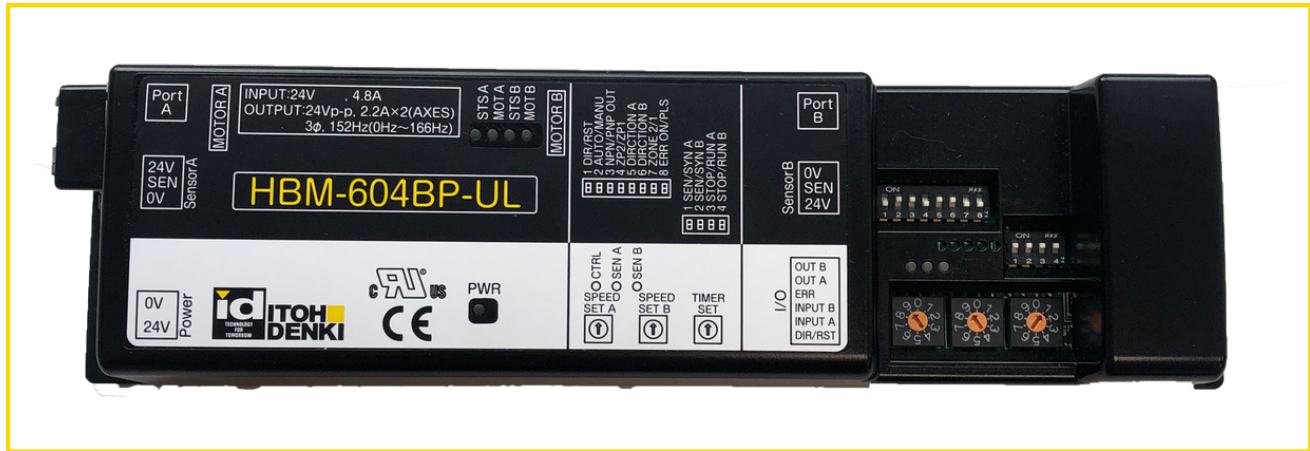


# HBM-604BN/BP

## Driver Card Manual



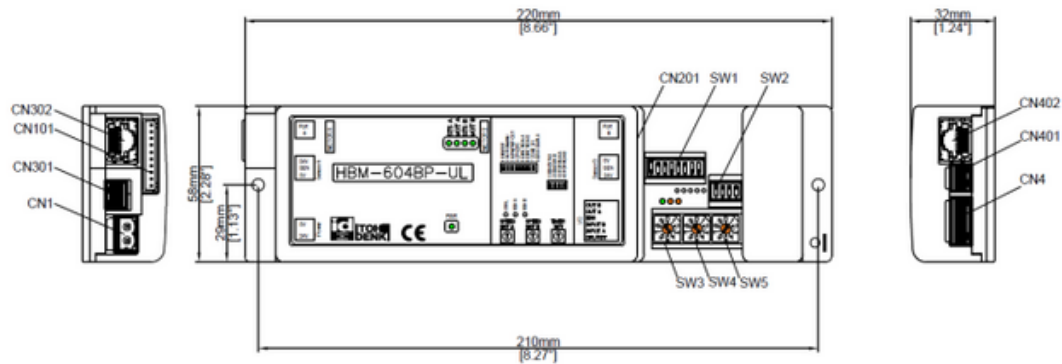
### FEATURES:

- Operates FS, FE and FP series motors  
Runs one or two Power Mollers in one or two zone configurations
  - 10 pin motor connector only
- LED indications for operation and error statuses
- Automatic or manual recovery for error statuses
- Motor protection against overheating, stall condition and overspeeding
- Lead free design for RoHS conformity
- Logic for general zero pressure accumulation (ZPA) is built-in
  - Singulated release
  - Slug (train) release with Flexible Zone Recognition (patented)
- Direct connection for two photo-sensors for power and signal
- Easy connection between adjacent HBM-604B's with communication cables simplifies wiring
- Independent speed control for each motor  
Adjustable timers by rotary switch
- Automatically detects the end of a conveyor line for accumulation when the communication cable is disconnected
- Stable speed function to ensure that different weight articles travel at the same rate
- Enclosure is made from fire resistant ABS

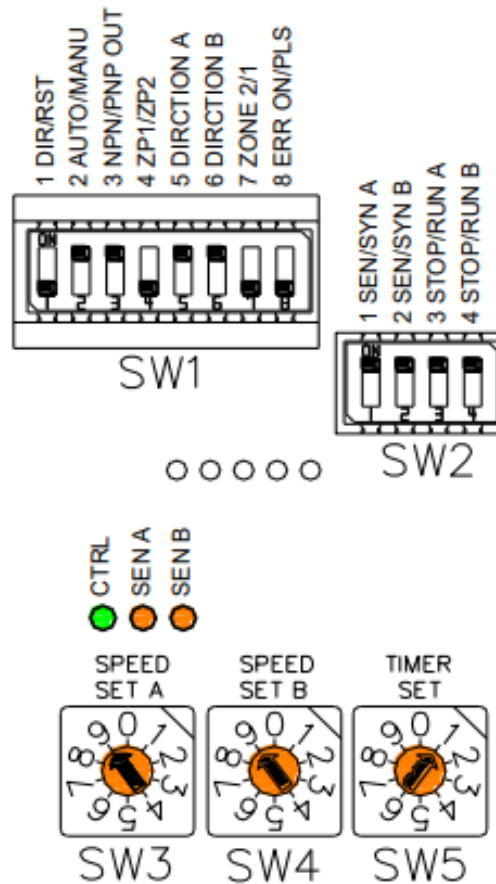
Specifications subject to change without notice

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## DIMENSIONS:



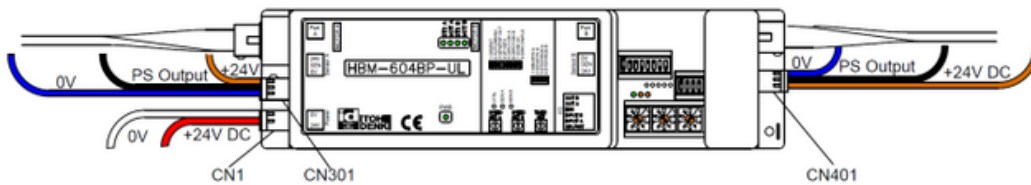
## USER INTERFACE:



CN1	2 PIN Connector for Power	Female Connector for Wiring WAGO #231-302 / 026-000
PIN	Description	
1	+24V DC $\pm 10\%$ (full-wave rectified, smoothed current <10% ripple)	Wire size: 28~14AWG
2	0V	

CN4	<u>Ordered Separately</u> 6 PIN Connector for external control	Female Connector for Wiring WAGO #733-106
PIN	Description	
1	Direction or error reset (selectable on SW1-1)	Wire size: 28~20AWG
2	Motor A forcible run or stop (selectable on SW2-3)	
3	Motor B forcible run or stop (selectable on SW2-4)	
4	Error output	
5	Motor A synchronization or sensor output (selectable on SW2-1)	
6	Motor B synchronization or sensor output (selectable on SW2-2)	

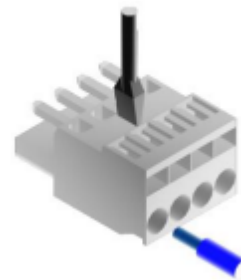
CN301, CN401	3 PIN connector for Photo Sensor	Female Connector for Wiring WAGO #733-103
PIN	Description	
1	+24V DC	Wire size: 28~20AWG
2	+24V or 0V DC input (sensor signal input)	
3	0V	



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 must be inserted and/or pulled out carefully, so as not to damage other parts.



