

## CB-018N2 Circuit Board

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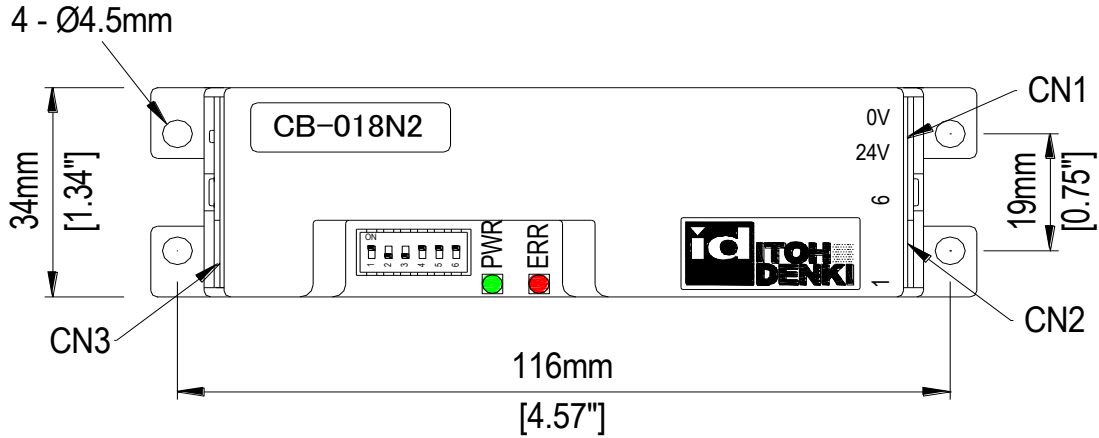


### Features

- Acceleration and deceleration control
- Stable speed operation
- Variable speed control with dip switches or by external signal inputs for up to 8 speeds
- Forcibly stops the motor if motor lock or overload errors occur
- Two (2) LEDs (red & green) to identify the status and errors
- Lead free design; RoHS compliant
- Low Voltage Protection reacts when
  - Sustained low voltage (less than 17V DC) for at least 1 second
- Error signal output
- External Direction control for reversing applications

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# SPECIFICATIONS



## Connections

CN1		Male Connector on Card	Female Connector for Wiring
2 PIN connector <b>POWER</b>		WAGO #734-162	WAGO #734-102
PIN	Description		
1	+24V DC	Wire size 28~14AWG	
2	0V		

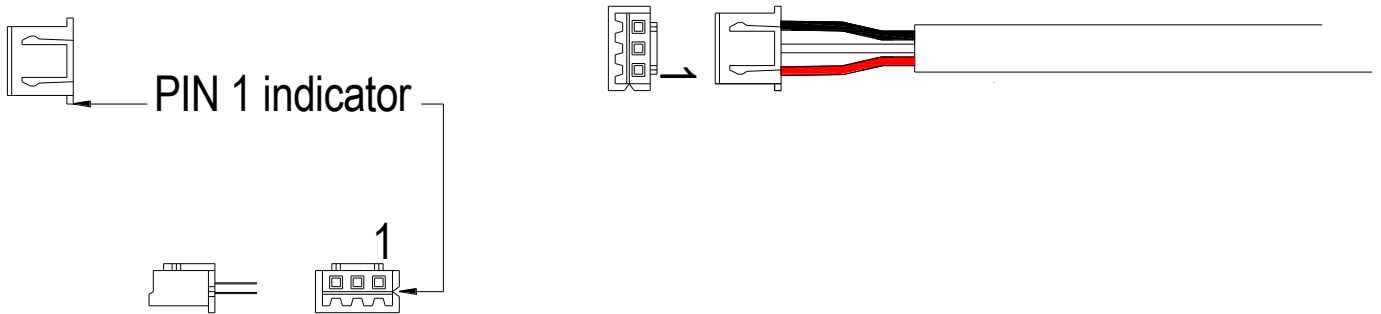
CN2		Male Connector on Card	Female Connector for Wiring
6 PIN connector <b>CONTROL</b>		WAGO #733-366	WAGO #733-106
PIN	Description		
1	RUN (NPN)	Wire size: 28~20AWG	
2	DIR (NPN)		
3	Speed Selection Inputs (NPN) Refer to Speed Change Table on page 6		
4			
5			
6	Error Output (NPN)		

