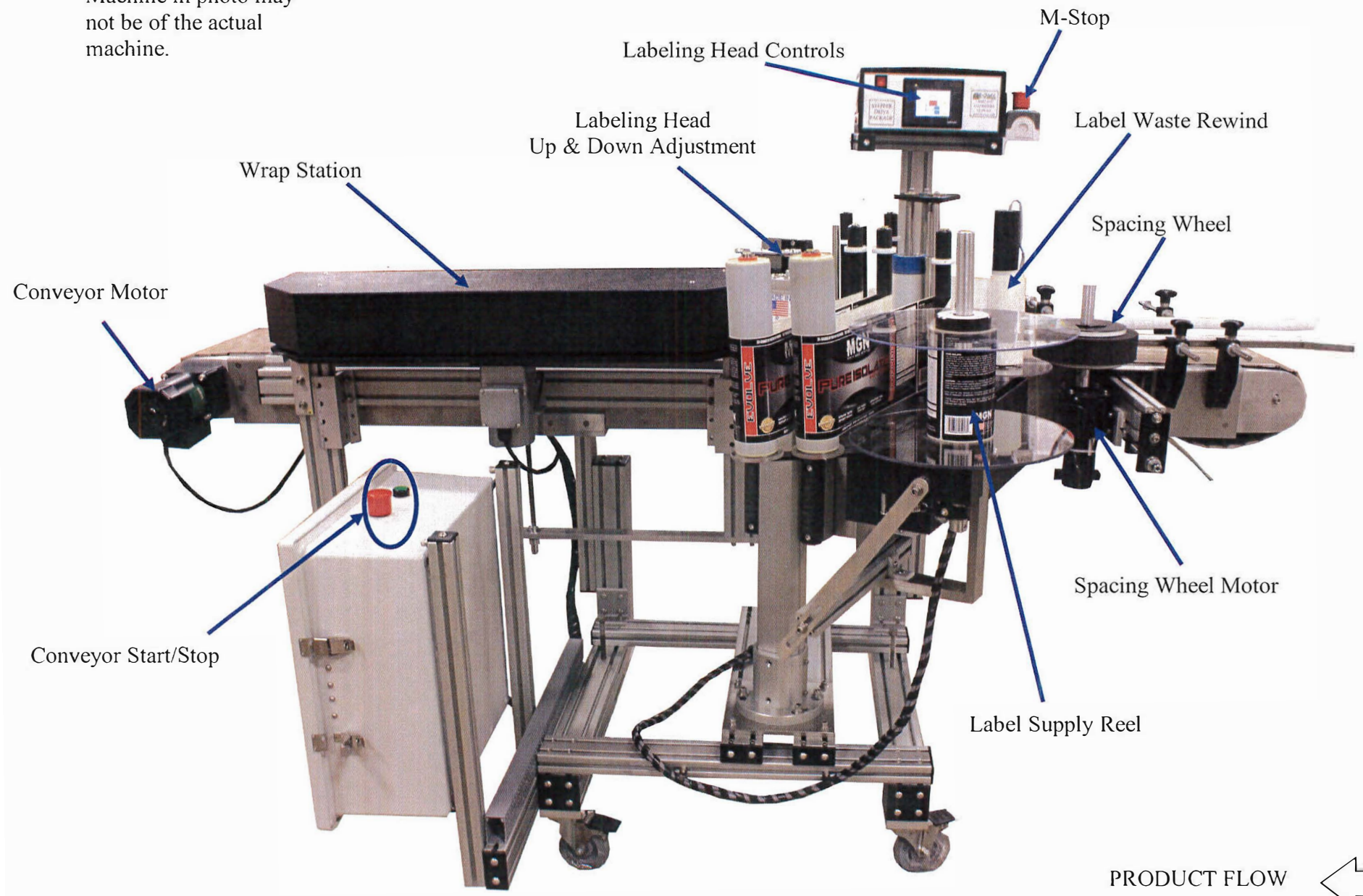
SYSTEM OVERVIEW

Machine in photo may not be of the actual machine.



PRODUCT FLOW

Set-Up Sheet For Large Frame Mini Wrap Labeling System

Customer Name: Envirocleanse LLC

Product: 1 Gallon Jug / 32OZ Spray bottle

Job #: L-026

Date Completed: 4/2020

INFEED SET UP

Infeed Guide Rail Front	Fixed
Infeed Guide Rail Back	Adjust to fit
Spacing Wheel	20 FPM

LABELING HEAD (Control Box Settings)

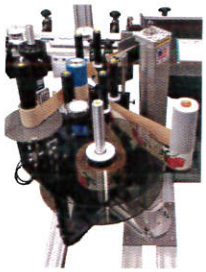
PLC Settings –	Motor Settings –
Product Delay - 350	**Accel / Decel - 300**
Label Sensor Stop - 6/5	**Speed - 1200**
Print Dwell - N/A – Set to 100	
Feed Error Limit – 20"	**Start Freq - 700**
** **Label delay cannot be set so that the**	**Label stops in the gap***

PRINTER ELECTRONIC CONTROLS (Markem Control Box)

Temperature	265

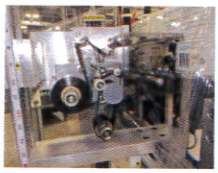
LABELING HEAD (Mechanical Adjustments)

Head Height (Post)	11"
Head Rotation Position	Fixed
Head Tilt (Post)	Flat, Minor Adjustment
Head Tilt (U-Arm)	Flat, Minor Adjustment



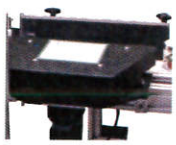
Coder Adjustments

Left to right Location	9 ½"
Up & Down Location	9"



WRAP STATION

Wrap Station Height	2"
Wrap Station Speed	95FPM



CONVEYOR / SYSTEM ADJUSTMENTS

Conveyor Speed	45 FPM
System air Pressure	80PSI

METHOD OF OPERATION
For Large Frame Mini Wrap

The Mini Wrap is designed for ease of operation. This is done by limiting the amount of set-up procedures and adjustments required.

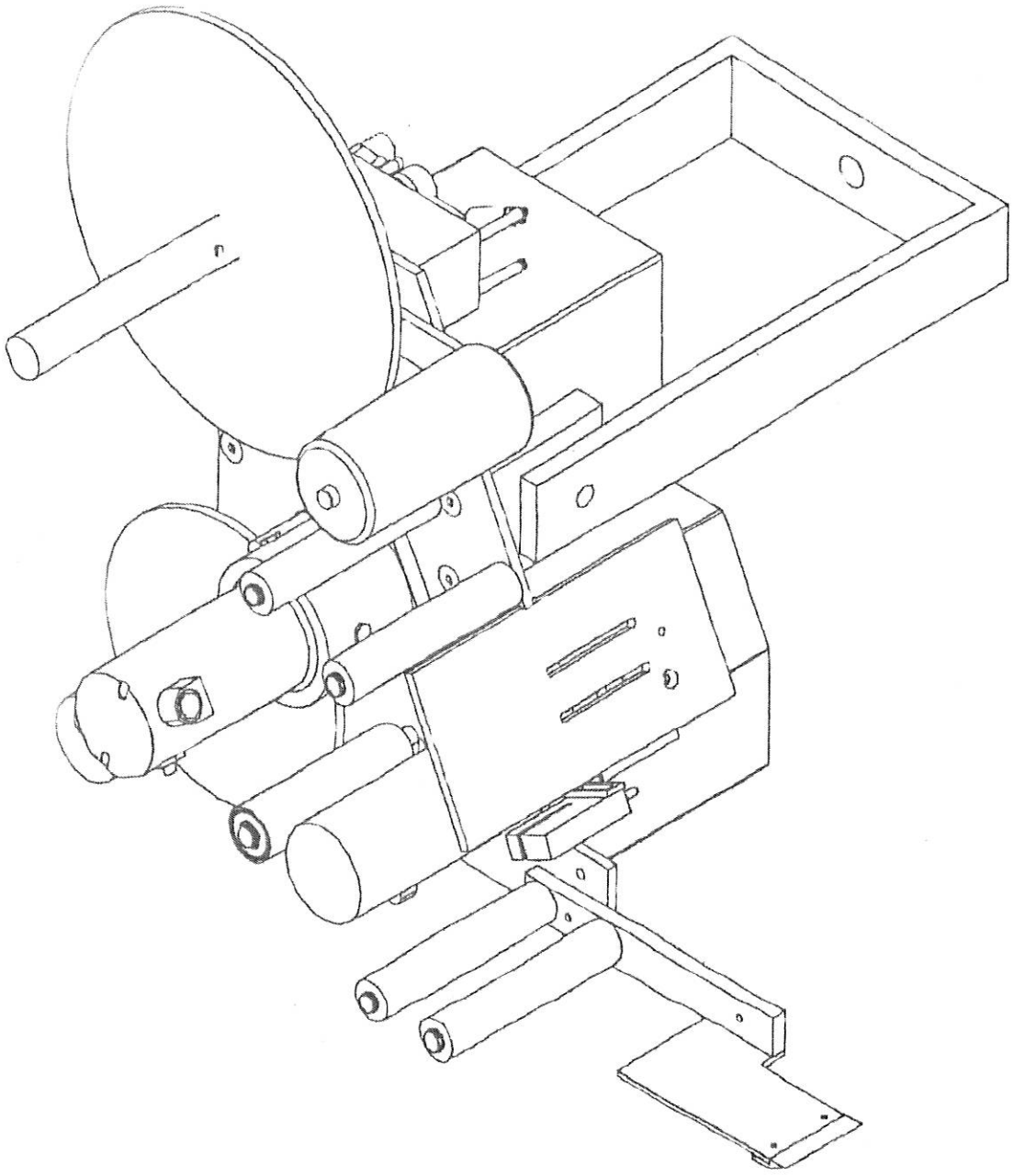
The wrap station and conveyor are controlled by variable speed AC motors. The spacing wheel is controlled by a variable speed DC motor. The A.C. Motors are set so that the conveyor runs at approximately 40 feet per minute, the wrap station runs at approximately 70 feet per minute, and the spacing wheel is adjustable depending on label length. The labeling head is controlled by a stepping motor. For most applications the speed of the labeling head should be set to match the speed of the wrap station. However, this may need to be adjusted for different label materials.