## INPUT / OUTPUT SETTINGS - CN4:

### CN4-1 – Direction / Error reset (selectable by SW1-1; see page 11)

- Direction input (SW1-1; OFF) [Default]
  - Reverses the logic flow and motor direction while the input is active. Logic flow is independent of motor direction.
  - This signal is shared through the communication cable.
- Error reset input (SW1-1; ON)
  - Resets error conditions at the time the signal is input only when the card is in operational condition and causes of errors have been removed. This signal is shared through the communication cable.

### CN4-2 – Input A (selectable by SW2-3; see page 12)

- Forcible run motor A input (SW2-3; ON) [Default]
  - Forcibly runs motor A while signal is active
- Forcible stop motor A input (SW2-3; OFF)
  - Forcibly stops motor A when sensor A becomes blocked while signal is active

### CN4-3 – Input B (selectable by SW2-4; see page 12)

- Forcible run motor B input (SW2-3; ON) [Default]
  - Forcibly runs motor A while signal is active
- Forcible stop motor B input (SW2-3; OFF)
  - Forcibly stops motor B when sensor B becomes blocked while signal is active

### CN4-4 – Error output (selectable by SW1-8; see page 11)

- Pulsed output (PLS; ON)
  - Used when connecting the error output to an IB-E03 / 04 remote input 1 (CN301-1 on IB-E series)
    - PNP pulse with SW2-3 ON
    - NPN pulse with SW2-3 OFF
- Output signal (ERR ON; OFF) [Default]
  - Outputs a signal when an error occurs
    - PNP signal with SW2-3 ON
    - NPN signal with SW2-3 OFF

### CN4-5 – Output A (selectable by SW2-1; see page 12)

- Synchronous output (SYN A; SW2-1 ON) [Default]
  - Outputs a signal on CN4-5 when motor A runs
- Sensor output (SEN A; SW2-1 OFF)
  - Outputs a signal on CN4-5 when sensor A is blocked

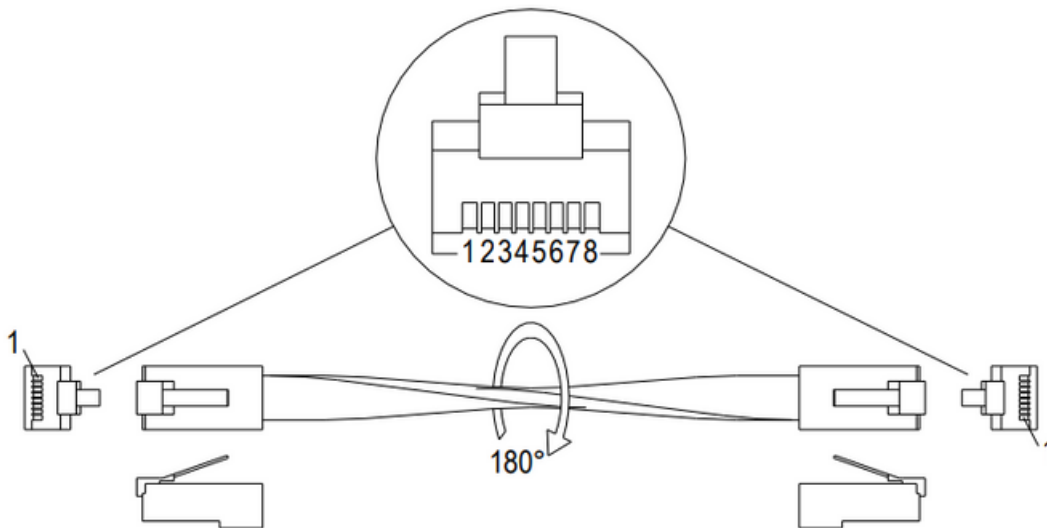
### CN4-6 – Output B (selectable by SW2-2; see page 12)

- Synchronous output (SYN B; SW2-1 ON) [Default]
  - Outputs a signal on CN4-6 when motor B runs
- Sensor output (SEN B; SW2-1 OFF)
  - Outputs a signal on CN4-6 when sensor B is blocked

## CONNECTIONS (CONTINUED):

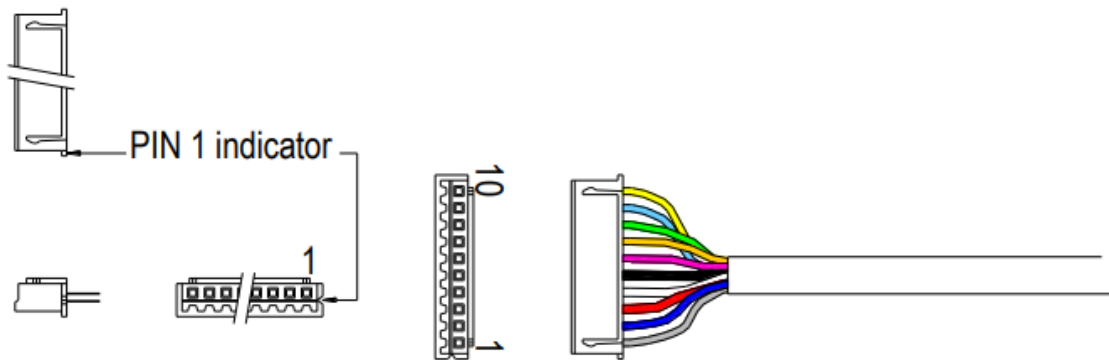
CN302 & CN402	8 PIN connector for Communication Cable	Female Connector for Wiring RJ-45
PIN	Description	Wire size: 26 AWG or Equivalent 8 wire cable
1	Error status	
2	Error status	
3	Motor status	
4	Motor status	
5	Error reset	
6	0V DC	
7	Sensor status	
8	Sensor status	

## COMMUNICATION CABLE – STRAIGHT-THROUGH WIRING (NOT CROSSOVER)



## CONNECTIONS (CONTINUED):

CN6	10 PIN Connector for Motor	Male Connector on Card JST #S10B-XH-A	Female Connector for Wiring JST #XHP-10
PIN	Description		
1	GND – Grey	<p>Wire size: 28~22AWG &amp; 24~22AWG motor phases</p> <p>Terminal pins: JST #SXH-001T-P0.6</p>	
2	+12V DC – Blue		
3	Motor phase U – Red		
4	Motor phase V – White		
5	Motor phase W – Black		
6	Hall sensor U - Violet		
7	Hall sensor V – Orange		
8	Hall sensor W – Green		
9	Thermistor – Light Blue		
10	Brake – Yellow		





