

# brookfield industries, inc.

## Commercial / Industrial Door Operator Manual

SWINGING AND SLIDING DOOR OPERATORS FOR LEAD  
SHIELDED DOORS



*For All Door Operator Model Numbers  
for Swinging and Sliding Doors*

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**brookfield industries, inc.**

**NB-4120-1 Bi-Parting Double Belt  
COMMERICAL/INDUSTRIAL  
SLIDING  
DOOR OPERATOR  
MANUAL**

**(5<sup>th</sup> Edition 01/01/2021)\***

**\*Incorporates Maintained Contact to Close per UL 325, Entrapment  
and improved safety relay.**

**US Patent No. 6,177,771 B1.**

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# WARNING!

## IMPORTANT INSTALLATION INSTRUCTIONS IMPROPER INSTALLATION CAN LEAD TO SEVERE INJURY OR DEATH READ AND FOLLOW ALL INSTRUCTIONS

- **Commercial/Industrial Sliding Door Operator** shall be installed more than 8' above the floor
- Install only on a properly operating and balanced door within the rated values for door weight, door width and operating forces as stated on the ratings label
- Do not connect door operator to source of power until instructed to do so
- This door operator shall be installed and serviced by a qualified technician, electrician or electrical maintenance person familiar with its operation and the potential hazards involved.
- Any person performing installation or service on this product shall read this manual first. Proper installation includes following all steps outlined in the **Installation Instructions** and the settings specified under the **Parameters** section.
- Assure all electrical wiring and grounding is installed as specified in this manual and as required by any local codes. Proper installation can also reduce the risk of electrical shock, fire or explosion.
- Locate activation switches or push button stations: (a) within sight of the door, (b) at a minimum height of 5' so small children cannot reach and (c) away from moving parts of the door.
- Install the Entrapment Warning Placard next to the activation switches in a prominent location
- As described in this manual, the Stop command controlled by the motor drive is not intended to be a fail safe or Emergency Stop (E-Stop) since it does not prevent the motor drive from malfunctioning. This can only be accomplished by disconnecting the AC power to the operator (terminals L1 and N).
- This door operator is to be a permanent or "hard" wired connection to the supply voltage. The electrical contractor shall install a dedicated breaker or line switch to disconnect each ungrounded pole of the door operator from the supply voltage. Each ungrounded pole shall have a minimum of 3mm contact separation.
- If this model is equipped with a manual release, disengage pin(s) between door and door operator before manually moving the door.

# WARNING!

## IMPORTANT SAFETY INSTRUCTIONS IMPROPER USAGE CAN LEAD TO SEVERE INJURY OR DEATH READ AND FOLLOW ALL INSTRUCTIONS

- **Commercial/Industrial Sliding Door Operator** for trained traffic\* use only. The manufacturer of this product does not include external safety devices as a standard feature.
- **External safety devices** are required on this door operator. The installer is solely responsible for selecting and installing the correct safety devices to prevent severe injury or death. Refer to the Terminal Strip Hookup in this manual for proper wiring and to the owner's manual of the external safety device manufacturer for proper installation and use.
- No person shall perform any service or activate this door operator unless they have been properly trained in its safe usage and have read the owner's manual.
- Never let children operate or play with door controls.
- Before activating this door operator, check the following:
  1. Assure that all personnel are clear of the path of this operator and the door that it is attached to.
  2. Assure that all fingers, hands, feet, limbs and articles of clothing are clear of all moving parts and pinch points.
- Personnel should keep away from a door in motion and keep the moving door in sight until it is completely closed or open. NO ONE SHOULD CROSS THE PATH OF A MOVING DOOR.
- Test the door's safety features at least once a month. Make any adjustments or repairs as necessary and retest. Failure to do so may cause severe injury or death.
- KEEP DOORS PROPERLY OPERATING AND BALANCED. Refer to door manufacturer's manual. Have repairs done by trained technicians.
- Prior to performing any service on this product (including the replacement of any fuses or circuit breakers), disconnect the operator from the supply voltage.
- For continued protection against fire, replacement fuses or circuit breakers shall be of the same type and ratings as those being replaced.

\*Defined in ANSI 156.10 as a controlled group of people trained in the safe use and operation of a particular door installation.

## SAVE THESE INSTRUCTIONS

## Overview

**The NB-4120-1 Bi-Parting, Double Belt, Sliding Door Operator** is designed and tested for lead shielding doors weighing up to 70,000 lbs (total both doors) operating at linear speeds of 6.0 in/sec maximum (each leaf in opposite directions) or a maximum horizontal operating force of up to 1400 lbs (total both doors).

This is accomplished with a belt drive system comprised of double, 2" wide H polyurethane steel reinforced timing belts coupled to a 2hp AC, high torque, right angle, helical gear motor.

*Applications involving heavier doors at slower speeds/acceleration rates should be referred to the Engineering Department.*

**The NB-4120-1** is designed to be used in conjunction with an existing linear bearing/rail system capable of supporting heavy doors with a low coefficient of friction or standard beam trolley supports for hanging the door. The open-ended style timing belts clamp directly to the top of the door carriage or attachment structure. Once the timing belts have been properly aligned and pre-loaded, in addition to the motor control parameters being correctly set, the **NB-4120-1** will provide many years of reliable service.

This power open/power close electro-mechanical operator with its state of the art components, makes it the strongest, most reliable and easiest to install in the industry today. Refer to the **Wiring Legend for Terminal Strip Hookup** for all open, partial open, close, stop and **External Safety Device** inputs, which are all Class (2) 24VDC normally open momentary contact (*except the stop input, terminal #10, which is a normally closed input*). Power supply hookups for both Class (2) 24VDC, and 230VAC, 3-phase are indicated. The PLC then processes all this information, in addition to many other features for proper control of these heavy lead or concrete doors. This door operator is patented under **US Patent No. 6,177,771 B1**.

The **NB-4120-1 Commercial/Industrial Sliding Door** is compliant with **UL 325** under Section 30.2 **External Entrapment Protection** featuring **Fail Safe Monitoring**, providing all External Safety Devices are wired and installed per this manual.

### Logic Control:

This Operator offers the latest technology in PLC (Programmable Logic Control). The following (3) modules snap to a DIN rail base:

**CPU (Central Processing Unit)**- processes and stores data in its internal register such as door position presets, inputs from pushbutton stations and outputs to motor controls. This extremely compact unit houses (8) LED 24 VDC inputs and (6) LED outputs with (3) isolated commons.

**Analog/Digital Converter**- converts the analog signal of the Rotary Position Transducer to a digital value.

**Class (2) 24 VDC Power Supply**- converts 110 supply voltage to Class (2) 24VDC power to operate the CPU, A/D converter, Rotary Position Transducer and presence sensors.

These plug-in modules with LED make diagnostics and replacement of parts easy and quick to perform.

Interface with the PLC is necessary to adjust **Door Position Presets** in the field. This is accomplished by plugging in an 8- Pin Phoenix connector to the back of the **Data Access Unit (DAU)** and a round female connector into the side panel of the operator. The **DAU** is a hand held, touch screen device that is purchased separately. The CPU has been programmed to adjust on the fly, such door position presets as **Back Check, Full Open, Latch Check and Full Closed**.

**Input** commands to be processed by the PLC, are done so by making the appropriate connections on the **Terminal Strip Hookup**. By connecting a separate normally open SPST switch between terminals 1 and 14 to open, terminals 1 and 13 to partially open, terminals 1 and 12 to close, and a normally closed SPDT switch to terminals 1 and 10 to stop the door, provides the customer discrete control of each input from a momentary contact push button station (not included). These commands can also be activated by presence sensors, or control mats. Reversing the direction of the door while it's moving (dynamic) can be accomplished by simply pressing the appropriate switch to change direction. *We do not include any activation devices or push button stations with our door operators.*

The **NB-4120-1** features momentary contact **Input** commands for **External Safety Devices** that comply with **UL 325 Section 30.2 External Entrapment Protection** featuring **Fail Safe Monitoring**. These devices are normally door mounted, **4-wire reversing edge contact type sensors** that reverse the door while closing. However, they can be substituted with non-contact type presence sensors providing the external wiring is compatible with our internal wiring. **Note: The door will not be allowed to close unless these sensors are correctly wired per this manual.** When installing contact type sensors, assure that they are properly secured to the leading edge of the door, and there are enough sensors that are properly spaced with adequate length to assure safe operation. **Input** commands and a **low voltage Class (2) power supply** are also provided for **additional (redundant) sensors**, such as **non-contact type presence sensors** that are frame mounted. brookfield industries does not manufacture nor do we include **External Safety Devices** with any of our door operators. *The installer is solely responsible for selecting the correct sensors to prevent injury.* To assure that external safety devices are properly installed and adjusted correctly, refer to the owner's manual. For proper wiring, refer to **Terminal Strip Hookup** and the **Wiring Diagram** included in this manual.

The NB-4120 also features a maintained contact (constant pressure/dead man) Input (Terminals 1 & 20) to close the door that complies with UL 325, Entrapment. For proper wiring to this input, please refer the Terminal Strip Hookup.

The user now has the flexibility of choosing either one of the above methods: Entrapment by means of maintained contact or External Entrapment Protection through safety sensors. Both methods can be employed by simply connecting to both inputs. The maintained contact could then be utilized as an emergency override for closing the door in case the tape switches fail. This allows the door to stay in operation until the contact sensors can be repaired.

The **Stop** command (normally closed terminal #10) will stop the door in any position when activated but it will not prevent a motor drive from malfunctioning nor is it a true emergency stop. **Emergency Stop (E-Stop) can only be accomplished by disconnecting AC power to the operator (Terminal L1, L2, L3 and Terminal N).**

The **NB-4120-1** features the same ***Absolute Position Feedback Control*** system and software as other **brookfield industries, inc.** door operators. There are no limit or proximity switches to adjust or install for any of the door positions under normal operation. Simply adjust the door's positioning presets as required by interfacing with the PLC via a hand held Human Machine Interface (purchased separately).

A **Rotary Position Transducer** attached to the gear motor output shaft provides the position of the door. As the door changes position, the output signal from the transducer varies in value. This signal, once converted to a digital value, is stored in the CPU for further processing. This device does not need to be "homed" or reset if there is a power loss or electrical noise nor does it need to go through "learn speed" after power up or after adjustments have been made.