For most applications the only speed related adjustment is the speed of the spacing wheel. The speed of the spacing wheel is adjusted to increase the pitch (spacing) between products. You may need to adjust the speed of the spacing wheel (pitch) when you change the length of the label.

The mechanical adjustments on the Mini Wrap are also limited. The height of the labeling head may need to be changed to properly locate the label on the product. The rear guide rail and wrap pad will need to be adjusted for different diameter products. The inside adjustments (front side) on the Mini Wrap Labeling System (such as inside guide rail, spacing wheel location, peel plate location, and wrap station location) should NOT be adjusted. Only the rear guide rail and wrap pad should be moved for product changeovers. Depending on the material, shape, and size of the product, the product sensor may have to be moved and the product sensor sensitivity adjusted.

This machine is equipped with an optional hot stamp coder. Type is placed in the type holder. The type is heated up by the Omron temperature controller. Once triggered a pneumatic cylinder extends pushing the heated type into the wax ribbon. The image from the type and ribbon is transferred onto the label. The coder is triggered by the labelers stop signal which is generated by the label sensor.

SERIES 3 & 4 APPLICATOR WITH STEPPING MOTOR DRIVE



SAFETY AND TRAINING

This machine is designed to be operated by trained and experienced personnel. To ensure its safe operation the following recommendations should always be followed:

- Caution and common sense should be used at all times.
- Never rethread or change labels while the applicator power is on.
- Maintenance nor adjustments should be made while the machine is in operation.
- Persons that are not properly trained should not work with this equipment.
- The rear cover on the applicator should never be removed while the machine is running. Belts, pullies, and other moving parts are contained inside this cover.
- The labeling head should never be turned on or operated without all of the covers and guards in place.
- Liquids, both flammable and non flammable should be kept away from this piece of machinery.
- The terminal strip on the rear of the applicator contains live voltage with power applied. For this reason, wires and/or components should not be replaced with the main power on.
- The labeling machine is not designed to be used in a hazardous, wet, corrosive, or an environment where flammable materials are present.
- The control box functions on 110 volt A.C. Electrical components within the control box will hold an electrical charge for several hours. A representative of All Fill should be consulted before attempt to work inside the control box.

During the initial installation of all All Fill machinery training will be provided to the customer. Only operators that have been designated as qualified by a All Fill representative are authorized to work with or on any piece of equipment supplied by All Fill. If at any time you should have a question on the safe and proper way to operate this machine please contact us at 610-524-7350.

FEATURES OF THE APPLICATOR

All Fill applicators are designed to accurately apply pressure sensitive labels. The labels must be supplied in roll form and meet the following criteria.

1) The label must be properly manufactured and have no problems with predispense or release.
2) The label must be in a die cut form with 1/8" matrix removed.
3) The "Web", or label liner, must be free from die cuts, tears and perforations.
4) The label core must have a 3" I.D. and the roll must have a 12" O.D. or less.
5) Minimum width on the label web is 3/8"
6) The standard applicator has a maximum web width of 4 ½". Versions are available to handle wider webs,

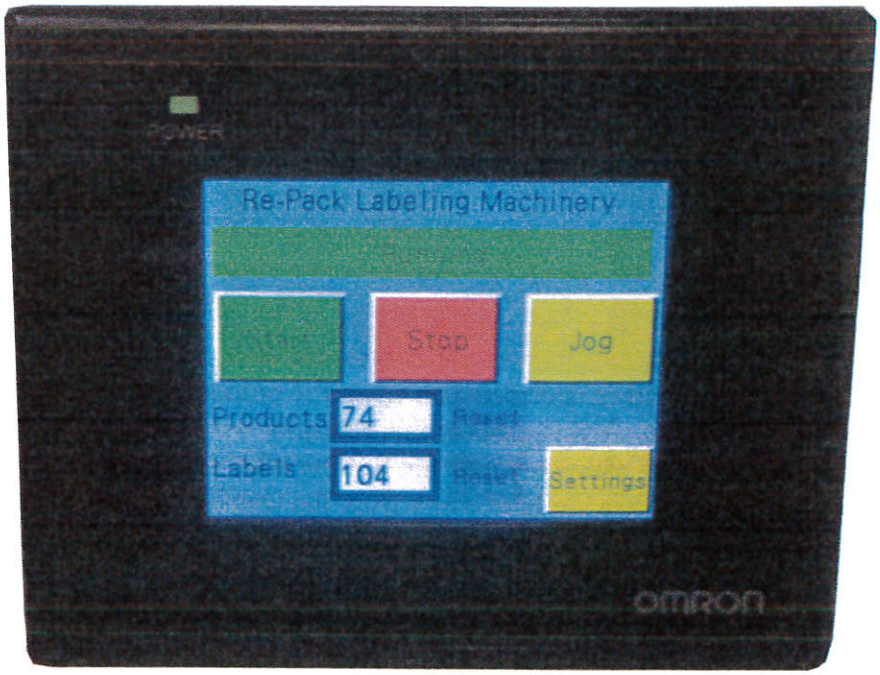
The applicators come in two (2) different versions, fixed speed and variable speed. The fixed speed drives are used on the Syncro Series Tamp and Blow-on labeling heads. The variable speed drive package is used on the Series 3, and Series 4. The variable speed drive packages are offered in three (3) different speed ranges. A speed chart, explaining these ranges, is detailed in this manual. Should you ever need to increase or decrease the maximum speed of your machine, a simple gear change can be made.

The serial number (found on the back of the label head) will explain the date of manufacturing and the feed direction or "Hand" of the machine. The first two digits of the serial number indicate the month the applicator was made. The second two numbers tell the year the head was made. The final two numbers note what number in that batch the labeler is. The two letters at the end indicate the hand of the applicator. "RH" stands for right hand and means the head was made to feed labels from left to right. Should the feed direction of the applicator need to be changed, this is a simple process. There is no difference in the components on a LH or RH head. Simply assembling the parts on the opposite side of the base plate will change its handling.

All All-Fill applicators are designed using easy to source "off the shelf" components. The standard label sensor is a Leuze. The standard product sensor is a Banner. These sensors may be swapped with other brands and types to meet your needs. The only requirement is that both sensors operate on 12vdc and both use NPN outputs.

APPLICATOR CONTROLS / FRONT PANEL

When you first turn the main power switch on it will take approximately 15 seconds for the PLC to do a self check and boot up. Once the PLC is fully powered up it will be in "RUN" mode and the screen shown below will appear.



Error Settings (Feed Error Limit) - This labeling head is versatile and can dispense labels with a repeat length as short as a 1/4" and as long as 21". The label sensor stops the feed process. If for some reason the label sensor fails or is out of adjustment, labels will continue to feed until the feed error limit is reached. For most applications the feed error limit can be set to 21" and left alone. However, when running extremely small labels you may want to adjust the feed error limit to 3 times the label length.

Saving a setting - This is a true touch panel controller, meaning you simply touch the setting you want to change and a key pad will be displayed. Press the numbers on the key pad to change the setting. Once this is done you will need to press the enter button in the lower right hand corner to save the setting.

Main – Return to Main Menu. Once you have changed your setting and pressed the enter button you will need to press the Main button to return to the main screen.

MOTOR SETTINGS: The motor settings button is located in the lower left hand side of the settings screen. After pressing the motor settings button, the screen displayed below will appear.

The feed of the label is controlled by a stepping motor. Each time the product sensor is triggered, the motor dispenses a label. Each time the label sensor sees the gap in between labels, the stepping motor stops label feed. You can make adjustments to the stepping motor by pressing the motor settings button.

- Once the motor settings button is pressed, a screen will come up giving you three (3) choices:
  - ACCEL/DECEL
  - Speed
  - Start Freq

SERIES 3 AND SERIES 4
WITH RK5D AND OMRON TOUCH PANEL

Rather the labeling head is supplied as a stand-alone device or integrated with a labeling system, it will have been set-up using the product and label samples provided during the initial build process at Re-Pack. Please see the set-up sheet section of this manual for details on the settings we used in the factory.

If you are doing the initial set-up for a label that was not provided to us, please follow the instructions listed below.