**IMPORTANT: PLEASE READ BEFORE INSTALLATION**

Precaution	Action	Reason
<b>Sensor</b>	Use a sensor that would have an active output when the zone is occupied Example: A retro-reflective photosensor would need to be dark-operate	The HBM responds to the active signal received from the sensor to denote zone occupation. If the incorrect type is used, the HBM would “think” that a zone is occupied when it is really clear. Not only would there be problems in ZPA logic operation, but there will also be JAM errors appearing.
<b>Restarting the system after applying ESTOP signal</b>	Make sure transported articles are not between photo-sensors.	Any article between photo-sensors will not be recognized as occupying a zone. Therefore any upstream articles being transported may collide into them.
<b>Powering ON</b>	Keep away from the system when it is first powered ON.	When the system is first powered ON and there is no signal from the photo-sensor for presence of an article, the zone will RUN for a short time at a slow speed to receive or advance any articles which may be between photo-sensors. There may be a risk for bodily injury because of moving rollers and transported articles
	Using as a slave card be sure the timer switch SW5 to zero (0) for slave mode	This eliminates all timer functions and communication. Roller(s) will not run on initial start up in slave mode
<b>Correct cables</b>	RJ-45 connectors 8-wire cables Straight-through wiring pattern	Straight-through wiring means that the connectors on both ends of the cable are wired in the exact same pattern. Cross-over wiring or any other wiring pattern will cause communication problems.
<b>Low impedance connection to PNP output(s)</b>	Ambient temperature is 32~104°F Ambient humidity is < 90% RH Atmosphere has no corrosive gas Vibration is < 0.5G Indoor use only	When the PNP signal is active, the low impedance input will draw a high current and subsequently damage the output circuit. Damage may also occur to the input circuit on the controller.





**IMPORTANT: PLEASE READ BEFORE ISNTALLATION**

Precaution	Action	Reason
<b>Multiple power supplies</b>	OV line of all power supplies on the same conveyor line (powering the card/rollers, & controls) need to be physically linked together.	This completes the signal path from one section of the conveyor (powered by a power supply) to the adjacent section of conveyor (powered by another power supply) and allows for proper communication through the cable and external interfaces.
<b>Voltage drop across the power bus</b>	Use suitable gauge wire in relation to distance and current draw to prevent voltage drop. Operating DC voltage is 24V $\pm$ 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>	The conveyor frame should be at the same potential reference as earth ground. Standard grounding practices should be followed.	Static discharge may interfere with general logic processing, and in possibly damage IC components on the circuit board. The grounding screw ensures proper contact against the grounded metal frame. If a grounded frame is not available to mount against, a ground wire can be attached
<b>Electrical</b>	24V DC $\pm$ 10% 4A maximum current limiter (motor lock is 4A) Diode protection for miswiring 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.

## INPUT / OUTPUT SETTINGS SW1:

DIP-SW	Function	ON Setting	OFF Setting	Initial Setting
1-1	Error Reset or Direction input	Error reset	Direction	OFF
1-2	Error recovery	Manual	Automatic	ON
1-3	PNP or NPN output	PNP	NPN	ON HBM-604BP OFF HBM-604BN
1-4	ZPA release mode	Train / Slug	Singulated	OFF
1-5	Motor A direction	Based on MDR type	Based on MDR type	ON
1-6	Motor B direction	Based on MDR type	Based on MDR type	ON
1-7	Zone count	One zone	Two zones	OFF
1-8	Error output function	Pulsed	Signal when error occurs	OFF

### DIP switch 1-1 – Error Reset or Direction

- Error Reset (RST; ON)
  - When the signal is applied then removed it resets an error(s) on all cards connected by communication cables
- Direction (DIR; OFF) [Default]
  - Reverses the logic and motor direction while signal is applied to all cards connected by communication cables
    - SW 1-5 and 1-6 only change motor direction and do not change logic direction
- If both signals need to be used o Set DIP switch 1-1 ON for one card and input the RST signal to CN4-1 on the same card
  - Set DIP switch 1-1 OFF for another card and input the DIR signal to CN4-1 on the same card

### DIP switch 1-2 – Error recovery

- Manual recovery (MANU; ON) [Default]
  - Some form of user intervention is needed to reset if the card is in thermal protection
  - The temperature of the motor and card must be in operating range in order for the recovery to work
  - Remove power (CN1) to the card, then reapply – most likely case
  - Input then remove a signal to CN4-1 and have DIP switch 1-1 set ON for Error Reset (RST)
    - This will send an error reset signal through all cards connected by communication cables
  - Input a signal to CN4-2 and have DIP switch 2-3 set ON for forcible run for errors on motor A
    - This will reset errors for motor A
  - Input a signal to CN4-3 and have DIP switch 2-4 set ON for forcible run for errors on motor B
    - This will reset errors for motor B
- Automatic recovery (AUTO; OFF)
  - The card will automatically reset the thermal protection once it or the motor has cooled to operating temperature.
  - This will also reset a low voltage error once the voltage becomes stable

## INPUT / OUTPUT SETTINGS SW 1 (CONTINUED):

### DIP switch 1-3 – Output signal type for both CN4-5 (OUT A) & CN4-6 (OUT B)

- PNP (ON) [Default on HBM-604BP]
  - When active the output will be +24V DC
    - Do not connect to a low impedance input, 0V, or GND
- NPN (OFF) [Default on HBM-604BN]
  - When active the output will be 0V DC

### DIP switch 1-4 – Release modes [Default OFF]

- ZP2 (OFF) – In singulated release mode (assuming accumulated conveyor) each zone will advance when its downstream zone is unoccupied
- ZP1 (ON) – In train/slug release mode (assuming accumulated conveyor) all zones will advance in unison

### DIP switches 1-5 and 1-6 - Motor Direction

DIP-SW	Function	ON Setting		OFF Setting		Default Setting
1-5	Motor A direction	FE	FS/FP	FE	FS/FP	ON
		CCW	CW	CW	CCW	
1-6	Motor B direction	FE	FS/FP	FE	FS/FP	ON
		CCW	CW	CW	CCW	

\* Motor direction (as viewed from the cable side; PM486 series) is independent of ZPA logic flow direction. Direction also changes with DIP switch 1-1 OFF and signal input to CN4-1.