#### **Motor Control:**

The **NB-4120 Bi-Parting Door Operator** uses a state of the art adjustable frequency AC drive for variable speed control of the 230 volt, 3 phase, and 2hp AC motor. The NB-4120 also features a multi-speed board that attaches to the side of the motor control. The multi-speed board features control of (4) independent speeds. The NB-4120 has the flexibility of controlling separate latch check speeds (Preset 1) and back check speeds (Preset 2) as well as close speeds (Preset 3) and open speeds (Preset 4). The motor control also features additional trimpots, which greatly improve the performance of the drive and motion profile of such heavy doors. The COMP (Slip Compensation) trimpot sets the amount of Volts/Hz to maintain set motor speed under varying loads. To increase, rotate clockwise. The ACC (Acceleration) trimpot sets the amount of time for the motor to accelerate from zero to full speed. To increase acceleration time, rotate clockwise. The DEC/B (Deceleration) trimpot sets the amount of time to decelerate from full speed to zero speed. To increase deceleration time, rotate clockwise. The MIN (Minimum Speed) trimpot sets the minimum motor speed. To increase the minimum speed, rotate clockwise. The MAX (Maximum Speed) trimpot sets the maximum motor speed. To increase the maximum speed, rotate clockwise.

**Overload Protection** for the 3-Phase AC motor is provided by using (1) circuit breaker for each phase from the 208/230 VAC 3-Phase power supply and the Adjustable frequency AC drive (see wiring diagram). Additional protection is provided for mechanical components by properly setting the Current Limit (CL) trimpot. This trimpot also limits the Maximum Horizontal Operating Force (lbs) in both the opening and closing directions. To increase, rotate clockwise.

#### **Drive Train:**

The **NB-4120-1** is a linear drive system comprised of double, 2" wide XH polyurethane steel reinforced timing belts driven by a 3 phase, 2 hp, 1750 RPM, AC motor that is coupled to an in-line helical (85:1) gear reducer with an output torque rating of 7260 lb-in and overhang load rating of 2050 lbs. The timing belts are open-ended and attached to each door leaf with



matching aluminum clamping plates. The belts are adjusted for pre-tension and tracking from the take-up end frames. A properly installed and adjusted timing belt will provide operating forces up to 1400 lbs (total both doors) at the maximum speed of 6 in/sec (each leaf in opposite directions).

**Supply Voltage:**

230 VAC, +/- 10%, 60 Hertz, 3 phase 4 wires & GND (L1, L2, L3, N & GND) is required to run the 3 phase motor and to provide 110VAC to the 24VDC power supply and PLC. The 3 phase AC Motor control and 110VAC power supply circuits are individually equipped with in-line circuit breakers for motor overload protection.

Surge protection and filtering of the supply voltage is featured to protect door operator components and to assure reliable performance (immunity) as well as minimizing RF noise (emissions).

**Current Consumption (AC Line Input):**

Maximum current/phase    10 amps

### **NB-4120-1 Double Belt Installation Instructions**

Although each Door Operator has been fully inspected and tested prior to shipment, assure that no physical damage has occurred during shipment and handling. Premature failure may occur if any part of the installation is not done properly.

To install the NB-4120-1 on bi-parting doors, refer to drawings **NB-4120-1-Travel**.

1. Install 2 door attachments (lower belt)- refer to drawing **NB-4120-1P2**.

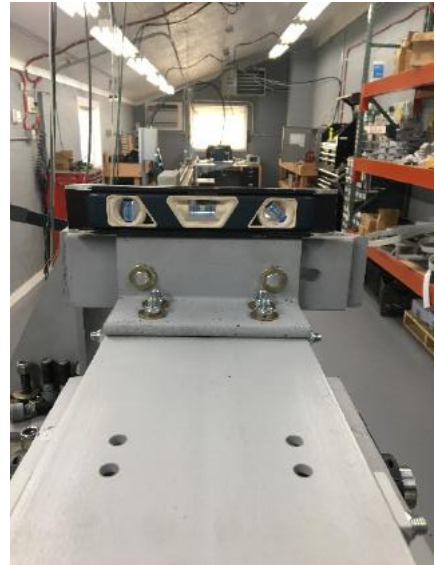
- Assure door attachments are *level*
- Create a centerline on the door attachments. Assure that it is parallel with the track centerline within (+/-) 1/32". (shim as required)
- Use the centerline on the door attachment as your reference dimension center line for the motor and take-up end brackets
- Make sure both belt centerlines stay consistent throughout



2. Mount take-up end – refer to drawing **NB-4120-1B**

- Verify take-up end is *level*
- Using the reference center line from the door attachments (from step 1) assure the pulley is the same distance from the track center line within (+/-) 1/16". (shim as required)

- Minor adjustments can be made by loosening the shaft collars, loosening the set screws on take up bearings, and moving the take up shaft from side to side



3. Mount motor end – refer to drawing **NB-4120-1D**

- Verify motor end is *level*
- Using the reference center line from the door attachments (from step 1) assure the pulley is the same distance from the track center line within  $(\pm) 1/16"$ . (shim as required)



#### 4. Mount timing belt

- Adjust take-up end pulley toward the motor end to allow for maximum adjustment
- For Bi-parting doors, assure both doors are in the closed position
- Attach one side of the 2" timing belt to the **lower door attachments closest to the take-up end**, secure belt with clamping plate and mounting hardware that was provided. Use torque pattern while tightening

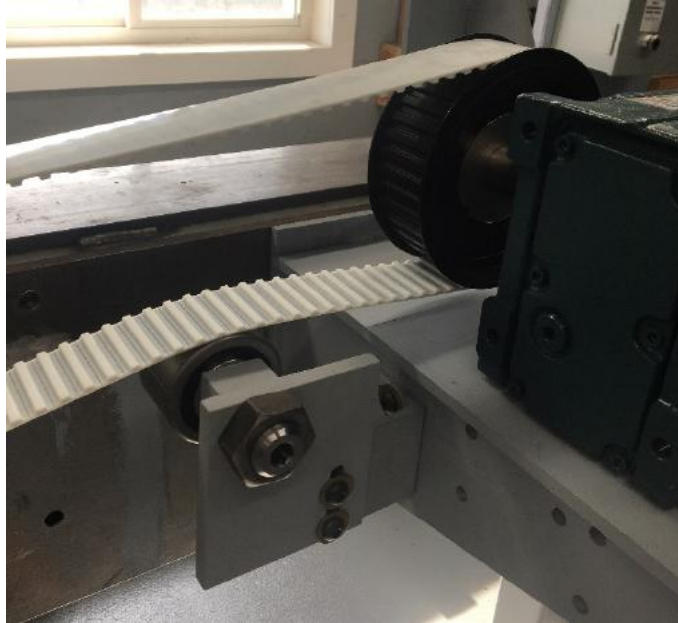


- Pull the belt through the take up end and around the pulley

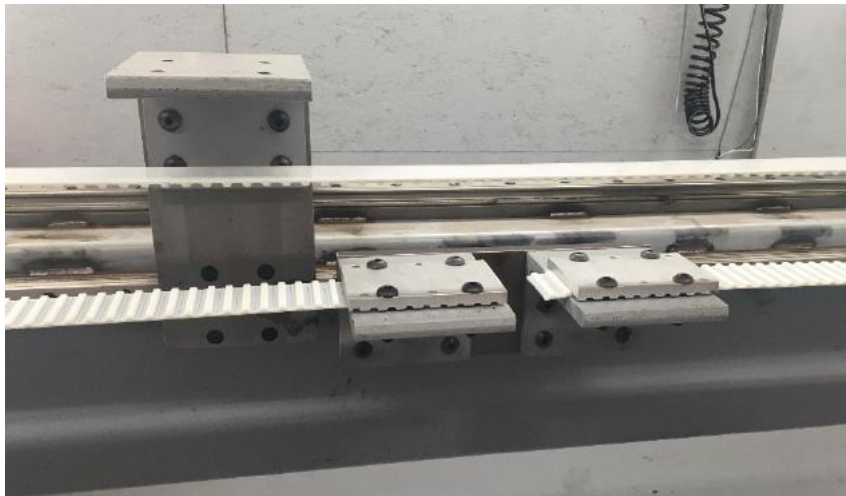


- Pull the belt to the motor end and around the motor end pulley while pulling out as much slack as possible (you may need to use c-clamps to hold the belt to the pulley's)





- Attach other end of the 2" timing belt to the lower door attachment closest to the motor end, secure belt with clamping plate and mounting hardware that was provided. Use torque pattern while tightening (remove any c-clamps)

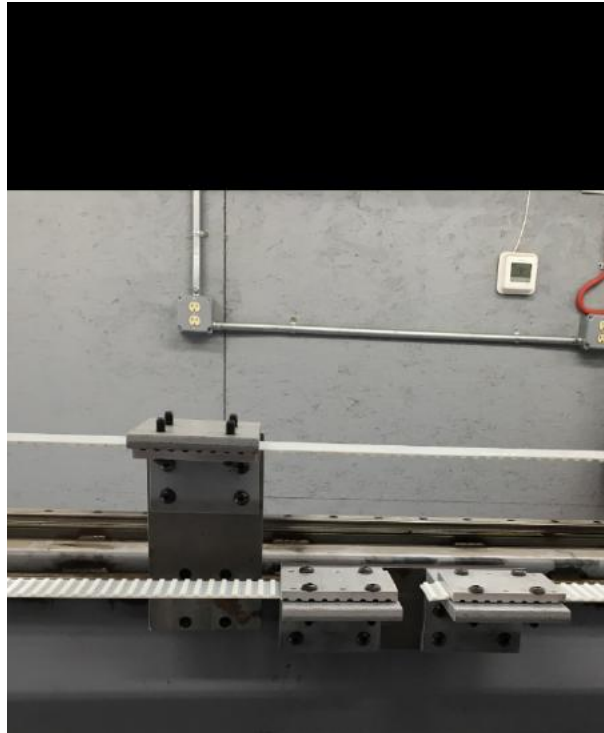


- Verify the belt teeth are fully engaged into their respective pulleys. Adjust the take-up end threaded rods as required. Adjust the motor end by shimming the bracket at the mounting surface

#### 5. Setting the belt tension – refer to parameter section of the 4120 Manual

- Belt tension is calculated and listed on a label on the motor end bracket and inside the electrical panel
- Belt tension should be set with the belt idler engaged (about 3/8" into the belt)
- For single slide doors: measure the force it takes to deflect the top belt 1" at the dead center of the belt between the pulleys, use take up end to adjust accordingly

- For bi-parting doors: **move the door to the open position** then set tension the same as a single slide door above
6. Install door attachment for upper belt– (Bi-parting Door only) refer to drawing **NB-4120-1P**
- Move both doors back to the full closed position
  - Assure door attachment is *level* and *parallel* with track centerline within  $(+/-) 1/32"$ , using same center line dimension from lower door attachments (shim as required)
  - Assure clamping plate is engaged into the belt teeth and bolted to the left door attachment (shim as required)