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# SPECIFICATIONS

## Connections (continued)

CN3	3 PIN connector for Motor	Male Connector on Card JST #S3B-XH-A	Female Connector for Wiring JST #XHP-3
PIN	Description		
1	Motor phase U – Red	Wire size: 24~22AWG Terminal pins: JST #SXH-001T-P0.6	
2	Motor phase V – White		
3	Motor phase W – Black		

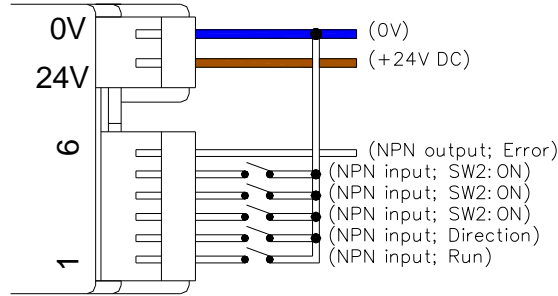


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## Control Wiring

Power to CN1 (24V DC) remains ON, control motor through CN2 (NPN signals only)

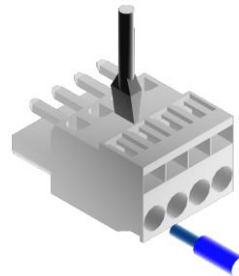


Press down spring clamp in connector with a small screwdriver.

Insert leads in proper order.

Lead should be stripped approx:  
0.31~0.35"

WAGO connector (included) must be inserted and/or pulled out carefully, so as not to damage other parts.



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<b>Electrical</b>	24V DC $\pm 10\%$ input <ul style="list-style-type: none"><li>- Battery</li><li>- Power Supply: fullwave rectified with smoothed current and <math>&lt; 10\%</math> Ripple</li></ul> Power ON delay $< 1s$ 2.2A locking current Input signal level for activation <ul style="list-style-type: none"><li>- 0V (3V or less) NPN</li></ul> Output (Error) signal <ul style="list-style-type: none"><li>- Open collector 35V, 25mA or less</li><li>- NPN</li></ul>
<b>Applicable PM Models</b>	PM320HS
<b>Brake</b>	Dynamic (Electric)
<b>Protection</b>	Thermal protection reaction <ul style="list-style-type: none"><li>- 75° C (167° F) on the PCB</li></ul> Built-in 5A fuse for power supply protection Built-in diode for incorrect wiring protection
<b>Applicable Environment</b>	Temperature 0~40° C (32~104° F) $< 90\%$ Relative Humidity (No condensation) No corrosive gas Vibration $< 0.5G$

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# OPERATION

## DIP Switches – User Settings

DIP-SW	Function	ON setting	OFF setting	Initial setting
1	Accel / Decel	1 sec accel 1 sec decel	Starts / stops with signal timing	ON
2	Speed selection input	External (Input CN2-3, 4 & 5)	Internal (DIP switches 3-5)	OFF
3	Direction*	CW	CCW	OFF
4	Speed Selection	Refer to table below		ON
5				ON
6				ON

\*Direction cannot be changed while run signal is active.