### DIP switch 1-7 – Zone Count

- 1 Zone on a card (ZONE 1; ON)
  - Connect motor to CN101 Motor A and sensor to CN301 sensor A
    - When using one motor per zone set SW2-4 to OFF
    - When using two motors per zone set SW2-4 to ON
- 2 Zones on one card (ZONE 2; OFF) [Default]
  - Utilizes both motor ports and sensor ports for two individual zones

### DIP switch 1-8 – Error output function

- Pulsed output (PLS; ON)
  - Used when connecting the error output to an IB-E03 / 04 remote input 1 (CN301-1 on IB-E series)
- Output signal (ERR ON; OFF) [Default]
  - Outputs a signal when an error occurs
    - PNP signal with SW2-3 ON
    - NPN signal with SW2-3 OFF

## INPUT / OUTPUT SETTINGS SW2:

DIP-SW	Function	ON Setting	OFF Setting	Initial Setting
2-1	Sensor A or Motor A synchronous	Synchronization signal	Sensor signal	ON
2-2	Sensor B or Motor B synchronous	Synchronization signal	Sensor signal	ON
2-3	Motor A input function	Forcible run	Forcible stop	ON
2-4	Motor B input function	Forcible run	Forcible stop	ON

### DIP switch 2-1 – Sensor A or Motor A synchronous output

- Synchronous output (SYN A; ON) [Default]
  - Outputs a signal on CN4-5 when motor A runs
- Sensor output (SEN A; OFF)
  - Outputs a signal on CN4-5 when sensor A is blocked

### DIP switch 2-2 – Sensor B or Motor B synchronous output

- Synchronous output (SYN B; ON) [Default]
  - Outputs a signal on CN4-6 when motor B runs
- Sensor output (SEN B; OFF)
  - Outputs a signal on CN4-6 when sensor B is blocked

### DIP switch 2-3 – Motor A input function

- Forcible STOP (OFF)
  - Prevents an article from advancing downstream once motor A's zone (while receiving the signal) becomes occupied
- Forcible RUN (ON) [Default]
  - Forces motor A's zone to RUN
    - This setting overrides accumulation logic
    - RUN Hold timer (SW5) has been added to this input and setting to alleviate the need of an external controller/timer with an infeed photo-sensor. Therefore, once an article clears the photosensor connected to this input (CN4-5), zone A will continue to operate and allow the article to reach the next zone's photo-sensor

### DIP switch 2-4 – Motor B input function

- Forcible STOP (OFF)
  - Prevents an article from advancing downstream once motor B's zone (while receiving the signal) becomes occupied
- Forcible RUN (ON) [Default]
  - Forces motor B's zone to RUN
    - This setting overrides accumulation logic
    - RUN Hold timer (SW5) has been added to this input and setting to alleviate the need of an external controller/timer with an infeed photo-sensor. Therefore, once an article clears the photosensor connected to this input (CN4-5), zone B will continue to operate and allow the article to reach the next zone's photo-sensor

## SPEED ADJUSTMENT:

Rotary switch SW3 – 10 step speed setting for Motor A

- Used to vary the speed on motor A

Rotary switch SW4 – 10 step speed setting for Motor B

- Used to vary the speed on motor B

PM486FE-60

Rotary Switch (SW3 & SW4)	Speed*	
	m/min +/-3%	ft/min +/-3%
9	60	196.8
8	55	180.4
7	50	164.0
6	45	147.6
5	40	131.2
4	35	114.8
3	30	98.4
2	25	82.0
1	20	65.6
0	15	49.2

\* Card controls speed through motor RPM feedback

- Roller surface speed is dependent on a combination of motor RPM, gear-staging, and roller diameter
- This table is based on a PM486FE-60 roller which has 2 stage gearing, a 1.9in diameter tube, and motor RPM which is adjustable through the entire selectable range
- If a motor is a slower speed, and all other factors remain the same, any settings above the motor's top speed will have no effect
  - For example: PM486FE-20 will reach its maximum speed at setting 2. Any higher settings (3~9) will have no effect on its speed

## TIMER SETTINGS:

Rotary switch SW5 – 10 step timer setting for both motors

- Used to vary timer settings for the run hold timer, sensor timer and jam timer

Rotary Switch (SW5)	Time (seconds)	
	Run Hold & Sensor	Jam
9	18	36
8	16	32
7	14	28
6	12	24
5	10	20
4	8	16
3	6	12
2	4	8
1	2	4
0	Slave mode	

**Sensor Timer:** controls the RUN time of the motor during the zone's infeed operation in the ZPA system

- Present zone must receive signals through the communication cable from the upstream zone to function
- Present zone will RUN when
  - Present zone's photo-sensor is clear o Upstream zone's photo-sensor becomes blocked
    - Also, it sends a RUN signal to the present zone
- Sensor Timer starts when
  - Present zone is running due to the condition above
  - AND the upstream zone's photo-sensor becomes clear
    - If a jam occurs in the upstream zone
      - Sensor Timer never starts
      - Present zone will stop when upstream zone's Jam Timer reaches set time
- Sensor Timer will STOP the present zone when
  - Present zone is running and its photo-sensor remains clear
  - AND Sensor Timer reaches the set time
- Sensor Timer is RESET when o It reaches the set time
  - Present zone's photo-sensor becomes blocked
  - Upstream zone's photo-sensor becomes blocked again
- Run hold Timer is RESET when
  - It reaches the set time
  - Present zone's photo-sensor becomes blocked
  - Upstream zone's photo-sensor becomes blocked

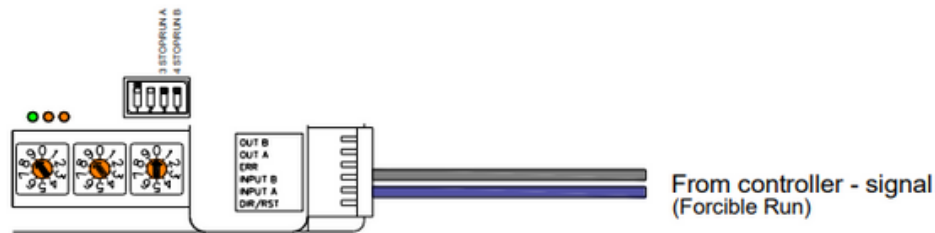
## TIMER SETTINGS (CONTINUED):

**Jam Timer:** controls the RUN time of the motor during the zone's running operation in the ZPA system

- Jam Timer starts when
  - Present zone is running and its photo-sensor becomes blocked
- Jam Timer will STOP the present zone when
  - Present zone is running and its photo-sensor remains blocked
  - AND Jam Timer reaches the set time
- Jam Timer is RESET when
  - Present zone's photo-sensor becomes clear
  - Downstream zone's photo-sensor becomes blocked
- Initial startup seek to sensor time is the same as the jam timer value. ZPA will not begin until this time expires.

## OTHER SETTINGS:

**Slave Mode:** this setting is used when the HBM-604 is used as a driver / slave card

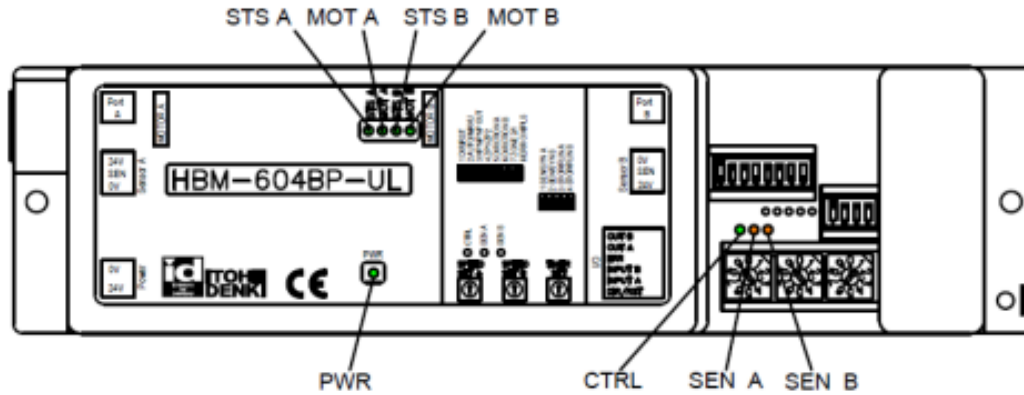


- Motor runs when a signal is present on CN4 and stops when the signal is removed
  - SW5 must be set to zero (0)
  - SW2-3 set to ON and signal input to CN4-2 to run motor A
  - SW2-4 set to ON and signal input to CN4-3 to run motor B