1. Start by threading up the label applicator. This should be done with the power to the labeler's controls off.

2. With power to the labeler's controls off, turn the drive roller by hand. If you are turning the drive roller in the correct direction, labels will feed through the labeler and peel off at the peel tip. You cannot turn the drive roller with power on.

3. After dispensing a couple of labels while turning the drive roller, stop the label so that the leading edge is at the peel tip. Please note this does not have to be perfect. If you are an 1/8" before the peel tip or an 1/8" past the peel tip, this will not affect the set-up.

4. With the label stopped at the peel tip, measure the distance between the leading edge of the label and the center line of the label sensor. **IMPORTANT NOTE: THE LABELER WILL NOT OPERATE PROPERLY IF IT IS SET-UP WITH THE LABEL SENSOR STOPPING IN THE LABEL GAP.**

5. Once you have measured the distance from the leading edge of the label to the label sensor, turn power to the labeler's controls on.

6. With power on, press SETTINGS.

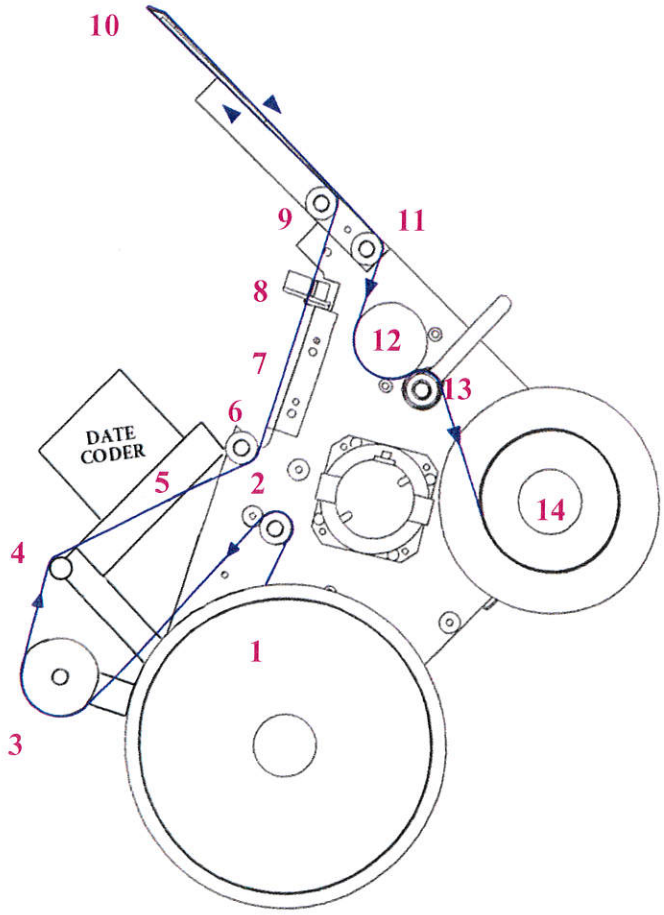
7. Once in settings mode, press Label Sensor Stop. Label sensor stop distance is measured in inches. If you enter 2.50 into label sensor stop the labeler will stop 2.5" after the label gap.

8. Enter the distance you measured in step 4. Please note in order to change this number you must first press on the small box with numbers in it next to the words Label Sensor Stop. After changing the number you must press enter to save the change.

9. After setting the label sensor stop, press main to return to the main screen

10. Press jog to jog (test fire) one label. You may have to make minor changes to label sensor stop in order to find the correct stop position.

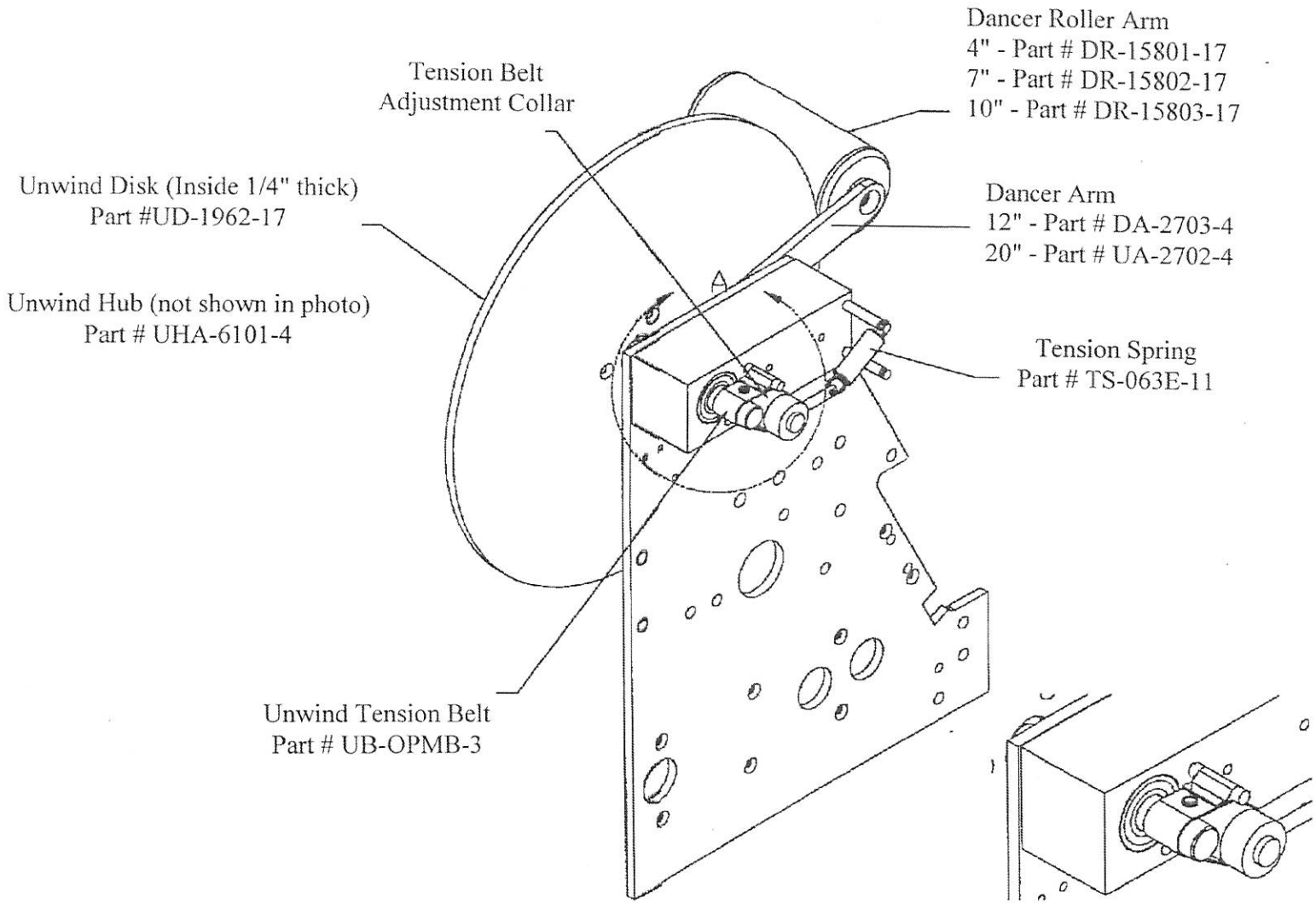
THREADING DIAGRAM



1. Place the roll of labels onto the supply reel.
2. Feed the labels under the stationary roller.
3. Pull the labels up to and around the dancing arm roller (make certain the labels are facing up)
4. Thread the labels passed the guide roller at the infeed of the date lot coder.
5. Pull the labels between the print head of the date lot coder and the coder's pressure plate.
6. Feed the labels down and behind the guide roller prior to the tension brush and label sensor.
7. Feed the labels between the tension plate and tension brush.
8. The labels should be facing up as you pass them through the label sensor.
9. Bring the labels behind the front guide roller on the peel plate arm.
10. Wrap the labels around the peel plate and pull towards the back of the machine.
11. Feed the labels under the rear roller on the peel plate arm and over the top of the drive roller.
12. Open the nip roller and feed the labels between the drive and nip roller.
13. Pull the labels under and around the nip roller.
14. Place the label web on the top of the rewind hub and secure in place with the locking pin.