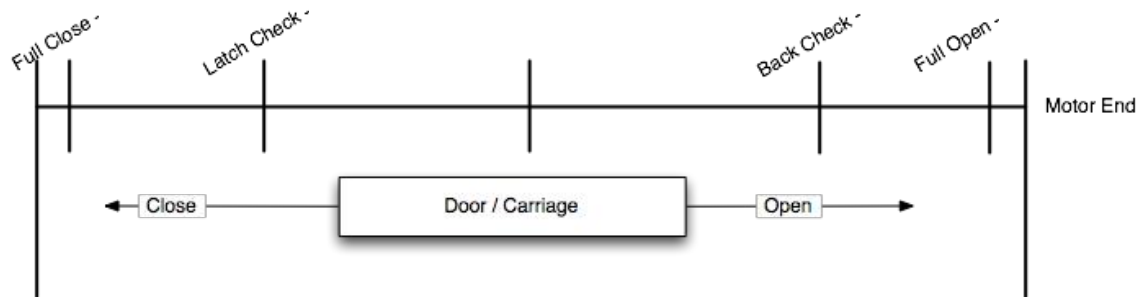
7. Install Emergency Hand Wheel – refer to drawing **NB-4120-1-EHW** and the **Instructions for installation (Emergency Hand wheel)** below.
8. Pull the black cable harness with the 6 14-gauge wires into the Emergency Hand wheel enclosure. Insert the 5 colored wires from the pigtail into the matching colors labeled on the connector splice using the insertion too supplied (attached to the wiring inside the enclosure)
- Caution:** To prevent risk of serious injury, assure source voltage has been disconnected and all “lock-out” safety procedures have been strictly adhered to.
9. Hookup 230 VAC supply voltage and grounding per **Terminal Strip Hookup**, the applicable **Wiring Diagram**, and/or local codes.
10. Connect 90-volt DC motor leads to the corresponding labeled wires (A1 and A2) on motor

11. Connect all Class (2) (24) VDC inputs per the **Terminal Strip Hookup** and the **Wiring diagram** including required **External Safety Devices** (not included with operator) that comply with the **External Entrapment Protection of UL 325 for Fail Safe Monitoring**.
12. These devices can be door mounted, **4-wire reversing edge contact type sensors** that reverse the door while closing or compatible non-contact presence sensors. **Note: The door will not be allowed to close unless these sensors are correctly wired per this manual.** When installing contact type sensors, assure they are properly secured to the leading edge of the door with sufficient spacing and length to assure safe activation (refer to the owner's manual).
13. Attach the limit switch provided for battery backup end of travel mode. We recommend this be between 1-2" past the fully open position, when properly adjusted. Assure adequate clearance exists between the door carriage and the door operator mounting plates once the limit switch has been activated.
14. Disconnect "lock-outs" and turn on power supply breakers.
15. Connect the positive and negative leads to the correct battery post.
16. All PLC and motor control settings have been preset prior to shipping; however, these values may require field adjustments that can vary for each installation (see **Parameter for NB-4120**).
17. Assure external speed "Pots" are set to the 10-20% range before activating the operator.
18. Assure all **Safety Instructions** and **Warnings** have been followed.
19. Setting the transducer
  - Hook up the HMI
  - Remove shroud covering transducer
  - Using a 3mm allen, tighten the coupling to the transducer shaft
  - rotate the coupling until the door position reads 320
  - tighten the coupling to the output shaft of the gearbox
  - reinstall transducer shroud
20. Activate Open, Close, and Stop commands
21. Be prepared to hit stop button: in-case any obstacles are encountered, or the door position readout is counting the wrong way-check motor or transducer wiring.
22. Check timing belt tracking and adjust as required with the take-up end adjusting rods
23. Adjust **Open, Partial Open and Close** speed "Pots" clockwise to the 65%-70% maximum setting.
24. Adjust **PLC** door position factory presets as required. Refer to the **Door Position Setup** and **DAU Instructions** and the **NB-4000 Parameters** sheet if necessary.



25. Adjust **Latch Check** and **Back Check** trimpots until a smooth stop has been obtained (20-30% range).
26. ***WARNING! To avoid serious injury or death: while the door is closing, activate contact sensors and assure Latch Check trimpot speed is properly adjusted to prevent injury. Check for pinch points and adjust the Latch Check Door Position accordingly. Repeat for Back Check while the door is opening when required.***
27. Check operation of all other safety devices including redundant and non-contact type. Refer to the installation/owner's manual from the sensor manufacturer for proper settings and adjustments.
28. Operate the door several times assuring all inputs, such as open, close, partial open and stop features function properly. Make the necessary adjustments as required.

## HMI Instructions



## HMI GT-01 Touch Screen

1. Plug the eight prong Phoenix Connector into HMI. For operator series before 'G,' use the **black** cable, plug the opposite round end into the PLC unit on the operator. For 'G' series and above, use the **gray** cable and plug the opposite round end into the receptacle on the end cover of the operator (right side).
2. A "Please Wait" message will flash for a few seconds and then a selection screen will show.
3. Choose either Master / Slave or Standard operator. For Master / Slave, select Lead or Follow Door on the next screen, then skip to step 6.
4. For Standard operator, choose the appropriate ship date of the operator on the next screen.
5. You'll be given a display of the first three user presets. To edit a preset, simply touch the preset **number value**.
6. You'll then be given a keypad display for entering the new preset. Enter the desired value and touch the enter (back arrow) key to set the value. Press **ESC** to cancel and go back to the preset list.
7. Press Next to display the remaining user presets.

\*Note: Real Time Door Position (RTDP) is always displayed on both preset screens

# Door Position Setup and HMI Instructions

## GT-01 Touch Screen

1. Plug the eight prong Phoenix Connector into GT-01. For operator series before 'G,' use the black cable, plug the opposite ROUND end into the PLC unit on the operator. For 'G' series and above, use the gray cable and plug the opposite ROUND end into the receptacle on the end cover of the operator (right side).
2. A "Please Wait" logo message will flash for a few seconds and then a selection screen will show.

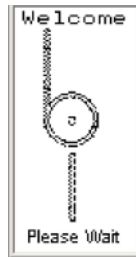


Fig. 2

3. For GT-01 software prior to Ver. 3, the screen in Fig. 3 will display. Choose either 'Standard' or 'Main/Sub' operator. For Ver. 3 of the GT-01 software, the screen in

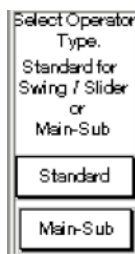


Fig. 3

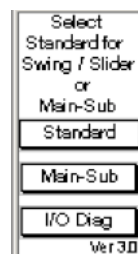


Fig. 4

Fig. 4 will display. For Main/Sub, select 'Lead Door' or 'Follow Door' on the next screen (Fig. 5), then skip to step 5.



Fig. 5

4. Selecting Standard will give you the screen shown in Fig. 6. Choose the appropriate serial number series of the operator, to get to the first preset screen (Fig. 7)

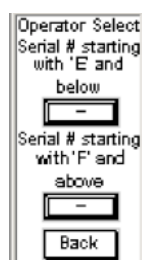


Fig. 6

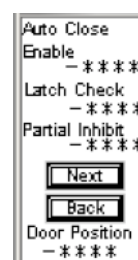


Fig. 7

5. You'll be given a display of the first three user presets (Fig. 7). To edit a preset, simply touch the preset number.
6. A keypad will then display for entering the new preset (Fig. 8). Enter the desired value and touch the ENTER (bent arrow) key to set the value. Press ESC to cancel and go back to the preset list.

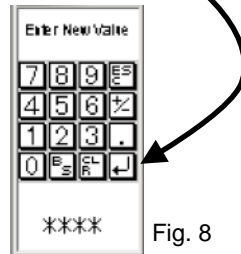


Fig. 8

7. Press 'Next' (Fig. 7) to display the remaining user presets or 'Back' to return to the previous screen.

Note: Real Time Door Position (RTDP) is always displayed on both preset screens

## I/O Diagnostics for Series 'i' Operators and Above only

Selecting the 'I/O Diag' button from main screen (Fig. 4), will bring you to the screen in Fig. 9. 'Outputs' will display the screen in Fig. 11.

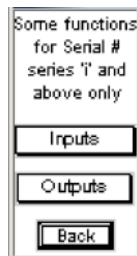


Fig. 9

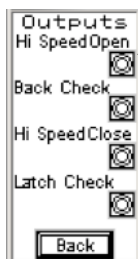
Select 'Inputs' to display the Input Diagnostic Screen (Fig. 10).

The buttons down the left side, represent an actual input to the PLC. All standard Operator functions can be tested using these buttons.



Fig. 10

The lamps down the right side of the screen indicate when an actual 'hard' input is being read by the PLC. E.g., if a Wall Switch or other device is sending an input, the applicable lamp will be lit.

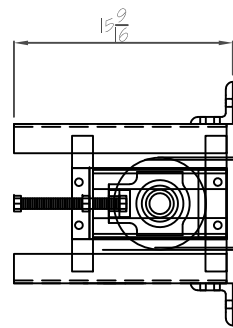
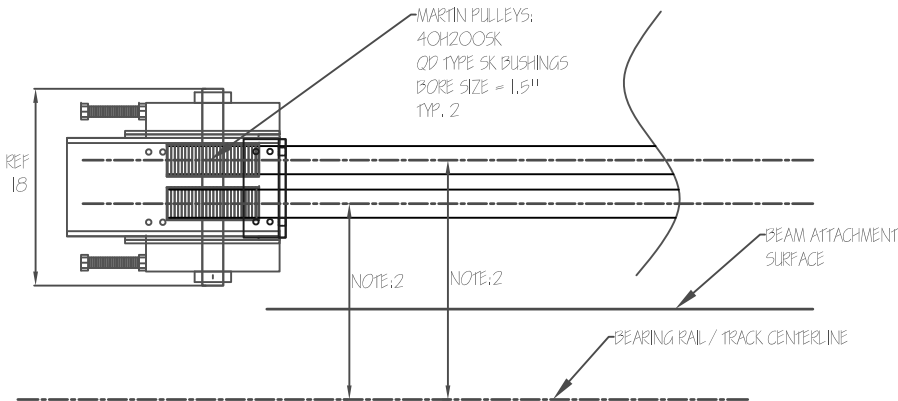


The lamps down the right side of the screen indicate when the PLC is sending the corresponding Output to the motor control.

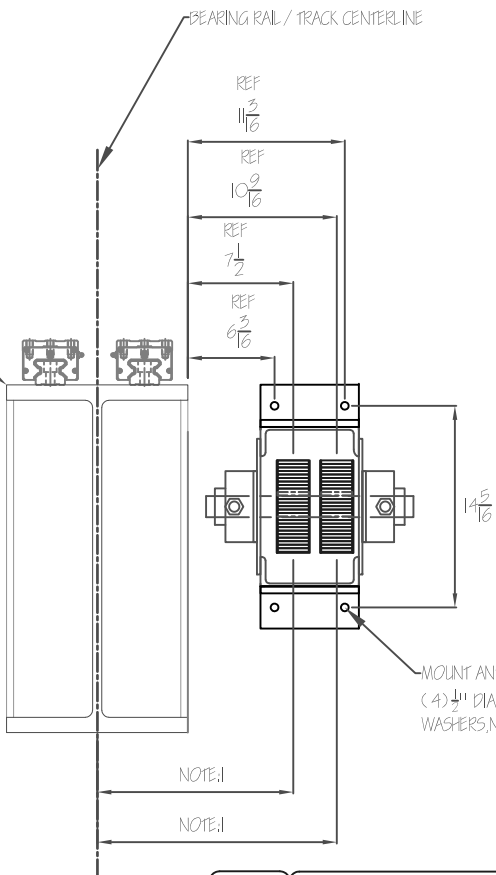
The serial number series referred to in these instructions is the starting letter of the Operators Serial Number.