## Speed Change Table (Default ON, ON, ON highest speed)

1	2	3	Nominal Speed (FPM)	Initial Setting
SW1-4	SW1-5	SW1-6		
CN2-3	CN2-4	CN2-5		
OFF	OFF	OFF	19.0	All switches set ON
OFF	OFF	ON	32.5	
OFF	ON	OFF	42.7	
OFF	ON	ON	52.2	
ON	OFF	OFF	61.7	
ON	OFF	ON	72.2	
ON	ON	OFF	81.0	
ON	ON	ON	94.5	

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### LED and ERROR Indications

LED 1 – Green (power) LED 2 – Red (error condition)

Status	LED 1 (Green)	LED 2 (Red)	Error Condition*	Result
Normal operation	●	○	-	Normal
No power	○	○	-	Supply power (24V DC)
Motor Run	Flashes (1Hz) ● ○	○	-	Motor is running normally (See Note)
Fuse blown or low voltage (<17V)	○	Flashes (1Hz) ● ○	Current overload or $\leq 17V$	Card must be replaced or supply stable 24V DC
High current (while running)	Flashes (1Hz) ● ○	Flashes /OFF ●●●●○ (2 sec) ○○○○○ (2 sec)	1 -1.5 A (Run signal ON $\leq 12s$ )	May indicate overload during operation
High current (while running)	Flashes (1Hz) ● ○	Flashes (6Hz) ●●●●○ ●●●●○	1 -1.5 A for $\geq 12s$ or $\geq 1.5 A$ for 4s	May indicate overload during operation, motor stops
Low voltage (<17V) and high current	○	Flashes /OFF ●●●●○ (0.4s) ● (0.6s)	$\leq 17V$ DC and 1 -1.5 A for $\geq 12s$ or $\geq 1.5 A$ for 4s	Motor stops
Thermal protection**	Flashes (1Hz) ● ○	●	PCB reached thermal limit	Motor stops 1s after reaction
Motor lock or motor not plugged in	Flashes (1Hz) ● ○	Flashes (1Hz) ● ○	Motor does not turn for 1s or motor is unplugged	Motor stops

**Note: Green LED flashes when the RUN input signal is active, even during an error condition**

\*To reset an error condition: Remove all input signals; then reapply an input signal to CN2-1 (RUN). The red LED error condition will not reset until run signal is re-applied.

\*\*Thermal protection can only be reset once the card reaches operating temperature. If the reset is attempted while thermal protection is active the motor will stop 1s after run signal is applied and red LED will illuminate again.

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### Installation Precautions – IMPORTANT, PLEASE READ BEFORE INSTALLATION

Precaution	Action	Reason
<b>Power supply</b>	If the power supply is not sized appropriately for the number of cards/rollers it provides power to, then a low voltage condition may occur.	If the voltage drops below 17V DC and remains low for 1s, then the low voltage error will appear.
<b>Multiple power supplies</b>	0V line of the power supply for the card must be common to the 0V line of the power supply for the controls (RUN, DIR, etc.).	This completes the signal path from the controller (PLC, etc.) to the motor driver card.
<b>Voltage drop across the power bus</b>	Use suitable gauge wire in relation to distance and current draw to prevent voltage drop.  <u>Operating</u> DC voltage is 24V ±10%	When running long distances from a DC power supply, the voltage drop during motor operation across the power bus may be significant (may drop below 15V!). If there is a large enough drop in voltage, the roller(s) may behave in a strange manner. In order to prevent this, a larger gauge wire must be used.
<b>Grounding</b>	Ensure the control card is securely grounded to the conveyor frame. The conveyor frame should also be at the same potential reference as earth ground. Standard grounding practices should be followed.	Static discharge may interfere and damage internal components.
<b>Electrical</b>	24V DC ±10% 2.2A maximum current limiter (motor lock is 2.2A) Diode protection for miss-wiring Sensor power short circuit protection 5A fuse for power supply protection	Improper power will damage the card. The motor/card should not be subject to locked conditions repeatedly. Internal fuse is not replaceable. If the fuse has blown, more serious damage has occurred within the card/motor.
<b>Environment</b>	Ambient temperature is 32~104°F Ambient humidity is < 90%RH Atmosphere has no corrosive gas Vibration is < 0.5G Indoor use only	Extreme environmental variables may cause poor or no performance and damage the card.
<b>Over-speeding</b>	Over-speeding of the roller's no-load speed by more than 50% may cause damage.	Back EMF will be generated.

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### Revision History

Revision Number	Change	Created by	Checked by
15-0716	Initial document	BB	KN

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