MECHANICAL

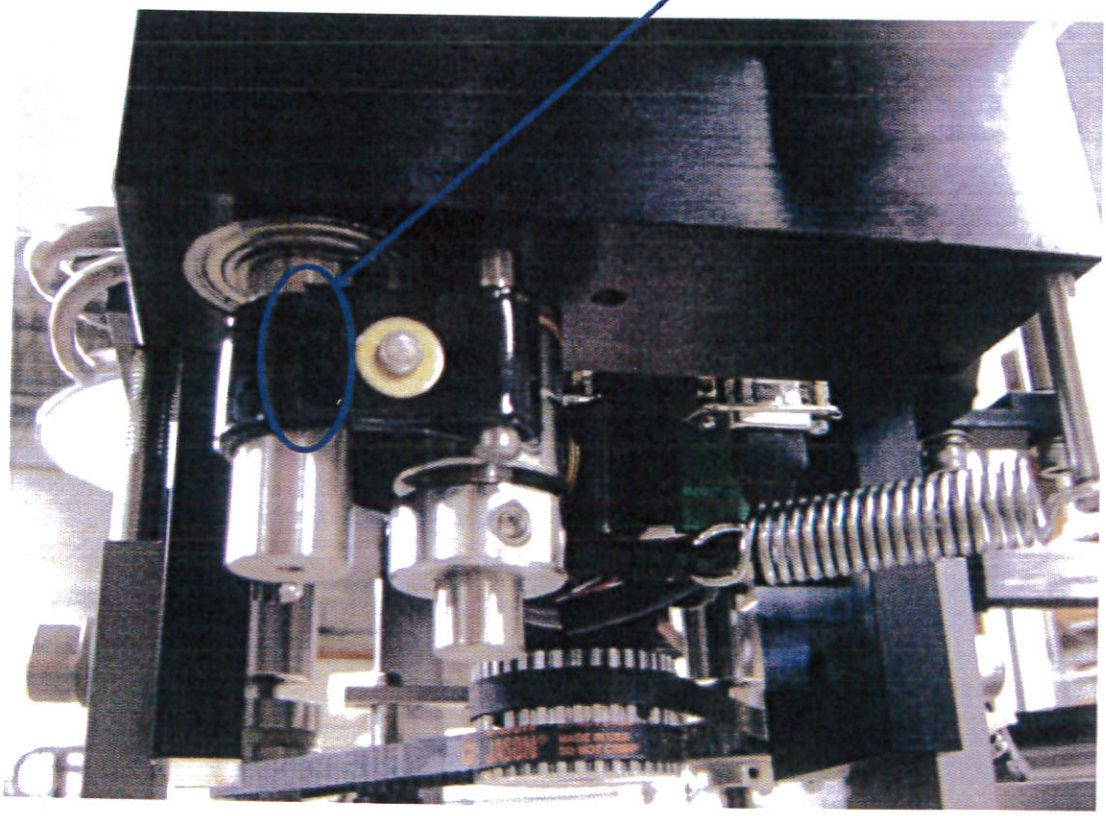
COMPONENTS



UNWIND ASSEMBLY

UNWIND BELTS

The Loop in the belt must point up or out depending on how labeler is mounted



Unwind Tension Belt. Part # UB-OPMB-3

UNWIND ASSEMBLY ADJUSTMENT

The unwind assembly is made up of three major parts.

1. The supply reels
2. Dancing arm and roller
3. Tension spring and brake belt

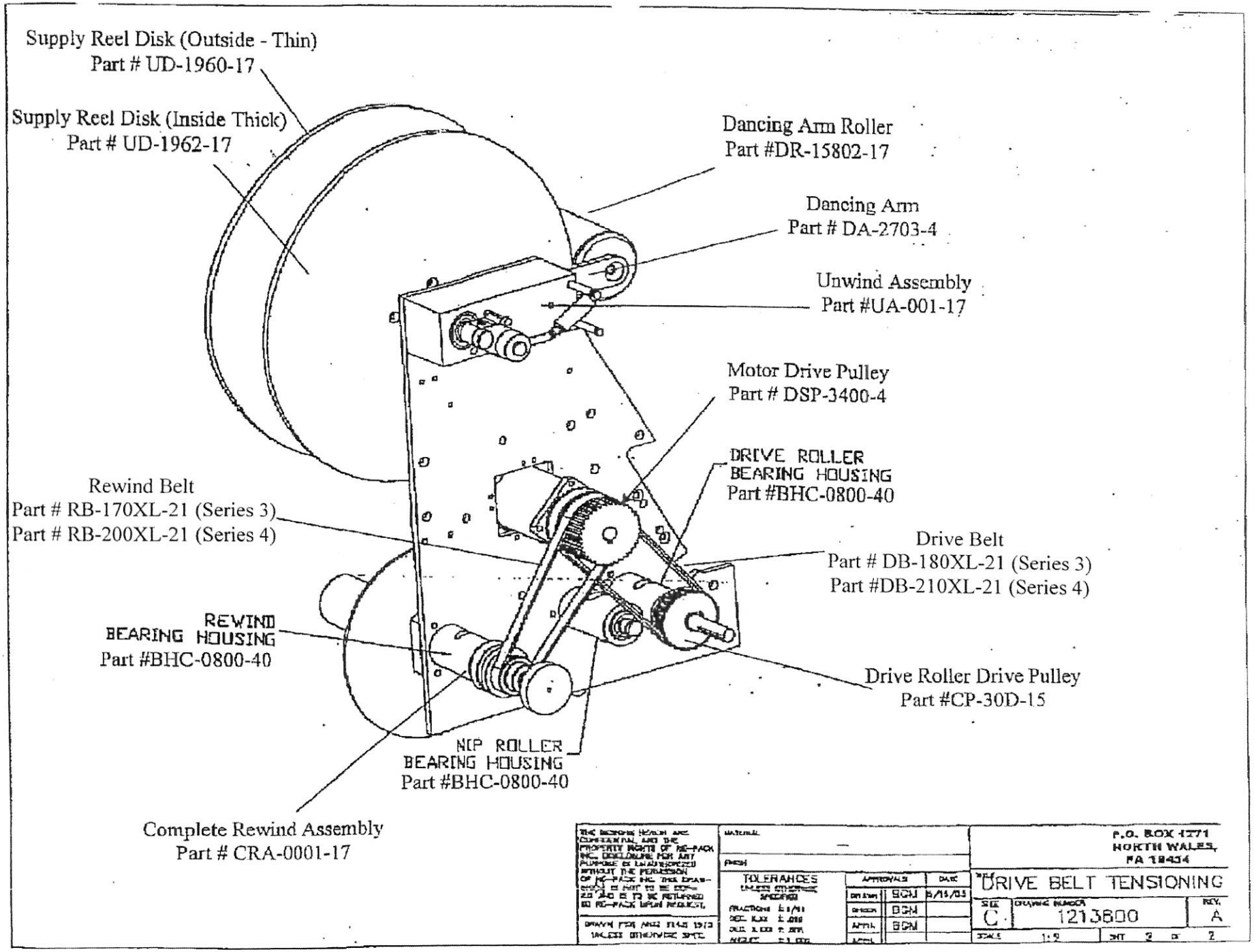
The labels are held in place by the supply reels. The supply reels are kept from spinning by the brake belt at the rear of the assembly (a white textured belt).

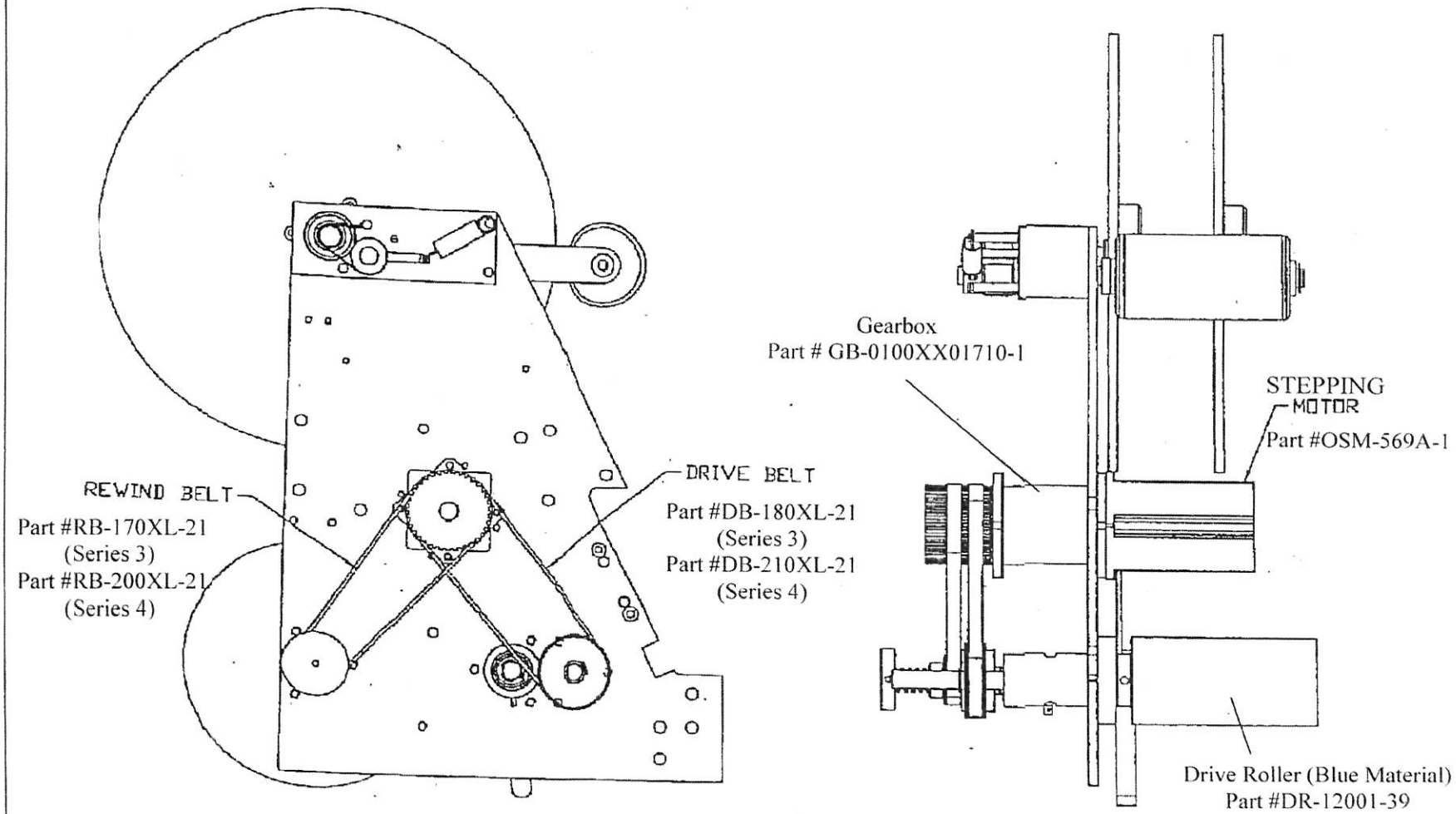
As tension is pulled at the dancing arm, the arm moves down and releases the brake belt. As long as pressure is applied to the dancing arm, the label roll will be allowed to spin.

