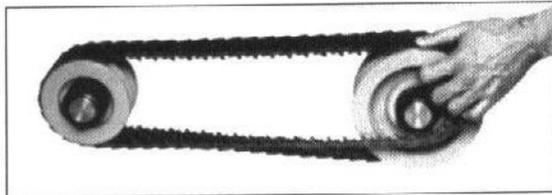


Flex belt further and insert second tab through end link by twisting tab with thumb.



Ensure tab returns to position across belt. Reverse belt so tabs run inside.

**IMPORTANT—Turn Belt INSIDE OUT (As shown) To Ensure Easy Assembly and Disassembly**



### IV. INSTALLATION

1. Turn belt with tabs to the inside before installing.
2. Determine direction of drive rotation.
3. Align belt directional arrow (←) with drive rotation.
4. Fit belt in nearest groove of smaller sheave.
5. Roll belt onto larger sheave, turning the drive slowly. Belt may seem very tight; this is okay; **DO NOT JOG MOTOR.**
6. Check to see all tabs are still in their correct position and are not twisted out of alignment.
7. For multiple belt drives, work belt from groove to groove. On particularly wide drives, it may be easier to install half the belts from the inboard side and half from the outboard. **Note:** With drive ratios around 1:1, it may be necessary to *add back* one link to allow belts to be rolled on. This does *not* apply if using Alternative Installation Method.

### III. MONTAGE

Tenez la courroie, les languettes dirigées vers l'extérieur.

Faites passer la languette de bout à travers deux maillons à la fois.

Pliez la courroie davantage et introduisez la deuxième languette dans le maillon de bout, en tournant la languette avec le pouce.

Assurez-vous que la languette revient à sa position en travers la courroie. Retourner la courroie de manière que les languettes passent à l'intérieur.

**IMPORTANT—RETOURNER LA COURROIE (Comme l'indique la photo) Pour Assurer le Montage et le Démontage Faciles**

### IV. INSTALLATION

1. Tournez la courroie, avec les languettes à l'intérieur, avant de l'installer.
2. Déterminez le sens de rotation de la transmission.
3. Alignez la flèche de direction de la courroie (←) avec la rotation de la transmission.
4. Mettez la courroie en place dans la rainure la plus proche de la poulie la plus petite.
5. Montez la courroie sur la poulie plus grande, en faisant tourner lentement la transmission. La courroie peut sembler très tendue, mais cela n'a pas beaucoup d'importance; **N'AVANCEZ PAS LE MOTEUR PAS A PAS.**
6. Vérifiez que toutes les languettes sont dans leurs positions correctes et qu'elles ne sont pas désalignées.
7. Quant aux transmissions à courroies multiples, posez la courroie en travaillant de rainure en rainure. Sur les transmissions particulièrement larges, il se peut qu'il soit plus facile de monter la moitié des courroies depuis le côté intérieur et l'autre moitié depuis le côté extérieur. **Note:** Pour les rapports d'entraînement d'environ 1:1, il faudra peut-être *réinstaller* un maillon pour permettre la mise en place des courroies. Cela *ne* s'applique pas à la Méthode Alternative d'Installation.

### III. MONTAJE

Sujete la banda, con las lengüetas hacia afuera.

Meta la lengüeta de extremo a través de dos eslabones a la vez.

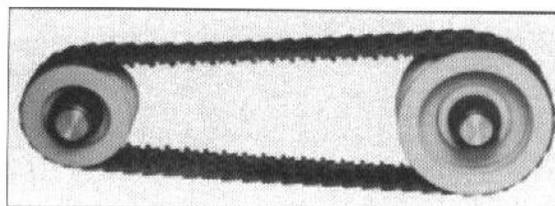
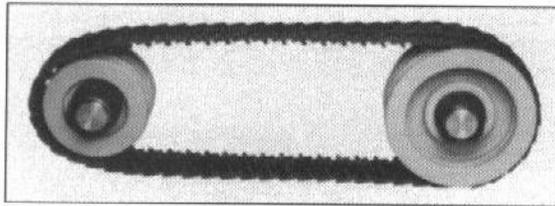
Doble la banda más y introduzca la segunda lengüeta a través del eslabón de extremo, haciendo girar la lengüeta con el pulgar.

Asegúrese de que la lengüeta vuelve a su posición a través de la banda. Vuelva la banda de manera que las lengüetas pasen hacia dentro.

**IMPORTANTE—VUELVA AL REVES LA BANDA (Como muestra la foto) Para Asegurar el Montaje y el Desmontaje Fáciles**

### IV. INSTALACION

1. Vuelva la banda, con las lengüetas hacia dentro, antes de instalarla.
2. Determine el sentido de rotación de la transmisión.
3. Alinee la flecha de dirección (←) de la banda con la rotación de la transmisión.
4. Coloque la banda en la ranura más cercana de la polea más pequeña.
5. Coloque la banda en la polea más grande, haciendo girar lentamente la transmisión. La banda puede parecer apretado, pero, no importa; **NO AVANCE POCO A POCO EL MOTOR.**
6. Verifique que todas las lengüetas están todavía en sus posiciones correctas y que no están desalineadas.
7. En cuanto a las transmisiones de bandas múltiples, coloque la banda, trabajando de ranura a ranura. En las transmisiones especialmente anchas, puede ser más fácil de montar la mitad de las bandas desde el lado interior y la otra mitad de las bandas desde el lado exterior. **Note:** Con razones de transmisión de aproximadamente 1:1, puede ser necesario de *reinstalar* un eslabón para permitir la colocación de las bandas. *No* se aplica al Método Alternativo de Instalación.