NOTE: When using the newer GT-01 Software with an older PLC, or vice-versa, the initial startup of the GT-01 may be longer than usual and/or may display an error on the screen, it will then clear and go to the initial screen shown in either Fig. 3 or Fig. 4

RevNo	Revision note	Date	Signature	Checked



BEARING RAILS  
AND BEAM  
BY OTHERS



Drawing Notes:

NOTES:

1) PULLEY CENTERLINES  
PARALLEL( + / - <sup>1</sup>/<sub>32</sub> )

2) BELT CENTERLINES  
PARALLEL( + / - <sup>1</sup>/<sub>16</sub> )

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Tolerances

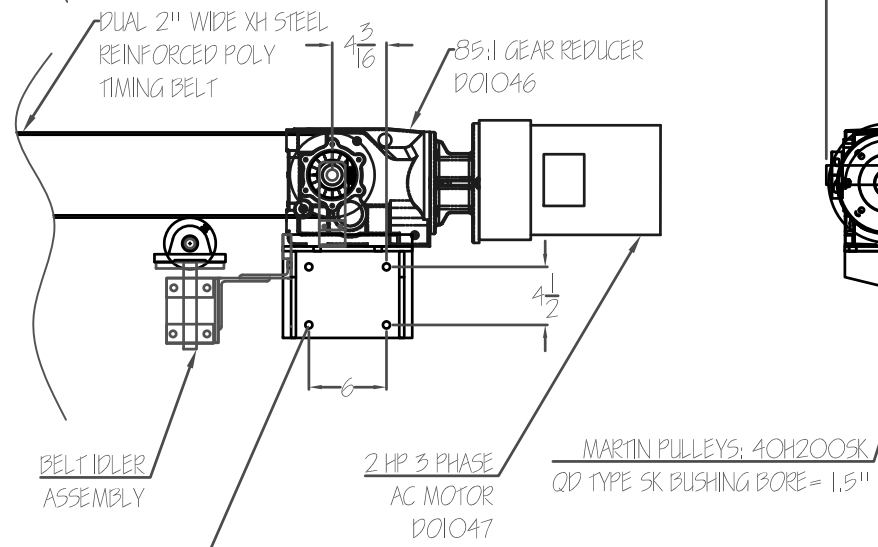
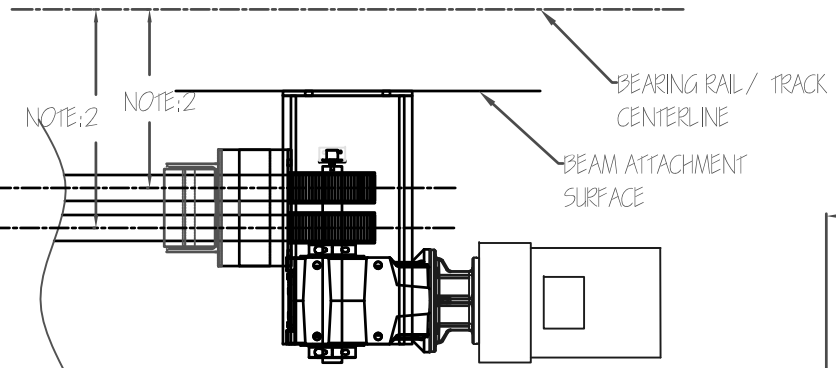
Decimal

Fractional + / - xxx

Angular + / - xxx

NB-4120-1 TAKE-UP		Drawn by KPK	
INSTALLATION (DOUBLE BELT)		Checked by XXX	
Edition 0			
Approved by - date XXX - 00 / 00 / 00 XXX	Filename 	Date 02 / 21 / 2020	Scale 1:1
brookfield industries Inc. 99 West Hillside Ave. ; Thomaston, CT 06787 P: (860) 283-6211 F: (860) 283-6123		Material SEE BOM	
		NB-4120-1B	

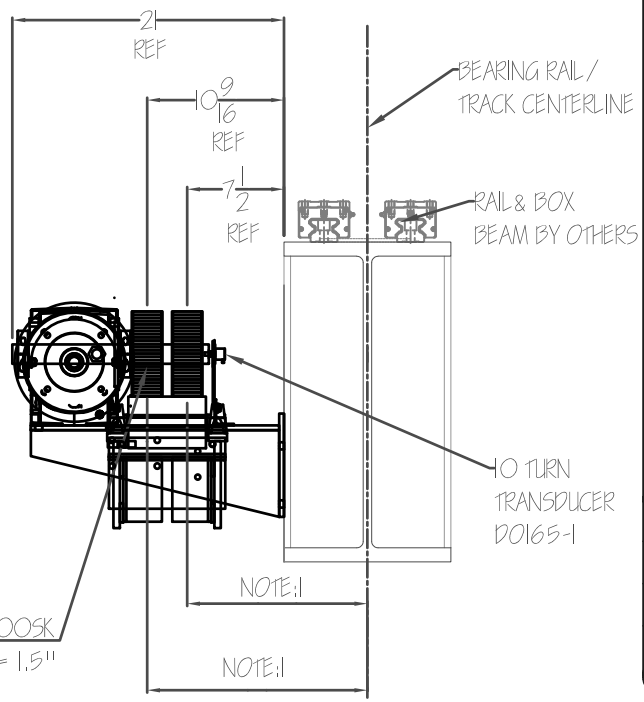
RevNo	Revision note	Date	Signature	Checked



BELT IDLER ASSEMBLY

MARTIN PULLEYS: 40H2005K  
QD TYPE SK BUSHING BORE = 1.5"

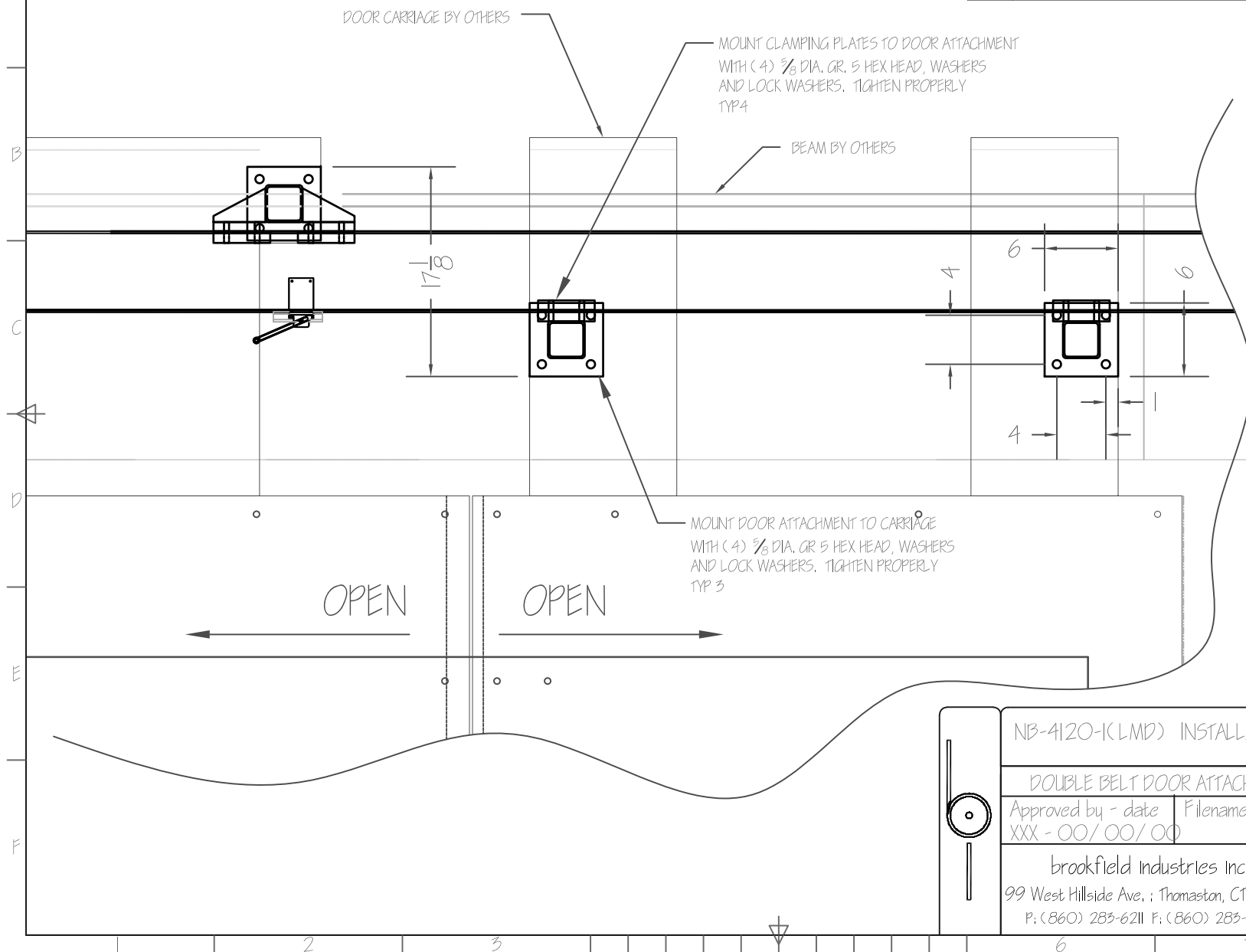
MOUNT AND PROPERLY TIGHTEN:  
(4) 1/2" DIA. GR. 5 HEX HEAD, WASHERS, NUTS & LOCKING.