### PNP / NPN inputs

- The card(s) are ordered with the inputs preset from the factory – ALL PNP or ALL NPN. The model designation will show the factory preset.
  - HBM-604BP – PNP input type
  - HBM-604BN – NPN input type
- Note –signal type for all outputs can be manually switched in the field by DIP switch 1-3. When the signal is not active, there is no voltage present
  - NPN (OFF) – when active the output will be 0V DC
  - PNP (ON) – when active the output will be +24V DC

# LED AND ERROR INDICATIONS:



LED	Green	Orange	Red	ERR Signal (CN4-4)	Cause	Effect	Solution*
<b>PWR</b> Main power	● (ON)	-	-	○ (OFF)	24 V DC supplied	Normal	-
	○ (OFF)	-	-	○ (OFF)	No Power	No operation	Supply 24 V power
<b>MOTA</b> Motor A	● (ON)	-	-	○ (OFF)	Operational	Normal	-
	○ (OFF)	-	-	○ (OFF)	Not used	No operation	-
<b>MOTB</b> Motor B	● (ON)	-	-	○ (OFF)	Operational	Normal	-
	○ (OFF)	-	-	○ (OFF)	Not used	No operation	-



# LED AND ERROR INDICATIONS:

LED	Green	Orange	Red	ERR Signal (CN4-4)	Cause	Effect	Solution*
STS A	○ (OFF)	-	○ (OFF)	○ (OFF)	Not told to run	Normal	-
	● (ON)	-	○ (OFF)	○ (OFF)	Told to run	Normal	-
	○ (OFF)	-	Blinks (6Hz) ●●●●●● ●●●●●●	● (ON)	Fuse blown or low voltage	No operation	1
	○ (OFF)	-	Blinks (1Hz) ● ○	● (ON)	Motor is not connected to card	No operation	2
	● (ON)	-	Blinks (1Hz) ● ○	● (ON)	Motor locked ≥ 1s	No operation	3
	○ (OFF)	-	● (ON)	● (ON)	Thermal protection	No operation	4
	● (ON)	-	Blinks (6Hz) ●●○○○○ ●●○○○○	● (ON)	Back EMF	Dynamic brake	5
STS B	○ (OFF)	-	○ (OFF)	○ (OFF)	Not told to run	Normal	-
	● (ON)	-	○ (OFF)	○ (OFF)	Told to run	Normal	-
	○ (OFF)	-	Blinks (6Hz) ●●●●●● ●●●●●●	● (ON)	Fuse blown or low voltage	No operation	1
	○ (OFF)	-	Blinks (1Hz) ● ○	● (ON)	Motor is not connected to card	No operation	2
	● (ON)	-	Blinks (1Hz) ● ○	● (ON)	Motor locked ≥ 1s	No operation	3
	○ (OFF)	-	● (ON)	● (ON)	Thermal protection	No operation	4
	● (ON)	-	Blinks (6Hz) ●●○○○○ ●●○○○○	● (ON)	Back EMF	Dynamic brake	5

LED	Green	Orange	Red	ERR Signal (CN4-4)	Cause	Effect	Solution*
CTRL Control Power	● (ON)	-	-	-	Power ON	Normal	-
	○ (OFF)	-	-	-	Power OFF	No operation	Apply 24V DC
SEN A Sensor A	-	● (ON) When sensor signal is ON	-	-	Sensor output ON	-	6
	-	○ (OFF)	-	-	Sensor output OFF	-	7
	-	Blinks (1Hz) ● ○	-	● (ON)	Jam error	Motor stops	8
SEN B Sensor B	-	● (ON) When sensor signal is ON	-	-	Sensor output ON	-	6
	-	○ (OFF)	-	-	Sensor output OFF	-	7
	-	Blinks (1Hz) ● ○	-	● (ON)	Jam error	Motor stops	8

## SOLUTION:

- Indicates either a low voltage error or the fuse has blown.
  - First check that there is a stable +24V DC power. If in manual recovery cycle the power to reset a low voltage error, if in automatic recovery the error will reset once a stable +24V DC is reached. See more information under Input/Output settings, DIP switch 1-2.
  - If the voltage is a stable +24V DC power then the fuse has blown and the card must be replaced.
- Motor unplugged.
  - Check motor ports to ensure the motor connectors are properly inserted into their respective motor ports. If using only one motor per zone select forcible stop on the motor you are not using. See more information under Input/Output Settings, DIP switch 2-3 and 2-4.
- Motor lock.
  - Remove the cause of the motor lock and clear the zone A signal applied to CN4-2 for motor A or CN4-3 for motor B with DIP switch 2-3 ON for motor A and DIP switch 2- 4 ON for motor B will reset this error. Review Connections CN4 and Input/output settings, DIP switch 2-3 and 2-4.
- Thermal protection.
  - See more information under Input/Output Settings, DIP switch 1-2 A signal applied to CN4-2 for motor A or CN4-3 for motor B with DIP switch 2-3 ON for motor A and DIP switch 2- 4 ON for motor B will reset this error. Review Connections CN4 and Input/output settings, DIP switch 2-3 and 2-4.
  - Thermal protection can only be reset if the temperature has fallen back into operating range

5. Back EMF error.

- See more information under Input/Output Settings, DIP switch 1-2. Roller(s) were driven faster than their designed speed and the HBM-604B activates the dynamic brake to slow the product down. In automatic recovery the card returns to normal operation once the voltage decreased to a safe level. In manual recovery a signal applied to CN4-2 for motor A or CN4-3 for motor B with DIP switch 2-3 ON for motor A and DIP switch 2-4 ON for motor B will reset this error. Review Connections CN4 and Input/output settings, DIP switch 2-3 and 2-4.

6. Sensor signal ON.

- Should be on only when the photo sensor is blocked. If it is on when the zone is clear then it is the incorrect type of sensor output and needs to be replaced with one that outputs a signal when it is blocked.