#### V. ALTERNATIVE INSTALLATION METHOD

1. Set motor to mid position of adjustment range and mark base clearly.
2. Determine required belt length as in I.
3. Push motor forward to minimum center distance.
4. Install belts as in IV.
5. Pull motor back to previously marked mid position.

#### VI. RETENSIONING

Like all high performance V-belts, PowerTwist Plus V-Belts require the maintenance of correct drive tension to operate efficiently. Experience indicates that drive tension should be checked after 24 hours running at full load. A retension may be necessary depending on the severity of the drive. Any initial belt stretch is then taken up. Subsequently, belt tension should be checked periodically and adjusted when necessary.

#### V. METHODE ALTERNATIVE D'INSTALLATION

1. Réglez le moteur au milieu de la plage de réglage et marquez la base clairement.
2. Déterminez la longueur exigée de la courroie suivant le numéro I.
3. Poussez le moteur en avant jusqu'à la distance de centre en centre minimale.
4. Montez les courroies suivant le numéro IV.
5. Tirez le moteur en arrière à la position centrale déjà marquée.

#### VI. RETENSIONNAGE

Comme toutes les courroies en V de haut rendement, Les Courroies en V PowerTwist Plus exigent le maintien de la tension correcte de la transmission pour fonctionner d'une manière efficace. L'expérience montre qu'il faut vérifier la tension de la transmission après 24 heures de marche à pleine charge. Il faudra peut-être rétendre selon la sévérité de la transmission. Alors, tout allongement initial des courroies est rattrapé. Par la suite, la tension des courroies doit être vérifiée de temps en temps et réglée au besoin.

#### V. METODO ALTERNATIVO DE INSTALACION

1. Monte el motor a la posición media de la gama de reglaje y marque la base claramente.
2. Determine la longitud requerida de la banda, según el número I.
3. Empuje el motor hacia adelante a la distancia entre ejes mínima.
4. Monte las bandas, según el número IV.
5. Tire del motor hacia atrás a la posición media marcada anteriormente.

#### VI. REATESAMIENTO

Como todas las bandas V de alto rendimiento, las Bandas V PowerTwist Plus necesitan el mantenimiento de la tensión correcta de transmisión para funcionar de manera eficiente. La experiencia muestra que hay que verificar la tensión de transmisión después de 24 horas de marcha a plena carga. Puede ser necesario de atesar de nuevo según la severidad de la transmisión. Así, se compensa todo alargamiento inicial de la banda. A partir de entonces, la tensión de la banda debe ser verificada de vez en cuando y ajustada según sea necesario.

# PowerTwist<sup>®</sup> Plus<sup>™</sup>

V-BELTS

# NOVELAIRE TECHNOLOGIES

HEAT & MASS TRANSFER PRODUCTS

10132 Mammoth Avenue  
Baton Rouge, LA 70814-4420  
Phone: (800) 762-1320 or  
(225) 924-0427  
Fax: (225) 930-0340  
website: [www.novelaire.com](http://www.novelaire.com)  
e-mail: [novelair@eatel.net](mailto:novelair@eatel.net)

# NOVELAIRE TECHNOLOGIES

## Cleaning the Energy Conservation Wheel

In the event that routine annual inspection indicates that there is dirt or dust buildup within the wheel causing an excessive pressure drop, then wheel cleaning should be performed as follows:

1. Using a standard shop vacuum, vacuum any debris from both faces of the wheel. Slowly work around the entire face of the wheel to complete the procedure. Do not damage wheel face by excessive pressure of the vacuum nozzle on the wheel face.
2. Using 20 psig clean dry air, and a small air nozzle, blow air through one face of the wheel. At a similar location on the opposite side of the wheel, gently apply a shop vacuum to “receive” any remaining debris exiting the wheel.

In the event that this method does not remove visual buildup or return pressure drop to within normal parameters, a wheel washing procedure is recommended. The NovelAire Technologies’ energy conservation wheels can be washed thoroughly with water without affecting the performance of the wheel. The wheel will simply dry out following a washing procedure and resume normal energy transfer without any deviation in performance.

If the energy conservation wheel can be easily removed from the cassette or unit, it is recommended to do so to facilitate the washing process. However, in most cases, it is impractical to remove larger wheels and therefore, the washing procedure must take place within the air handling unit and provisions need to be made to collect the runoff water from the bottom of the unit or collect the water by using a wet vac on the opposite side of the wheel during the procedure.

1. Shield all electrical components and bearings with plastic sheeting. Ensure that an adequate drainage system exists to collect runoff water from the bottom of the unit. Alternatively, use a wet vac with a wide nozzle on the opposite face of the wheel to collect the water during the washing procedure.
2. Disable the drive motor.
3. Using standard pressure water (do not use a high pressure washer) and working from the one side of the wheel, wash the wheel with a standard “garden” nozzle to flush any debris trapped within the flutes of the wheel. If desired, a mild detergent can also be used to enhance cleaning without effecting the performance of the wheel.

4. After washing, energize the drive motor and begin rotating the wheel. Place the unit back into service and the wheel will dry completely and return to normal performance in a relatively short period of time.