Drawing Notes:	
NOTES:	
1) PULLEY CENTERLINES PARALLEL( + / - 1/32)	
2) BELT CENTERLINES PARALLEL( + / - 1/16)	
Tolerances	
Decimal	+ / - 1/32 UNO
Fractional	+ / - .xxx
Angular	+ / - .xxx

NB-4120-1-GEAR MOTOR BRACKET		Drawn by KPK	
INSTALLATION FOR DOUBLE BELT		Checked by XXX	
Approved by - date XXX - 00/00/00 XXX		Edition 0	
brookfield industries Inc. 99 West Hillside Ave. ; Thomaston, CT 06787 P: (860) 283-6211 F: (860) 283-6123		Date 02/20/2020	
		Scale 1:1	
		Material SEE BOM	
		NB-4120-1D	

RevNo	Revision note	Date	Signature	Checked



Drawing Notes:	
Tolerances	
Decimal	+ / - 1/16 UNO
Fractional	+ / - xxx
Angular	+ / - xxx

	NB-4120-1(LMD) INSTALLATION		Drawn by KPK	
			Checked by XXX	
	DOUBLE BELT DOOR ATTACHMENTS		Edition 0	
	Approved by - date XXX - 00/00/00	Filename	Date 10/29/12	Scale 1:1
brookfield industries inc. 99 West Hillside Ave. : Thomaston, CT 06787 P: (860) 283-6211 F: (860) 283-6123		Material SEE BOM NB-4120-1P		

RevNo	Revision note	Date	Signature	Checked

A

B

C

D

E

F

A

B

C

D

E

F

DOOR CARRIAGE BY OTHERS

MOUNT CLAMPING PLATES TO DOOR ATTACHMENT  
WITH (4)  $\frac{5}{8}$  DIA. GR. 5 HEX HEAD, WASHERS  
AND LOCK WASHERS. TIGHTEN PROPERLY  
TYP 4

BEAM BY OTHERS

17/8

6

4

6

4

1

MOUNT DOOR ATTACHMENT TO CARRIAGE  
WITH (4)  $\frac{5}{8}$  DIA. GR. 5 HEX HEAD, WASHERS  
AND LOCK WASHERS. TIGHTEN PROPERLY  
TYP 3

OPEN

OPEN

Drawing Notes:

Tolerances

Decimal + / - 1/16 UNO

Fractional + / - .xxx

Angular + / - .xxx

NB-4120-1(LMD) INSTALLATION

Drawn by KPK  
Checked by XXX

DOUBLE BELT DOOR ATTACHMENTS

Edition 0

Approved by - date  
XXX - 00/00/00

Date  
10/29/12

Scale  
1:1

brookfield industries inc.  
99 West Hillside Ave. ; Thomaston, CT 06787  
P: (860) 283-6211 F: (860) 283-6123

Material  
SEE BOM

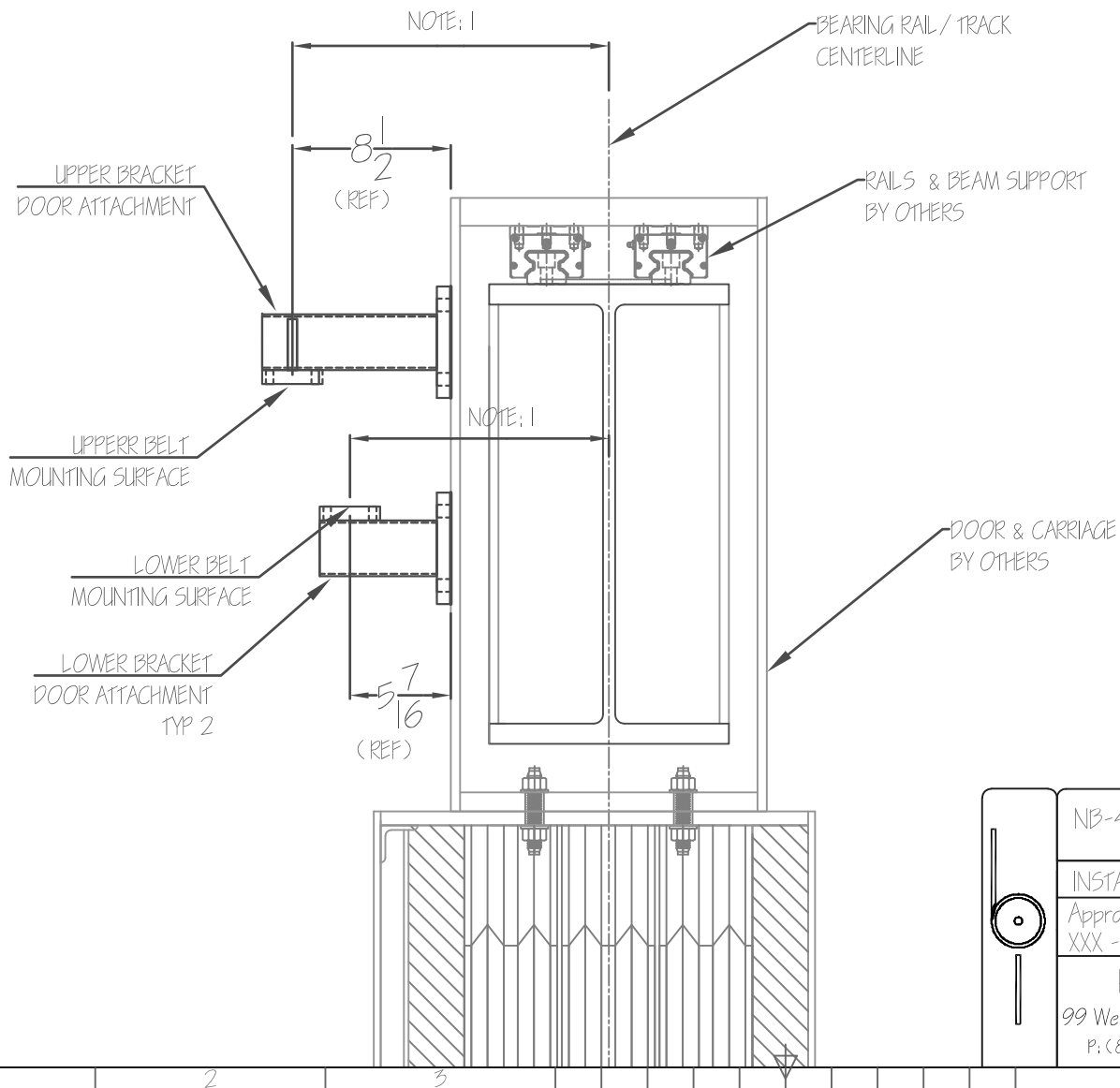
NB-4120-1P

6

7

8





RevNo	Revision note	Date	Signature	Checked

#### Drawing Notes:

NOTES:  
1) BELT CENTERLINE TO BE PARALLEL (+ / -  $\frac{1}{16}$ )

#### Tolerances

Decimal + / - 1/32 UNO

Fractional + / - .xxx

Angular + / - .xxx

NB-4120-1-DOOR ATTACHMENTS

Drawn by KPK  
Checked by XXX

INSTALLATION FOR DOUBLE BELT

Edition 0

Approved by - date  
XXX - 00/00/00 XXX

Date  
02/20/2020

brookfield industries Inc.  
99 West Hillside Ave. ; Thomaston, CT 06787  
P: (860) 283-6211 F: (860) 283-6123

Material  
SEE BOM

NB-4120-1P2

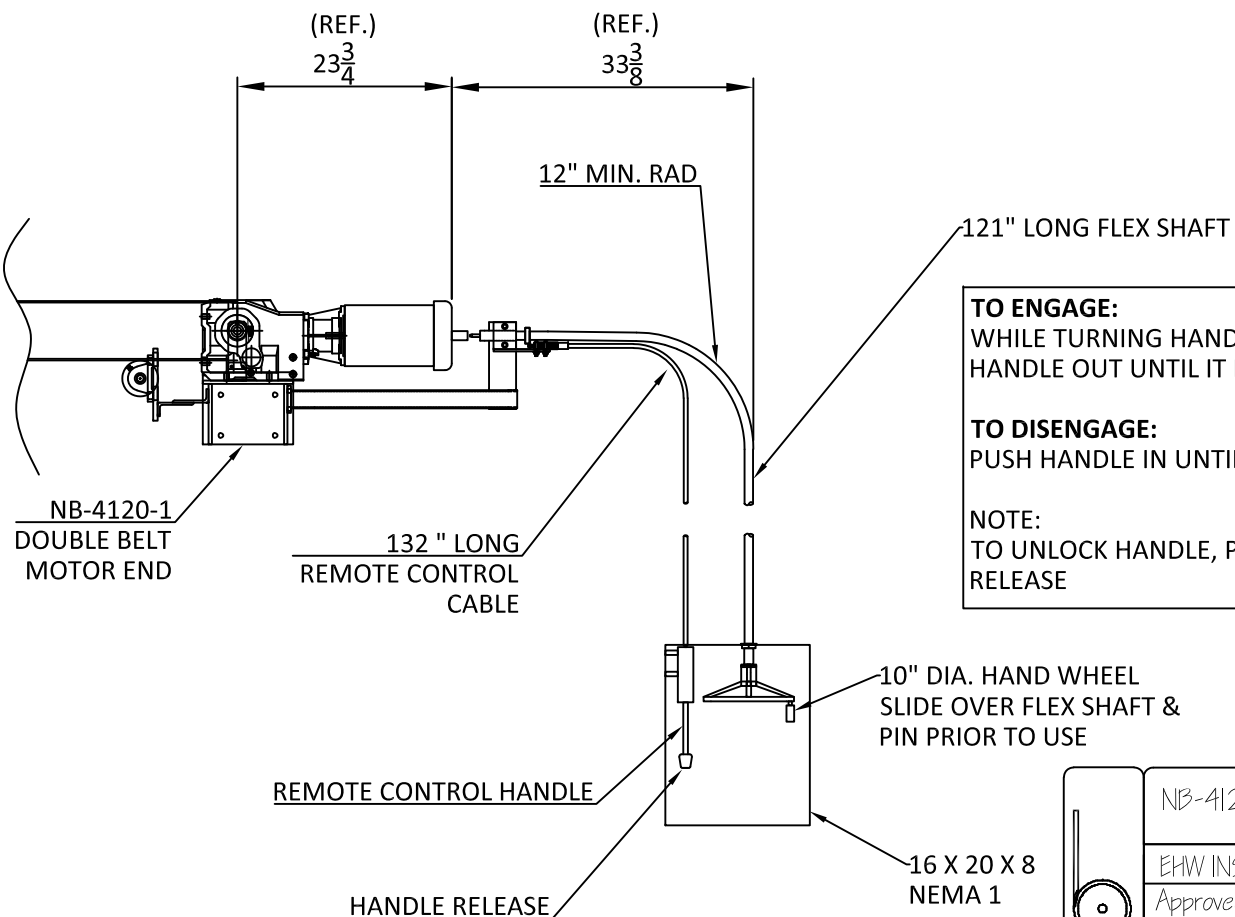
# WARNING!

ENGAGE ONLY DURING POWER INTERRUPTION  
FOR EMERGENCY OPERATION.  
DISENGAGE FOR ALL OTHER USE.