The amount of tension at the dancing arm is controlled by the tension spring. Both the tension spring and tension (brake) belt can be adjusted using the locking collars located at the top rear of the labeling head.

The inner collar controls the tension on the brake belt. This may be adjusted by loosing the set screw and rotating the collar. Rotating the collar towards the dancing arm will decrease the tension.

When setting the tension on the labeler, it is important to monitor a complete roll of labels to ensure correct setting. The amount of tension required may change as the roll size decreases. Choose the setting that works best for an entire roll of labels.


Supply Reel Disk (Outside - Thin)
Part # UD-1960-17
Supply Reel Disk (Inside Thick)
Part # UD-1962-17
Dancing Arm Roller
Part #DR-15802-17
Dancing Arm
Part # DA-2703-4
Unwind Assembly
Part #UA-001-17
Motor Drive Pulley
Part # DSP-3400-4
DRIVE ROLLER
BEARING HOUSING
Part #BHC-0800-40
Rewind Belt
Part # RB-170XL-21 (Series 3)
Part # RB-200XL-21 (Series 4)
Drive Belt
Part # DB-180XL-21 (Series 3)
Part #DB-210XL-21 (Series 4)
REWIND
BEARING HOUSING
Part #BHC-0800-40
Drive Roller Drive Pulley
Part #CP-30D-15
NIP ROLLER
BEARING HOUSING
Part #BHC-0800-40
Complete Rewind Assembly
Part # CRA-0001-17
TOLERANCES
APPROVALS
DATE
SCM
5/15/03
BGN
BGN
P.O. BOX 1271
NORTH WALES,
PA 19454
DRIVE BELT TENSIONING
SIZE
C
DRAWING NUMBER
1213800
REV.
A
SCALE 1:2
SHT 2 OF 2



DRAWN PER ANSI Y14.5 1973 UNLESS OTHERWISE SPEC.

MATERIAL —

FINISH

TOLERANCES UNLESS OTHERWISE SPECIFIED
FRACTIONS ±1/64
DEC. X.XX ±.010
DEC. X.XXX ±.005
ANGLES ±1 DEG.

APPROVALS		DATE
DRAWN	BGM	6/11/03
CHECK	BGM	
MFG.	BGM	
APPR.		

P.O. BOX 1271
NORTH WALES,
PA 19454

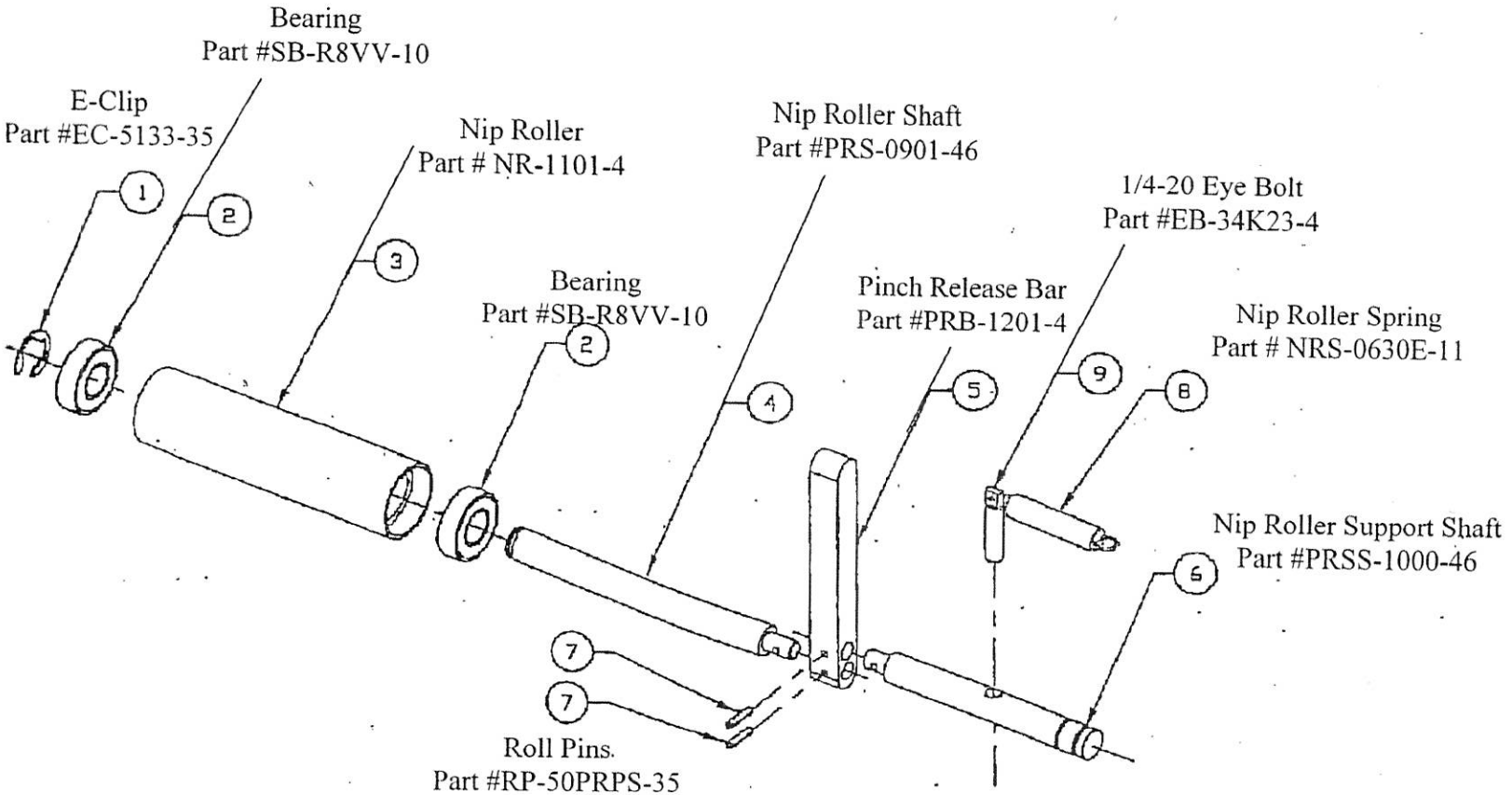
TITLE: DRIVE BELT TENSIONING

SIZE	DRAWING NUMBER	REV.
C	1213800	A

SCALE 1:2 SHT 1 OF 2

NIP ROLLER ASSEMBLY

ITEM #	PART DESCRIPTION	PART NUMBER	QTY
1	E-CLIP	EC-5133-35	1
2	BEARING	SB-R8VV-10	2
3	NIP ROLLER	NR-1101-4	1
4	NIP ROLLER SHAFT	PRS-0901-46	1
5	PINCH RELEASE BAR	PBR-1201-4	1
6	NIP ROLLER SUPPORT SHAFT	PRSS-1000-46	1
7	ROLL PINS	RP-50PRPS-35	2
8	NIP ROLLER SPRING	NRS-0630E-11	1
9	1/4 20 EYE BOLT	EB-34K23-4	1
	SHIMS FOR NIP ROLLER (NOT SHOWN)	NRS-A362-14	1



Nip Roller Assembly sold as complete assembly. The part # is NRA-0800-17

DRAWN PER ANSI Y14.5 1973 UNLESS OTHERWISE SPEC.

MATERIAL —

FINISH —

TOLERANCES
UNLESS OTHERWISE SPECIFIED
FRACTIONS ± 1/64
DEC. X.XX ± .010
DEC. X.XXX ± .005
ANGLES ± 1 DEG.

APPROVALS		DATE
DRAWN	BGM	4/8/97
CHECK	BGM	4/8/97
APPR.	BGM	4/8/97
APPR.		

P.O. BOX 1271
NORTH WALE
PA. 19454

SIZE	DRAWING NUMBER	REV.
B	0000800	B

REWIND TENSION ADJUSTMENT

The label rewind assembly is belt driven off of the main drive motor. It is geared to turn 5% more than the drive roller. The rewind assembly has a friction clutch to control the tension on the used label web.