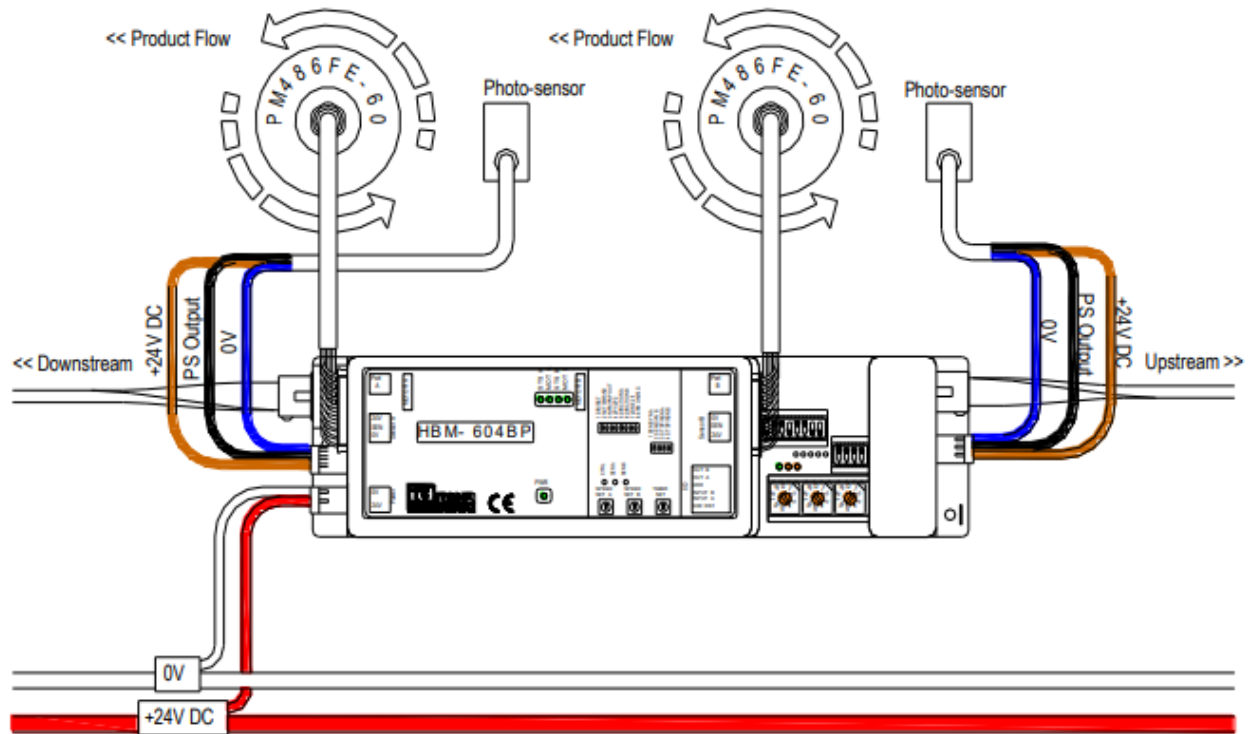
7. Sensor signal OFF.

- Should be OFF only when the photo sensor's zone is clear. If it is OFF when the sensor is blocked then it is the incorrect type of sensor output and needs to be replaced with one that does output a signal when blocked.

8. Remove the cause of the jam and clear the zone.

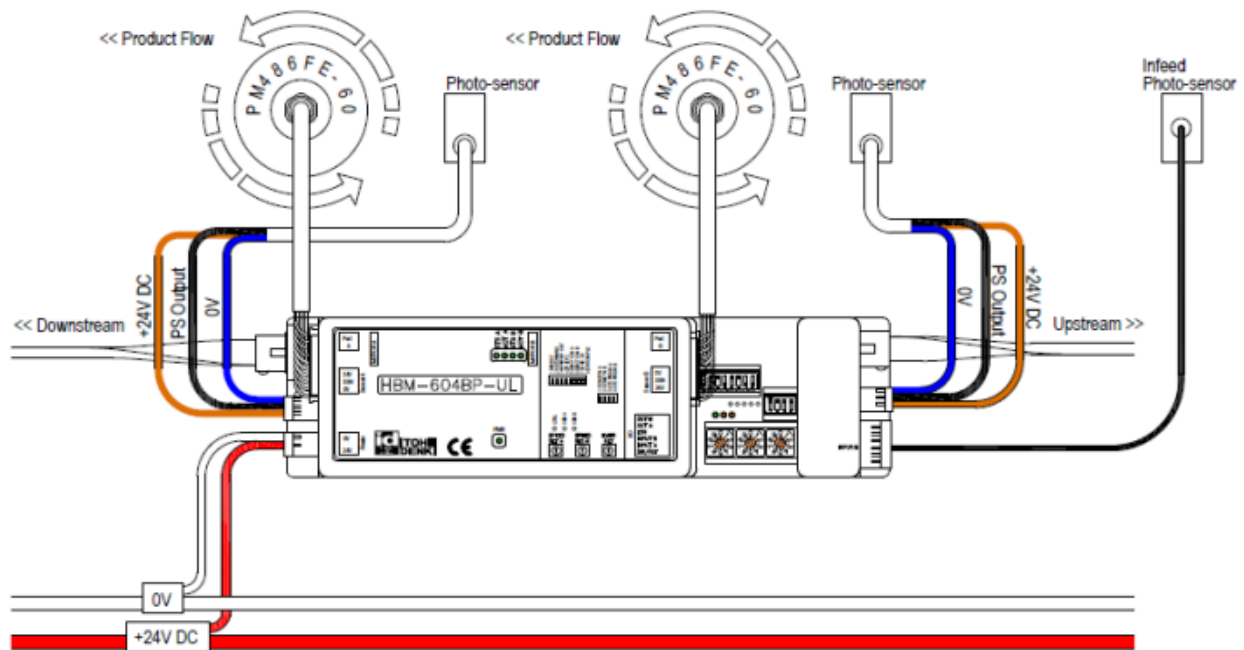
- A signal applied to CN4-2 for motor A or CN4-3 for motor B with DIP switch 2-3 ON for motor A and DIP switch 2-4 ON for motor B will reset this error. Review Connections CN4 and Input/Output settings, DIP switch 2-3 and 2-4. As long as a run signal is applied a jam error status will not turn ON

## STANDARD ZONE:



- This configuration (factory set) is the standard set-up for any zone that is not specifically an infeed or discharge zone. Review page 3 for default dip switch settings.