RevNo	Revision note	Date	Signature	Checked

## Drawing Notes:

Tolerances
Decimal
Fractional + / - xxx
Angular + / - xxx



**TO ENGAGE:**  
WHILE TURNING HAND WHEEL, PULL  
HANDLE OUT UNTIL IT LOCKS.

**TO DISENGAGE:**  
PUSH HANDLE IN UNTIL IT LOCKS

**NOTE:**  
TO UNLOCK HANDLE, PUSH IN HANDLE  
RELEASE

NB-4120-1 BI-PART DOUBLE BELT

Drawn by KPK  
Checked by XXX

EHW INSTRUCTIONS/ INSTALLATION

Edition 0

Approved by - date  
XXX - 00/00/00 XXX

Date  
03/04/2020

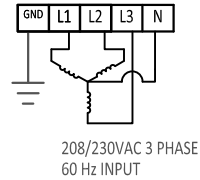
Scale  
1:1

brookfield industries Inc.  
99 West Hillside Ave. ; Thomaston, CT 06787  
P: (860) 283-6211 F: (860) 283-6123

Material  
SEE BOM

NB-4120-1-EHW

**NB-4125, NB-4150, NB-4155, NB-4120-1 (Double Belt)**



**NORMALLY OPEN MOMENTARY DRY CONTACT ACTIVATION (UNLESS NOTED OTHERWISE):**

- \*\*DOOR WILL NOT CLOSE UNLESS FAIL SAFE SENSOR IS PROPERLY INSTALLED**

9. CONTINUOUS POWER FOR EXTERNAL SAFETY SENSORS OR ANY DEVICE WITH LOW CURRENT CONSUMPTION (mA Range).

**(CLASS 2 POWER SUPPLY 24VDC, 2 AMP RATED):**

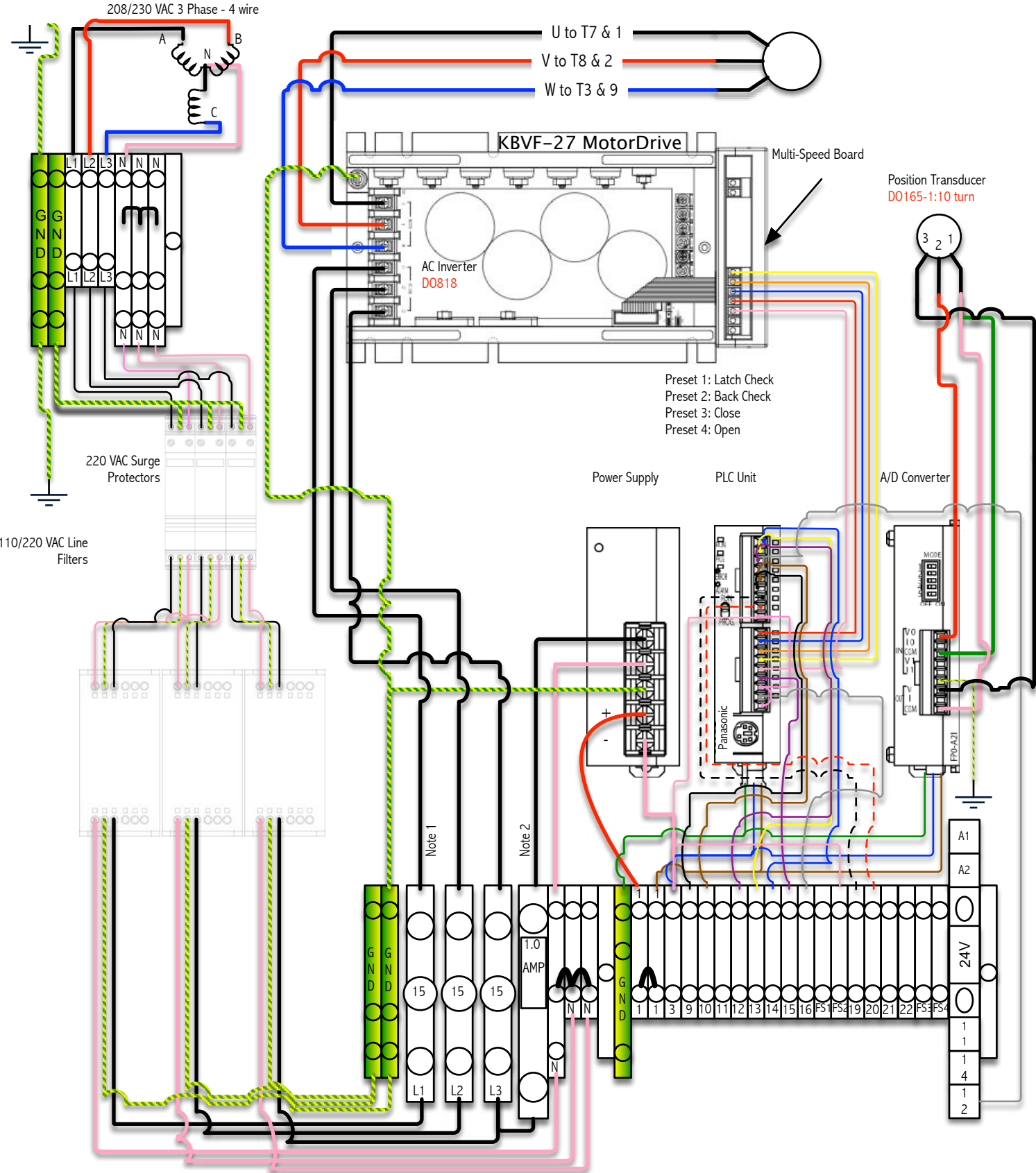
12. DOOR CLOSED SIGNAL, OTHER (ADD + 15, -15 TERMINAL)  
13. DOOR OPEN SIGNAL, OTHER (ADD +16, -16 TERMINALS)

\*\*\*CABLE SUPPLIED WITH OPERATORS FOR CLASS 2 CONNECTION TO AN EXTERNAL DEVICE, AND CABLE SUPPLIED WITH AN EXTERNAL DEVICE FOR CONNECTION TO A CLASS 2 CIRCUIT OF AN OPERATOR SHALL BE: TYPE CL2, CL2P, CL2R, CL2X COMPLYING WITH THE STANDARD FOR POWER-LIMITED CIRCUIT CABLES, REF. ANNEX A, REF. NO. 12, OR OTHER CABLES WITH EQUIVALENT OR BETTER ELECTRICAL, MECHANICAL AND FLAMMABILITY RATINGS; OR CABLE THAT IS FACTORY-CONNECTED INTEGRAL PART OF A CLASS 2 POWER SUPPLY COMPLYING WITH STANDARD FOR CLASS 2 POWER UNITS, REF. IN ANNEX A, REF. NO. 13, OR A CLASS 2 TRANSFORMER COMPLYING WITH THE STANDARD FOR LOW VOLTAGE TRANSFORMERS-PART 3: CLASS 2 AND CLASS 3 TRANSFORMERS, REF IN ANNEX A, REF. NO. 11, OR A LPS(LIMITED POWER SOURCE) COMPLYING WITH THE STANDARD FOR INFORMATION TECHNOLOGY EQUIPMENT-SAFETY-PART 1: GENERAL REQUIREMENTS REF. IN ANNEX A. REF. NO. 14.

Wiring Diagram:NB-4120

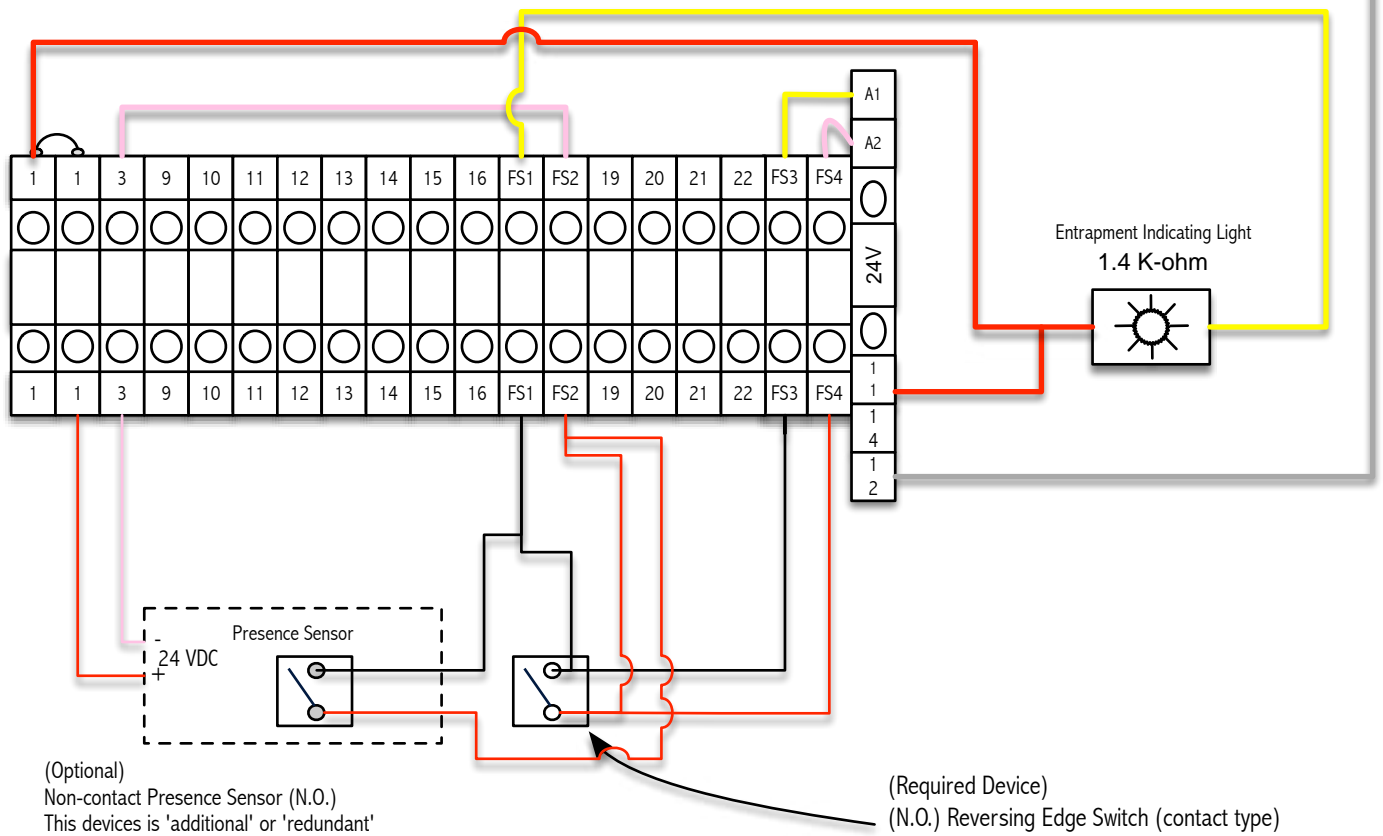
Field Wiring

Leeson 2HP AC Motor



## Presence Sensor/Reversing Edge Wiring

to X3 input on PLC



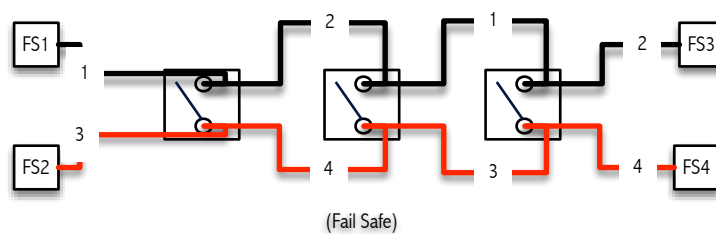
Notes:

1. Use 15 Amp/250 VAC; Circuit Breaker
2. Use 1 Amp/250 VAC; Circuit Breaker
3. Class (2) 24 VDC Terminals: Power Supply: (Com & 3) Inputs: 9-14 & 19, 20
4. All 110/220 AC wires shall be minimum 14 AWG & (105° C, 300 V)
5. All 12-24 VDC (non-motor) wires shall be minimum 20 AWG & (105° C, 300 V)
6. All motor wires shall be minimum 12 AWG & (105° C, 300 V) and 25' max. length

Legend:

Pink solid line designates a WHITE wire.