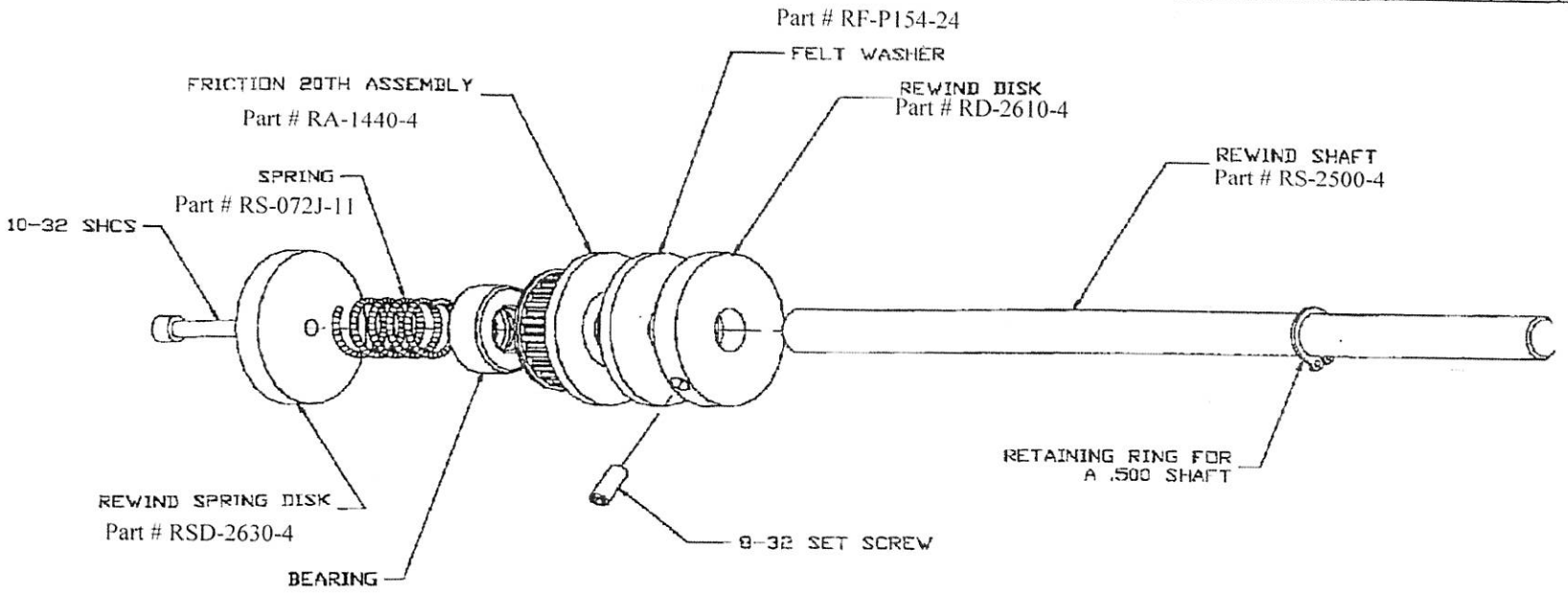
The amount of clutch slip is adjusted by decreasing spring tension on the rewind spring disk.

To increase the amount of rewind tension – loosen the set screw on the rewind spring disk, then turn the spring disk clock wise.

To decrease the amount of rewind tension – loosen the set screw in the rewind spring disk, then turn the spring counter clockwise.

An adjustment to the rewind assembly may be required as the felt disk wears. We recommend checking the setting once every three months. Adjust the spring disk a half at a time.

REV.	DESCRIPTION	DATE	APPR.
A	PROD—RELEASE		



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DRAWN PER ANSI Y14.5 1973 UNLESS OTHERWISE SPEC.

MATERIAL —

FINISH —

TOLERANCES UNLESS OTHERWISE SPECIFIED

FRACTIONS ± 1/64
DEC. X.XX ± .010
DEC. X.XXX ± .005
ANGLES ± 1 DEG.

APPROVALS		DATE
DRAWN	BGM	6/14/89
CHECK		
APPR.		
APPR.		

P.O. BOX 1271
NORTH WALES
PA. 19454

THE REWIND SHAFT ASSEMBLY

SIZE	DRAWING NUMBER	REV.
B	2001--S	A

SCALE FULL SHT 1 OF 1

Section .....

ELECTRICAL COMPONENTS

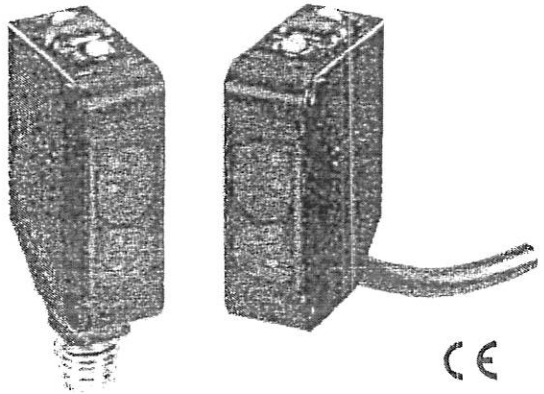
PRODUCT SENSOR / TRIGGER SENSOR

OMRON

Distance-settable Photoelectric Sensor
E3Z-LS

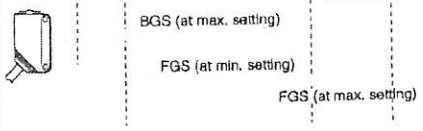
Selectable Foreground/Background Suppression Photoelectric Sensor

- Stable sensing regardless of target's color or size.
- Adjustable sensing distance.
- Unique Algorithm minimizes external interference from fluorescent lighting.
- Visible light ensures easy alignment.
- Available in pre-wired or connector-ready configuration.



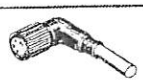
Ordering Information

Sensors

Sensing method (selectable)	Appearance	Connection method	Sensing distance (white paper)	Model	
				NPN output	PNP output
BGS/FGS diffuse		Pre-wired (2-m cable)		E3Z-LS61	E3Z-LS81
		M8 Connector		E3Z-LS66	E3Z-LS86

Accessories (Order Separately)

Sensor I/O Connectors

Cable specification	Appearance	Cable type		Model
Standard M8 cable	Straight 	2 m	4-wire	XS3F-M421-402-A
		5 m		XS3F-M421-405-A
	L-shaped 	2 m		XS3F-M422-402-A
		5 m		XS3F-M422-405-A

Specifications

■ Ratings/Characteristics

Sensing method		Distance-settable	
Item	NPN output	E3Z-LS61	E3Z-LS66
	PNP output	E3Z-LS81	E3Z-LS86
Sensing distance (see *Operation*)	BGS	White or black paper (100 x 100 mm): 20 mm to 200 mm	
	FGS	White paper (100 x 100 mm): 40 mm to 200 mm Black paper (100 x 100 mm): 40 mm to 160 mm	
Adjustable sensing range (see note)		White paper (100 x 100 mm): 40 to 200 mm Black paper (100 x 100 mm): 40 to 160 mm	
Hysteresis		(Refer to the "Hysteresis vs. Sensing Distance" graph in the *Engineering* section of this data sheet.)	
Reflectivity characteristic (black/white error)		10% of set distance max.	
Light source (wavelength)		Red LED (680 nm)	
Power supply voltage		12 to 24 VDC ±10%, ripple (p-p) 10% max.	
Current consumption		30 mA max.	
Control output		Load power supply voltage 26.4 VDC max., load current 100 mA max. (residual voltage 1 V max.) Open collector output (NPN or PNP depending on model) Light-ON/Dark-ON switch selectable	
BGS/FGS selection (wire selectable)		BGS: Open or connected to GND FGS: Connected to Vcc (See *Operation*)	
Protective circuits		Reverse polarity protection, output short-circuit protection, mutual interference prevention	
Response time		Operation or reset: 1 ms max.	
Distance setting		5-turn adjuster	
Ambient illumination		Incandescent lamp: 3,000 lx max.; Sunlight: 10,000 lx max.	
Ambient temperature		Operating: –25 to 55°C, Storage: –40 to 70°C (with no icing or condensation)	
Ambient humidity		Operating: 35% to 85%, Storage: 35% to 95% (with no condensation)	
Insulation resistance		20 MΩ min. at 500 VDC	
Dielectric strength		1,000 VAC at 50/60 Hz for 1 minute	
Vibration resistance (destruction)		10 to 55 Hz, 1.5-mm double amplitude for 2 hours each in X, Y, and Z directions	
Shock resistance (destruction)		500 m/s² for 3 times each in X, Y, and Z directions	
Degree of protection		IEC 60529 IP67	
Connection method		Pre-wired (standard length: 2 m/0.5 m)	M8 connector
Indicators		Operation indicator (orange), stability indicator (green)	
Weight (packed state)		Pre-wired Sensors, 2 m: Approx. 65 g	Approx. 20 g
Material	Case	PBT (polybutylene terephthalate)	
	Lens	Denaturated polyallylate	
Accessories		Instruction sheet (Mounting Brackets must be purchased separately.)	

Note: The sensing range of an object that has reflectivity that is similar to a white paper can be adjusted from 40 to 200 mm. The sensing range of an object that has reflectivity that is similar to a black paper can be adjusted from 40 to 160 mm.