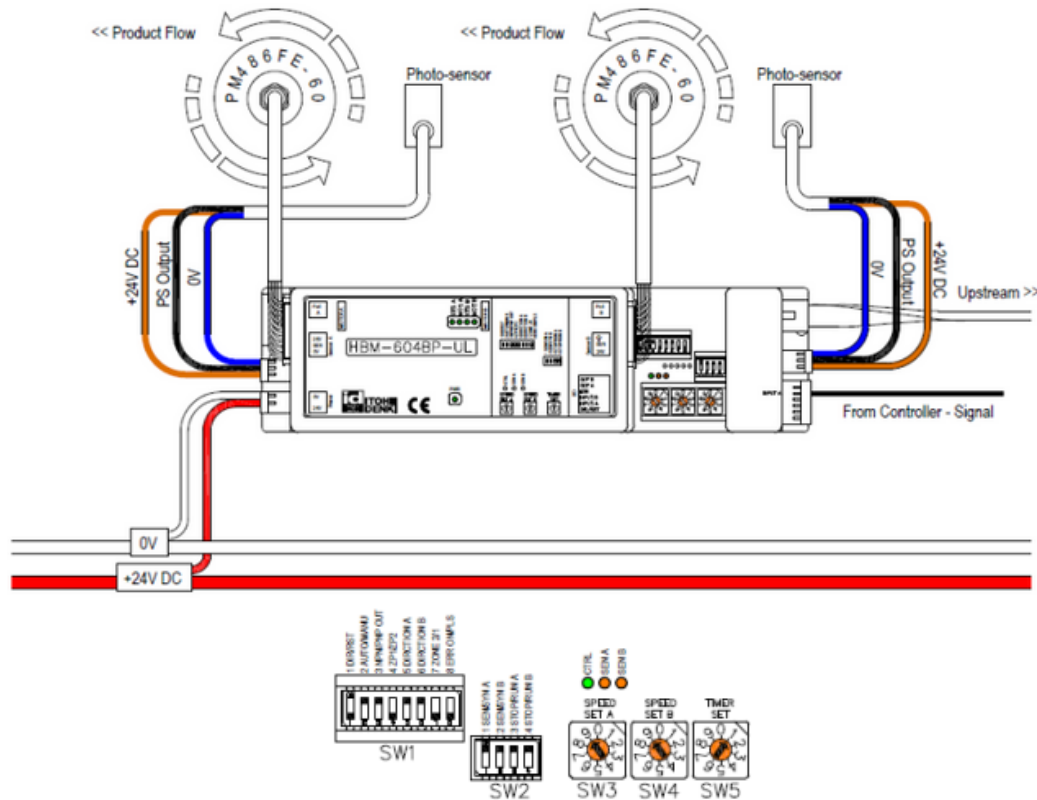
## INFEEED ZONE:



- The infeed zone can use 2 photo-sensors
  1. Main photo-sensor for motor B
  2. Infeed photo-sensor (powered separately)
- Set up
  - Card is in standard configuration
  - Distance between the infeed photo-sensor and the main photo-sensor should be set the same distance that is between all the adjacent zone photo-sensors
  - Infeed photo-sensor is powered from the 24V DC bus
  - Output from photo-sensor is connected to INPUT CN4-3 with DIP switch 2-4 ON
- While the output from the infeed photo eye is active the motor will continue to run regardless of sensor A or B's zone status. The sensor timer is active after the infeed photo eye clears. An external controller may be necessary for specific applications

## DISCHARGE ZONE:

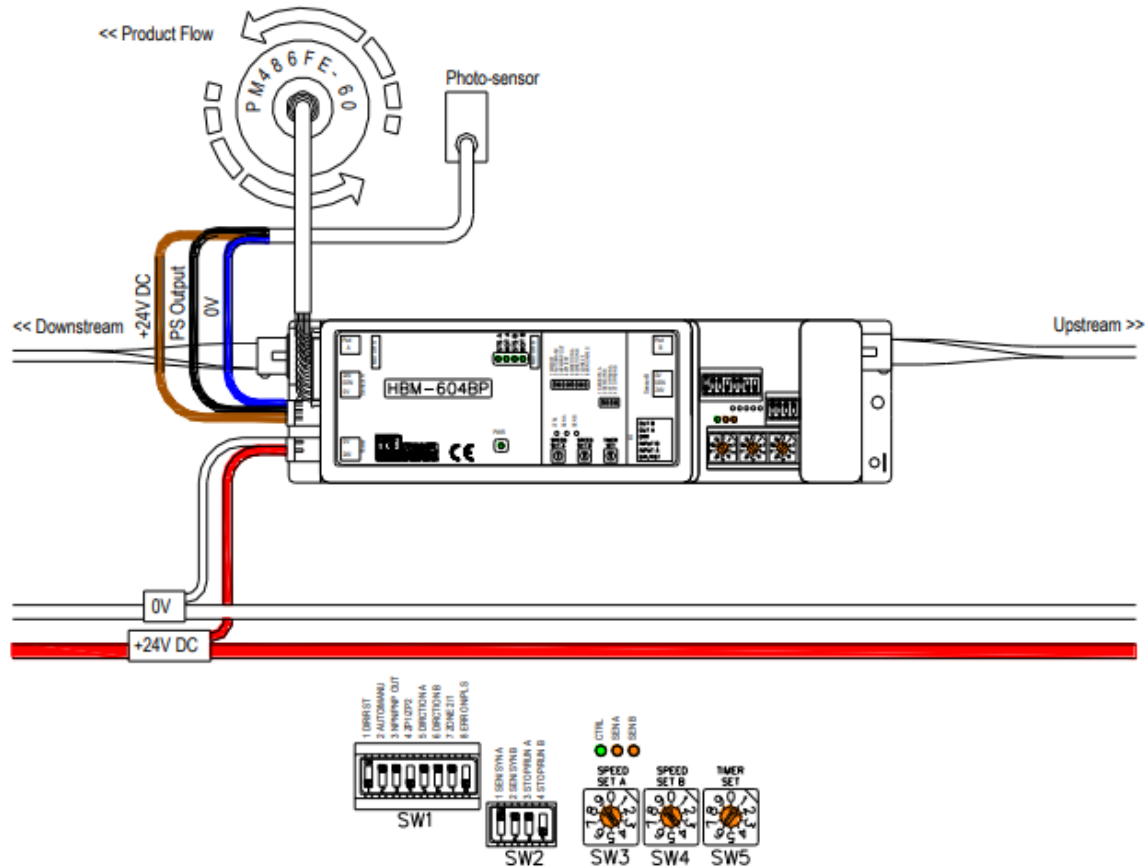
- The card is in standard orientation



- Discharge zone is applied when an article is to accumulate once it reaches the last HBM zone. Without a communication cable connected to CN301 in the default direction or CN402 when the direction signal is applied to CN4-1, the card automatically accumulates at the last sensor. An external signal from a controller is used only when discharging (force to RUN) of the article is needed.
- The signal from the controller will be applied to INPUT CN4-2 in the default product flow direction (shown above). The cards DIP switch 2-3 will be set to ON for Motor A forcible run.
- The signal from the controller will be applied to INPUT CN4-3 for product flow in the reverse direction. The cards DIP switch 2-4 will be set to ON for Motor B forcible run.
- There is no timing function applied to this configuration. The external discharge signal must remain active until the article has completely exited the zone (or cleared the photo-eye). Whenever the discharge signal is not active, the zone will stop and accumulate whenever an article is present.