### Daisy Chain Connection of 4-Wire Tape Switches



## Parameters for NB-4120-1 Bi-Parting

### Double Belt Door Operator

Based on the following **PLC** and **Motor Control Settings**, the approximate time to travel 48" is 6-8 seconds for a bi-parting door and 12-16 seconds for a single slide.

#### PLC Settings of Door Position in Digital Value (DV):

Full Close	=	320
Full Open	=	(Travel (in) x A) + 320
Partial Open	=	(Desired Opening (in) x A) + 320
Back Check	=	Full Open - (A x 9)
Latch Check	=	320 + (A x 9)
Resolution:		
DV/in	=	A = 40 ( $\leq 84''$ Travel) = 20 ( $> 84'' \leq 168''$ Travel) = 4.0 ( $> 168'' \leq 900''$ Travel)

**Rotary Position Transducer Setting:** 320 door closed position

#### Motor Control Settings:

##### Multi-Speed Board KB 9503

Jumper Settings:

**J1** 50 / **60 Hz**

**PRESET 1** (Latch check Speed): 

Lo
R / F
Hi

**PRESET 2** (Back check Speed): 

Lo
R / F
Hi

**PRESET 3** (Close Speed): 

Lo
R / F
Hi

**PRESET 4** (Open Speed): 

Lo
R / F
Hi

Trimpot Settings:

<b>PRESET 1:</b>	Latch check (REV) Speed POT	20%
<b>PRESET 2:</b>	Back check (FWD) Speed POT	20%
<b>PRESET 3:</b>	Close (REV) Speed POT	100%
<b>PRESET 4:</b>	Open (FWD) Speed POT	100%

### Multi-Speed Board KB 9503 to KBVF-27 connections

Red, Black & White wires to F-S-R connector  
 Green, Black & White wires to 60 Hz connector  
 Orange wire to P2 connector

### KBVF-27 220 VAC 3 -phase Motor Control

Jumper Settings

**J2**    **X1** X2

Trimpot Settings:

<b>COMP</b>	50% or 1.5 volts/Hz
<b>ACC</b>	30% or 6 seconds
<b>DEC/B</b>	30% or 6 seconds
<b>MIN</b>	0%
<b>MAX</b>	90% or 100% frequency setting (out of 110% max)
<b>CL</b>	48% or 4.0 amps

**Reversing Direction:**        Can be accomplished by (2) methods:

Method 1)

Physically rotate the operator 180 degrees by placing the motor end to the transducer end and the transducer end to the motor end.

Method 2)

1. With the door in the new home or closed position, reset the **Rotary Position Transducer** to 320.
2. On the **Rotary Position Transducer**: Move the green and white wire to terminal 1 and the black wire to terminal 3.
3. On the **AC Inverter**: reverse the appropriate wires to the AC 3 phase motor (see wiring diagram).

### **Timing belt pre-tension:**

Must be properly set to assure the timing belt teeth stay engaged when operating at design loads.

$F = 924/c-c$

F= the vertical force to deflect the belt 1.0" at mid span.

c-c= the center to center distance between pulleys.

## Maintenance Intervals

Check all nuts, bolts and screws for tightness every 100,000 cycles. Also, inspect the operator for wear or damage to any of its components. The frequency of these inspections will vary upon the installation and will be directly proportional to the usage of the operator. **Do not use the operator if any component is worn or damaged**

## Safety Systems Test Intervals

Reversing edge safety sensors, presence sensors and other external devices that are not supplied by the manufacturer of the door operator but added during installation, must be properly tested on a frequent enough basis so as not to compromise the safety and reliability of the complete door operating system on a continuing basis. These tests should normally range from daily to weekly checks.

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## **brookfield industries, inc.**

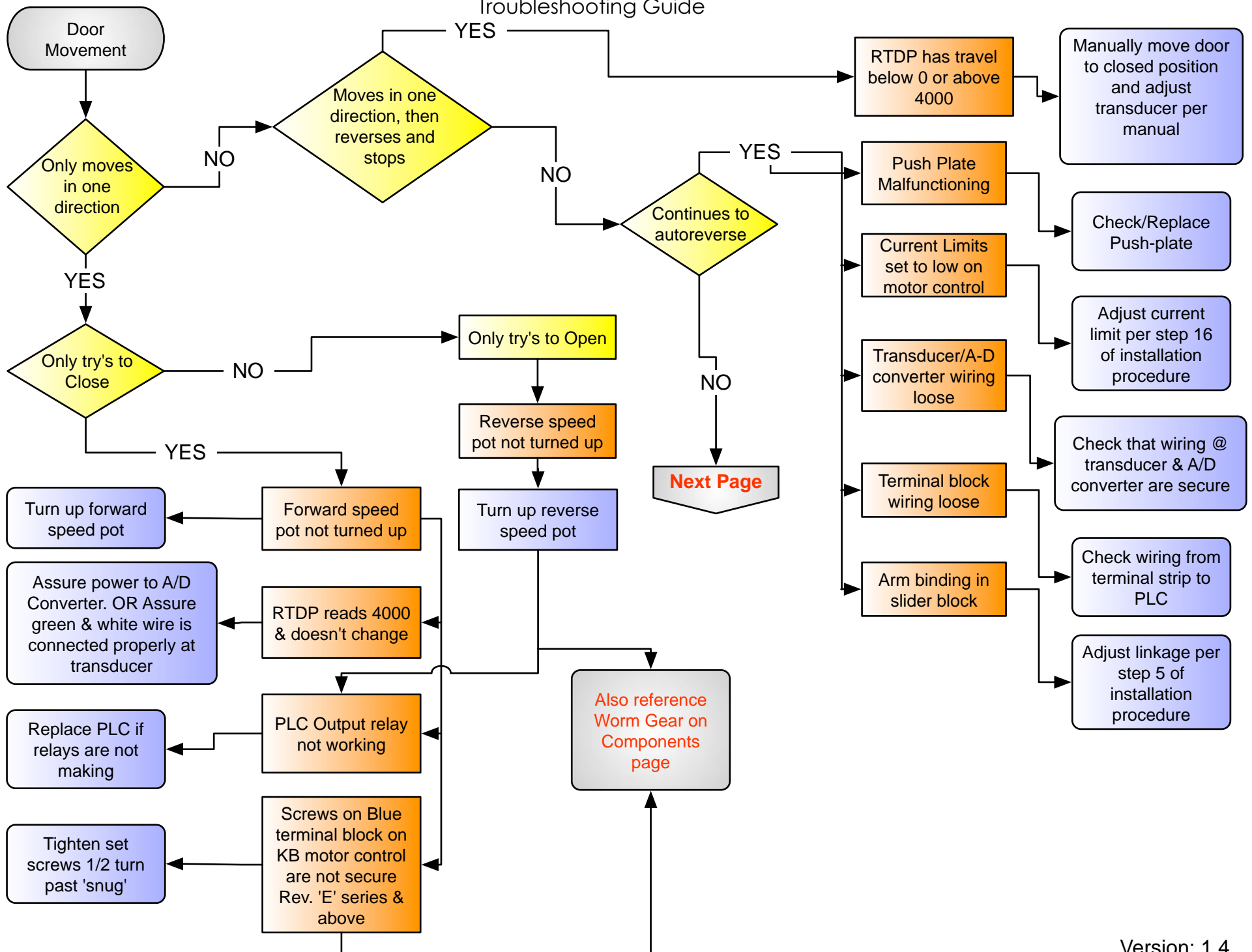
### **Limited Warranty**

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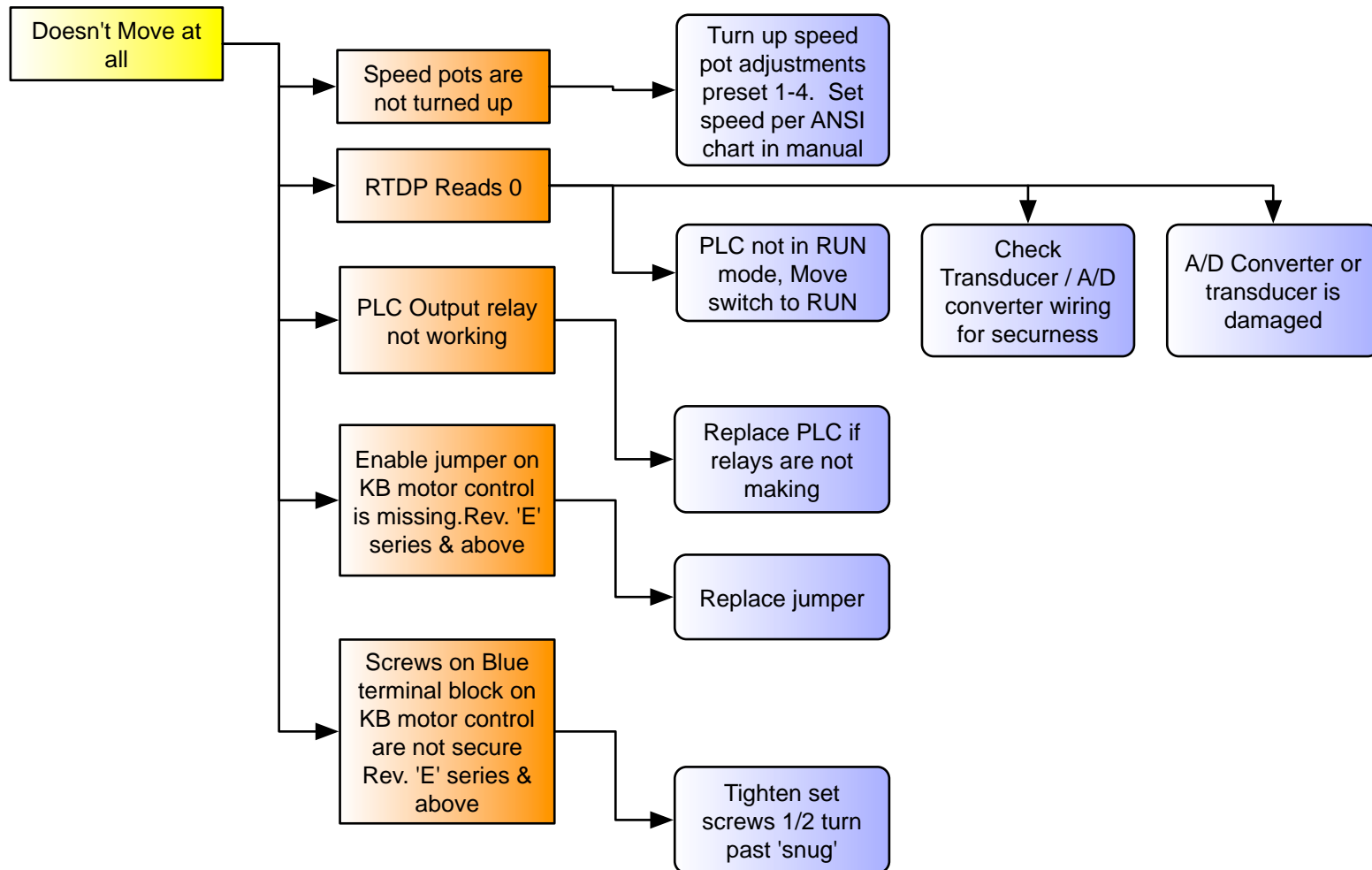
*brookfield industries, inc.* warrants that door operator models NB-500, NB-1000, NB-2000 and NB-4000 are free from defects in material and workmanship according to the following terms and conditions:

- 1) The limited warranty for all aforementioned products extends for (1) year beginning on the date of shipment from our facility.
- 2) During the limited warranty period, *brookfield industries, inc.* will repair or replace any defective component or any part that does not operate as originally specified or intended with a new or rebuilt part. No charge will be made to the consumer for any such parts. Credits or reimbursements, as well as associated shipping costs, will be issued only after any replacement parts have been returned by the consumer.
- 3) *brookfield industries, inc.* will also reimburse or credit the consumer for any reasonable labor charges associated with the repair or replacement of a particular part. *brookfield industries, inc.* and the consumer must agree upon the dollar amount as well as the scope of work, before any amount is allocated. This amount may vary depending on the geographical location of the labor market. Travel expenses are not applicable.
- 4) *brookfield industries, inc.* shall not cover, nor will the consumer have any benefits under this limited warranty if any of the following conditions apply to any returned parts as determined through an evaluation by *brookfield industries, inc.* or any of its vendors:
  - a) The product has been subjected to: improper installation, installation practices or any settings not in accordance with the operator manual, abnormal use, abnormal conditions, exposure to moisture, dampness or any other severe environmental conditions, unauthorized modifications, unauthorized connections, unauthorized repair, misuse, neglect, abuse, accident, altercation, door weights and/or door speeds and/or operating forces that exceed the rated values, or other acts which are out of the control of *brookfield industries, inc.*, such as damage caused by shipping.
  - b) Removing or altering of the serial number or any other action that prohibits *brookfield industries, inc.* from determining the original purchase date.

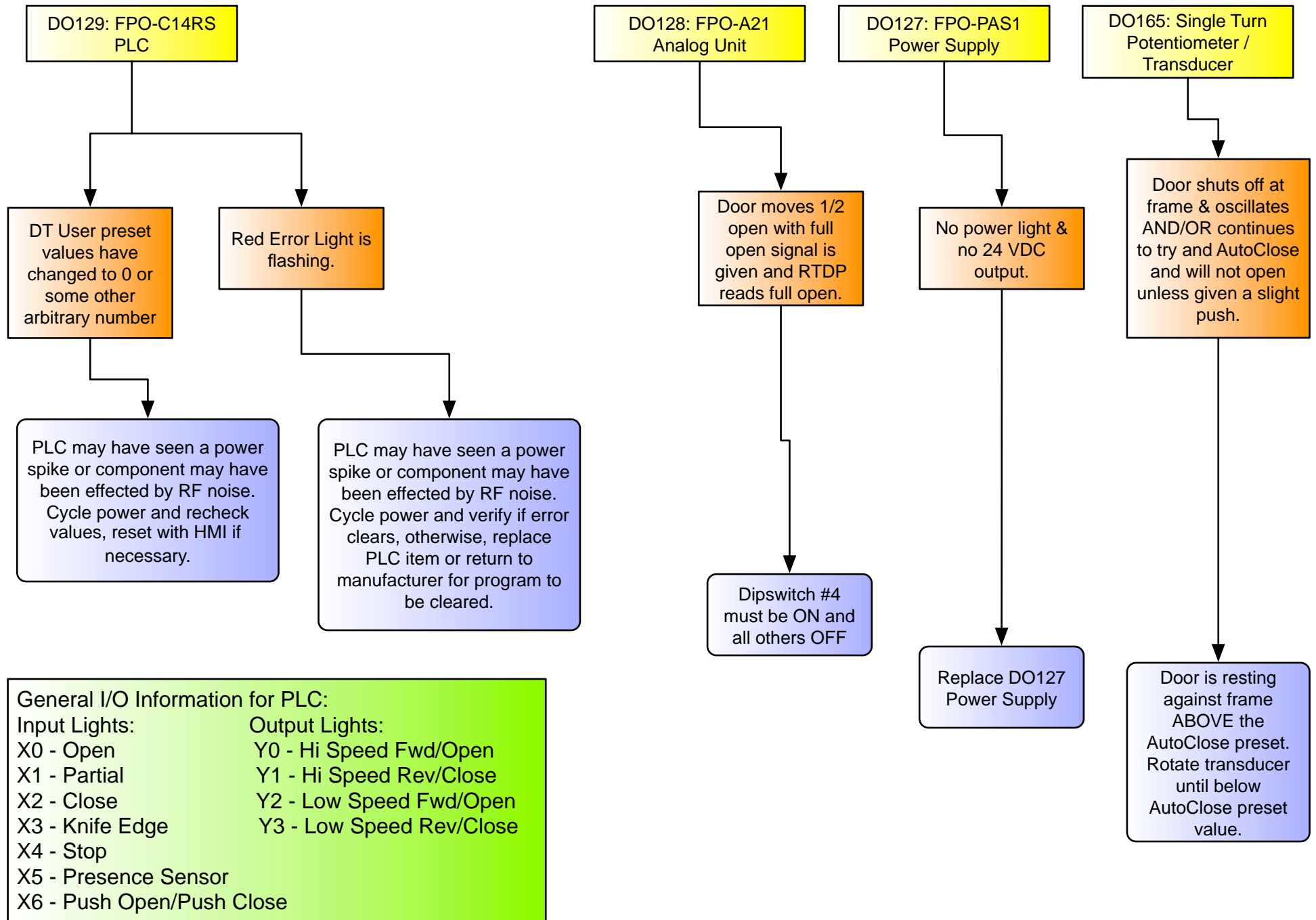
# Troubleshooting Guide



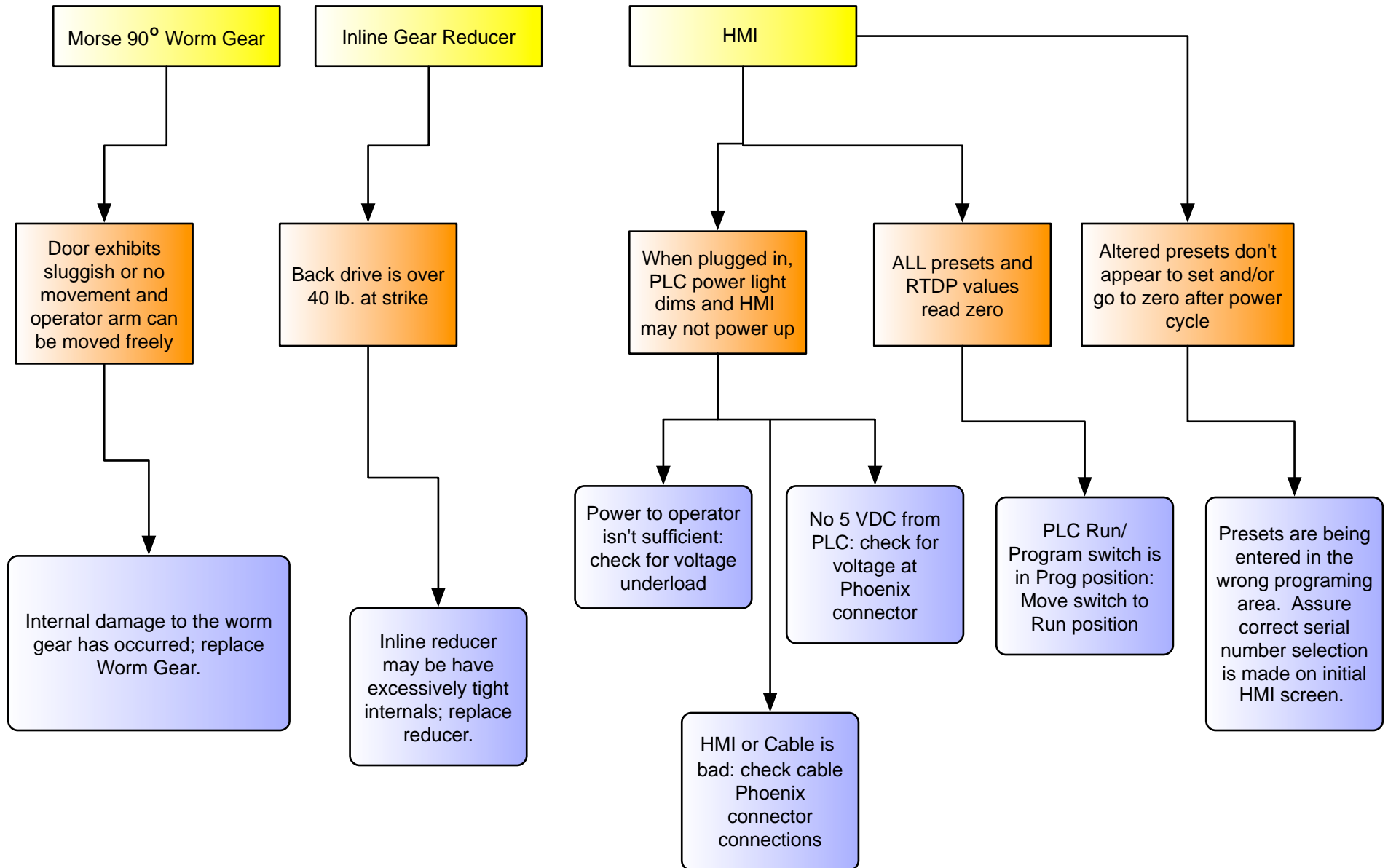
## Troubleshooting Guide



## Component Specific Problems



## Component Specific Problems



## Component Specific Problems