Principle of Operation

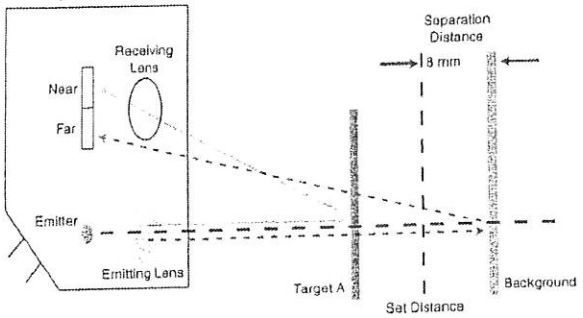
Background Suppression

Background Suppression: Objects beyond the set distance will not be detected.

To ensure reliable background suppression, a minimum separation distance between the set distance and the background is recommended. Please refer to the "Hysteresis vs. Sensing Distance" graph in the *Engineering* section of this data sheet to determine the minimum separation distance.

Example: A target that has a reflectivity that is similar to a black paper is set to a maximum set distance of 160 mm. Based on the "Hysteresis vs. Sensing Distance" graph, the hysteresis is 5%. The recommended minimum separation distance in this case is 8.0 mm (5% of 160 mm) between the background and the set distance. This means that the background must be at least 8.0 mm behind the set distance.

Background Suppression Optical Configuration



Foreground Suppression

Foreground suppression: Objects in front of the set distance will not be detected.

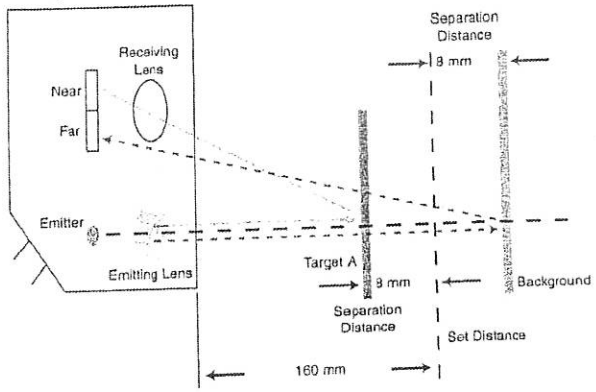
Objects with glossy or irregular surface often reflect the light emitted from the sensor in different directions. This phenomenon often leads to false detection. For such objects, a foreground suppression sensor (FGS) or a polarized retro-reflective sensor is the sensor of choice. For applications that do not have space for a reflector, the FGS is ideal.

FGS sensors accomplish reliable detection by not detecting the object directly. An FGS sensor uses a background, as a retro-reflective sensor would use a reflector, to reliably detect any object that passes between itself and the background. FGS uses the position on which the light reflected from the background strikes its receiver as a point of reference (see the diagram at right.) A change in switching state occurs when the light strikes the receiver at a different position. Any object that passes between the sensor and the background will reflect the light onto the receiver in a position that will be different from the point of reference (reflection from the background).

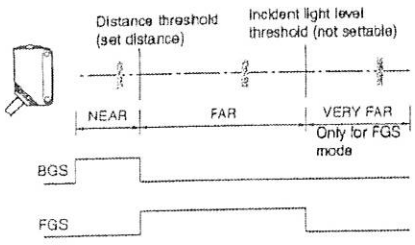
To ensure reliable foreground suppression, a minimum separation distance between the set distance and the background as well as a minimum separation distance from the target to the set distance is recommended. Please refer to the "Hysteresis vs. Sensing Distance" graph in the *Engineering* section of this data sheet to determine the minimum separation distance.

Example: A target that has a reflectivity that is similar to a black paper is set to a maximum set distance of 160 mm. Based on the "Hysteresis vs. Sensing Distance" graph, the hysteresis is 5%. The recommended minimum separation distance in this case is 8.0 mm (5% of 160 mm) between the background and the set distance, and 8.0 mm between the set distance and the background. This means that the background must be at least 8.0 mm behind the set distance, and the set distance must be at least 8.0 mm behind the target.

Foreground Suppression Optical Configuration

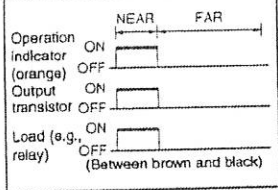
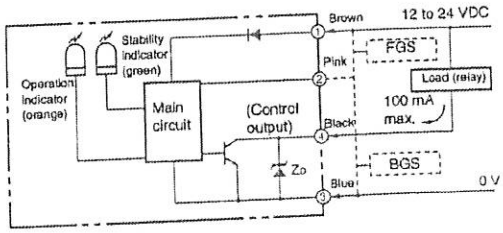
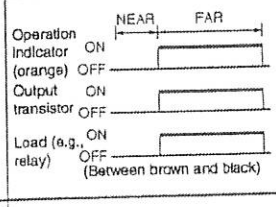
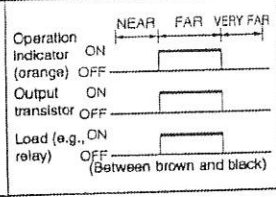
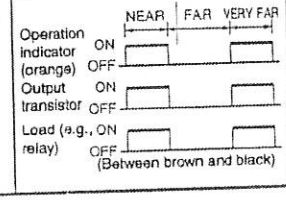


Operation



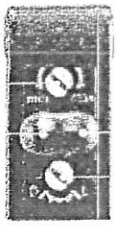
Note: The VERY FAR region is supported only for FGS. The incident light level threshold is fixed and cannot be set.

NPN Output

Model	Output transistor status	Timing chart	Mode selection switch	BGS/FGS selection method	Output circuit
E3Z-LS61 E3Z-LS66	Light ON		L side (L/ON)	BGS: Either leave the pink wire (2) open or connect it to the blue wire (3).	
	Dark ON		D side (D/ON)		
	Light ON		L side (L/ON)	FGS: Connect the pink wire (2) to the brown wire (1).	
	Dark ON		D side (D/ON)		

Connector Pin Arrangement

Nomenclature

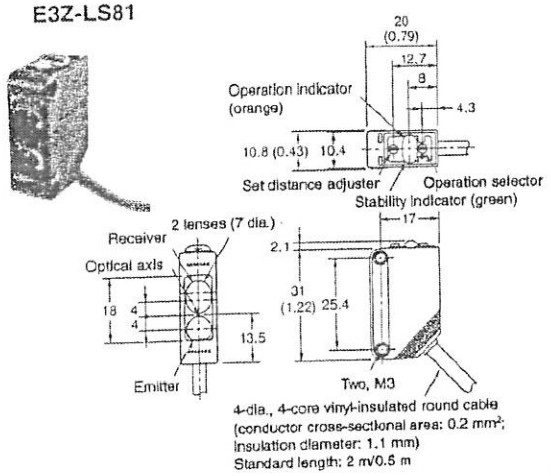


Dimensions

Unit: mm (inch)

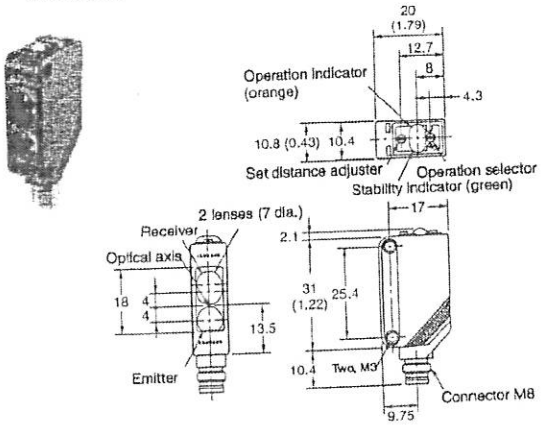
Pre-wired Sensors

E3Z-LS61
E3Z-LS81



Sensors with M8 Connectors

E3Z-LS66
E3Z-LS86



ELECTRICAL COMPONENTS

LABEL SENSOR INFORMATION

As a standard, we offer three types of label sensors.

- In most cases, the Lions Eye works fine to sense opaque labels. The sensor includes a teach feature that allows it to learn most labels. In some cases, manual sensitivity adjustment may be required.

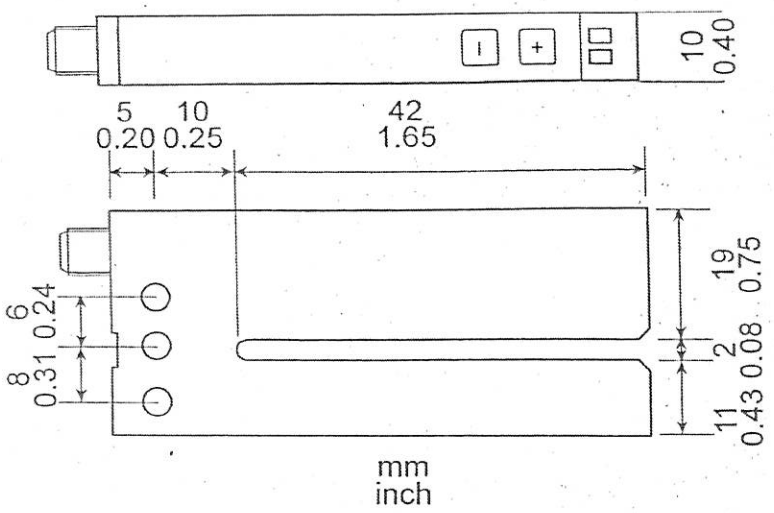
- For the sensing of most clear labels we offer the optional Lions LRD2100 Clear Label Sensor. As this sensor is an analog type the set-up is done through adjustment pots. Normally used with a clear label on a clear liner.