## SINGLE ZONE, ONE MDR:

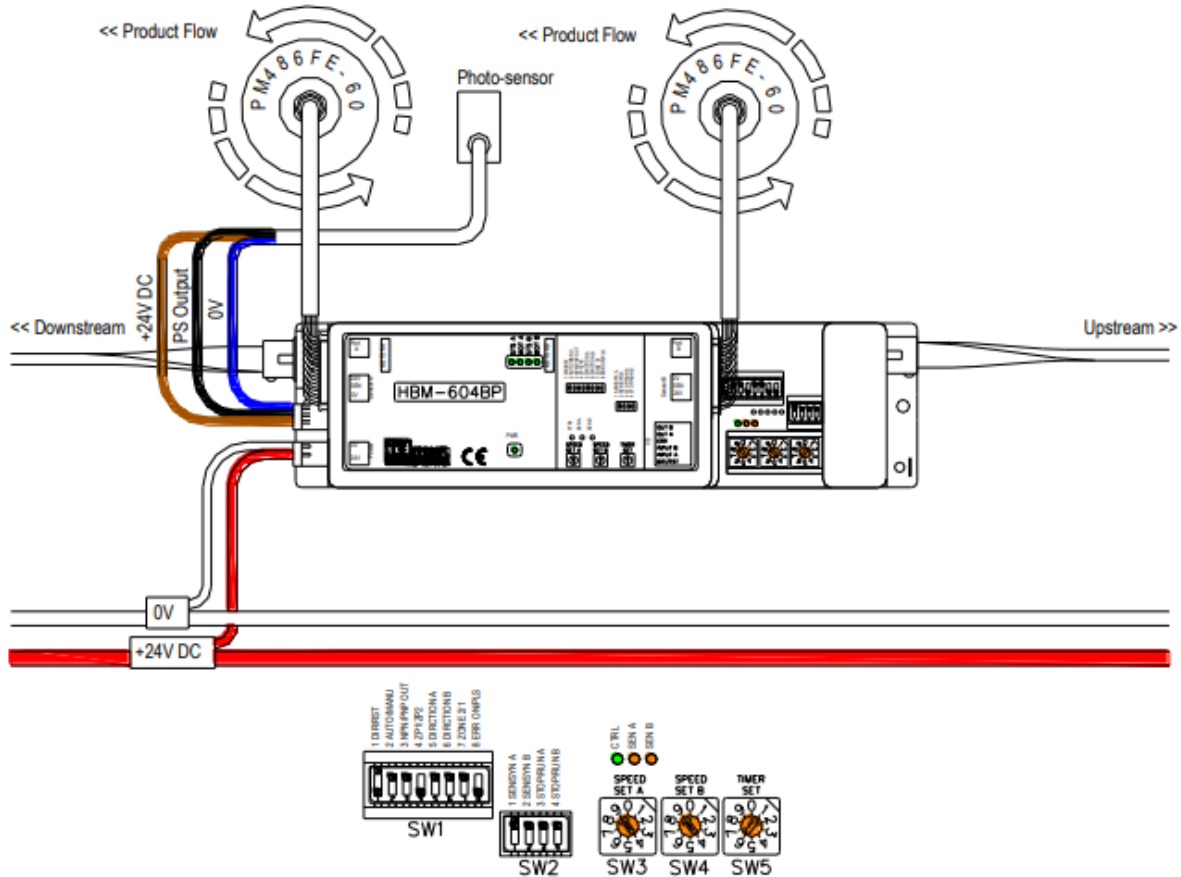
- The card is in standard orientation



- Applicable when only one zone and one MDR are needed. Set DIP switch SW1-7 ON for single zone operation. To remove motor B's motor unplugged error set DIP switch SW2-4 OFF. This configuration is used both with and without external direction signal input to CN4-1.
- **Note: Power must be cycled OFF-ON for switch changes to take affect if settings are changed while the card is already powered ON**

## SINGLE ZONE, TWO MDRS:

- The card is in standard orientation

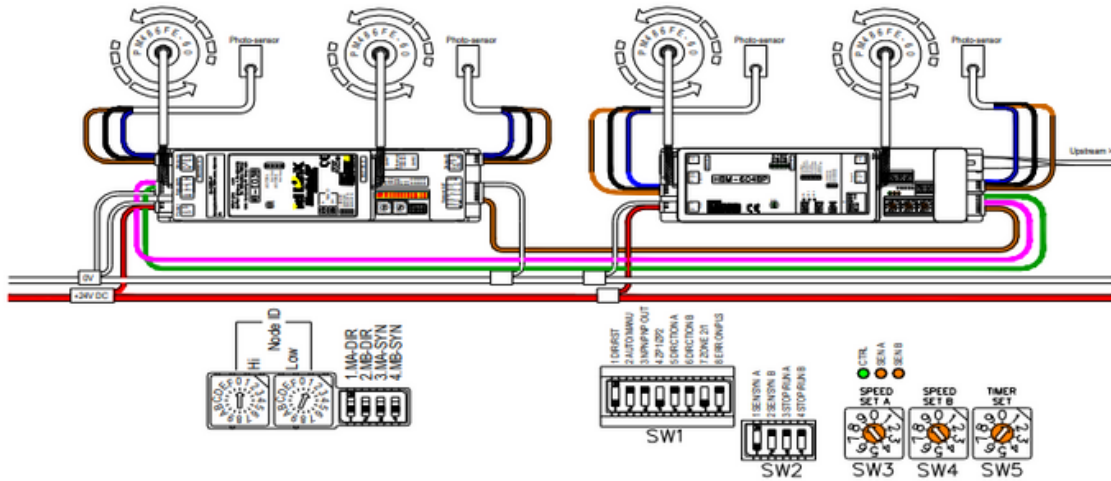


- Applicable when two MDR's are needed in one zone. Set DIP switch SW1-7 ON for single zone operation. To synchronize motor B with motor A set DIP switch SW2-2 ON. This configuration is used both with and without external direction signal input to CN4-1.
- **Note: Power must be cycled OFF-ON for switch changes to take affect if settings are changed while the card is already powered ON**



## HANDSHAKE SIGNALS BETWEEN HBM-604BP AND IB-E03BP:

- The cards are in standard orientation



- An HBM-604B can exchange handshake signals with the IB-E03B and IB-E04F. Product will accumulate at the last zone before the IB card. When sensor A is blocked on the HBM-604B, it sends the sensor out signal to the IB. The IB then sends a force run signal to the HBM. If an HBM-604B has an error, the error output signal is pulsed from the HBM-604B to the IB card which can determine the error condition and bring it to upper level Ethernet communication.
- Set up:
  - Both cards are in standard orientation
  - No communication cable is in CN302 to force accumulation at photo sensor A on CN301.
  - On the HBM set DIP switch SW1-8 to ON for pulsed error output
  - On the HBM set DIP switch SW2-3 to ON for forced run motor A
  - On the HBM set DIP switch SW2-1 to OFF for sensor A output
  - On the IB, there are no DIP switch settings necessary and the card remains in standard orientation

- Wiring:
  - Connect CN4-4 on the HBM card to Remote Input 1 on the IB card (remote input 1 must be used)
  - Connect CN4-2 on the HBM card to a Remote Output on the IB card\*
  - Connect CN4-5 on the HBM card to a Remote Input on the IB card\*\*
  - When using an HBM-604BP, connect the common on Remote Input to 0V and the common on Remote Output to +24V. When using an HBM-604BN, connect the common on Remote Input to +24V and the common on Remote Output to 0V

- Note: Power must be cycled OFF-ON for switch changes to take affect if settings are changed while the card is already powered ON**

\*Any remote output on the IB card can be used according to your specific program or controller

\*\*Other than remote input 1, any remote input on the IB card can be used according to your specific program or controller

Revision Number	Change
15-0115	Initial document
15-0528	Updates to page 11 forcible run
19-0107	Updated to -UL and updated address
20-0130	Corrected references in text to CN2 pins to reference CN4 pins. Altered some wordings and images to bring text and images in line with those of HBK-608.