- For sensing clear labels we also use the Banner SLC1 Clear Label Sensor. However, as it is a self-teach sensor, there are some clear labels it does not work well with. Normally used for sensing clear labels on an opaque liner.

Due to different label types some of our machines are supplied with both an opaque label sensor and a clear label sensor. Both the Lions Clear Label Sensor and the Banner Clear Label Sensor are larger than the Lions Eye Opaque Label Sensor. Also, the sensing area of the Lions Eye Opaque Label Sensor is near the end of the sensor. The sensing area on the two clear label sensors is closer to the center of the sensor. This requires the mount of the sensor to be moved left to right (across the web) when changing sensor types. All sensors are marked showing the location of their sensing element.

Please find cut sheets and set-up information on all three (3) sensors mentioned above attached. This allows us to offer one (1) standard manual regardless of label sensor type used.

Mechanical Detail



TWO YEAR WARRANTY

AUTOMATED QUALITY TECHNOLOGIES INC., and its division LION PRECISION warrants to the Purchaser that the LRD Product will be free from defects in material and workmanship and will be in conformance with the Purchaser's specifications when such specifications are accepted by specific contract. The foregoing warranty is exclusive and in lieu of all other warranties whether written, oral, or implied (including any warranty of fitness for purpose). If it appears within two years from the date of shipment by the Corporation that the equipment as delivered does not meet the warranties specified above and the Purchaser so notifies the Corporation promptly, the Corporation shall correct any defect, including non-conformance with the specifications, at its option, either by repairing any defective part(s), or by making available at the Corporation's plant, a replacement or required part.

The above warranty is null and void if the equipment is used or serviced in a manner that does not conform to the ratings and specifications as defined by the Corporation or if the equipment has been damaged or altered. The foregoing shall constitute the sole remedy of the Purchaser and the sole liability of AUTOMATED QUALITY TECHNOLOGIES, INC.

User Guide

for the

LionEye$_2$ Label Sensor

from

Lion Precision

LION PRECISION

Document Number: M015-3775.001

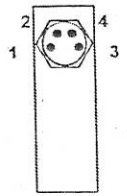
Description

The Lion Precision LionEye$_2$ is an inexpensive optical sensor for the detection and registration of label edges and splices. The sensor output signal indicates the leading or trailing edge of the label as it passes through the sensor.

Connecting to the Sensor

Pin	Color	Connection
1	Brown	10-30VDC
2	White	NPN Output (Current Sinking), 100mA, 0.2μf max load
3	Blue	Ground (0VDC)
4	Black	PNP Output (Current Sourcing) 100mA, 0.2μf max load

M8 Connector Pins



Specifications

Power supply	Voltage	10 - 30 VDC
	Residual Ripple	10% (must remain within 10-30 VDC)
	Current	40mA
Response time	on or off	50μs max
	Switching Frequency	10kHz max
Output	Output Current (sinking or sourcing)	100mA max
	Switching output	NPN (white), PNP (black)
	Output voltage drop at 100 mA	2 V
	Output voltage drop at 10 mA	1 V
Emitter	LED (continuous)	Infrared
Temperature	Operating Range	-4°F to +140°F (-20°C to 60°C)
External Light Immunity	Artificial Light	5,000 Lux
	Daylight	10,000 Lux
Protections	Supply	Inverse Polarity Protection
	Switching output	Short Circuit and Overload Protection
	Degree of Protection	IP 65

Important Indications:

Red LED on steady: Sensor Setup Locked

Yellow LED is on when outputs are activated/on

Teach Mode Setup Procedure:

1. Place web only in sensor (remove a label, or carefully center a gap in the sensor).
   Press [+] and [–] at the same time for less than one second.
   The red LED will begin to flash.
2. Place a label in the sensor.
   Press [–] for less than one second.
   The red LED stops flashing.
3. Automatic setup is complete (steps 1 and 2 can be reversed).

Manual Adjustments of Sensitivity:

The "Teach" mode setup should always be successful. However, the sensitivity of the sensor can be adjusted manually by pressing the [+] or [–] buttons. The red LED will flash with each button press.

Locking/Unlocking the Setup

Press and hold the [+] and [–] for three seconds (but less than six seconds). The red LED will change state. When the buttons are released, the red LED will then indicate locked (red LED on) or unlocked (red LED off).

Light/Dark Switching

Press and hold the [+] and [–] for six seconds. When the mode is changed, the red LED will begin to flash slowly until the buttons are released.

Precautions for Compliance with UL Standards and CSA Standards

Notice to Users of the SYSMAC CP1L CPU Units in the USA and Canada

Please observe the following installation information instead of the general information in the instruction manuals in order to use the product under the certified conditions of UL and CSA when the products are installed in the USA and Canada. These conditions are according to the National Electrical Code in the USA and the Canadian Electrical Code and may vary from information given in the product manuals or safety precautions.

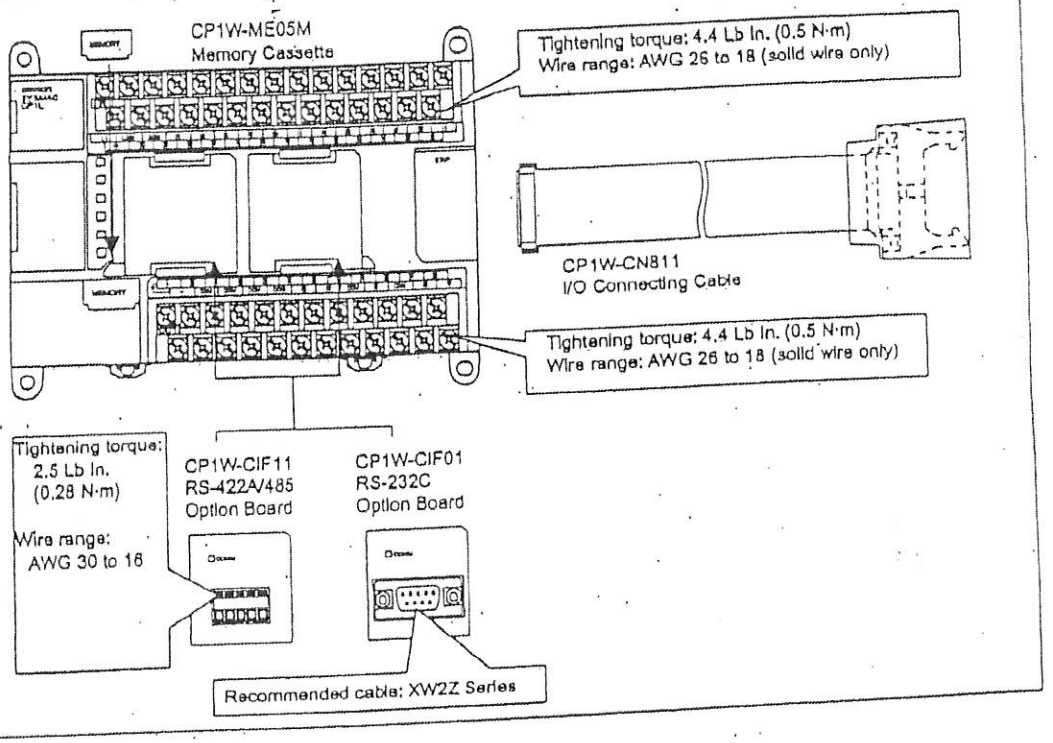
- 24-V DC Power Supply Wiring for Models with DC Power Supply Input
  - Use an isolated DC power supply.
  - Do not use crimp terminals to wire the power supply. Tighten the screw directly on the solid wire.

- I/O Wiring
  - Do not use crimp terminals for I/O wiring. Tighten the screw directly on the solid wire.
  - Do not insert more than one wire in one terminal.

- RS-232C Cable for CP1W-CIF01
  - Use the recommended cable: XW2Z Series (e.g., XW2Z-200S-CV)

- External Power Supply
  - The external power supply from the CP1L-L20DR-A or CP1L-L14DR-A cannot be used if a CP1W or CPM1A Expansion I/O Unit or Expansion Unit is being used.

- Surrounding Air Temperature
  - The rated temperature for the CP1L-L20DR-A or CP1L-L14DR-A is 55°C when 50% of the I/O are ON and 50°C when all of the I/O are ON.
  - The rated temperature for the CP1L-L20DR-A or CP1L-L14DR-A is 55°C when the external power supply output is at 50% and 45°C when the external power supply output is at 100%.
  - The rated temperature for all other Units is 55°C.



1618627-3C

OMRON

MODEL **S8VM** SWITCHING POWER SUPPLY

EN INSTRUCTION MANUAL (2/2)

DE Bedienungsanleitung (2/2)

FR Manuel d'instructions (2/2)

Read the S8VM Instruction Manual (1/2) together with this manual without fail.

Bewahren Sie diese Anleitung griffbereit zum Nachschlagen auf, und beziehen Sie sich beim Betrieb darauf. Lesen Sie auf jeden Fall die "S8VM Bedienungsanleitung (1/2)" zusammen mit dieser Anleitung.

Lisez absolument le "Manuel d'instructions (1/2) S8VM" en plus de ce manuel.

EN Precautions for Correct Use

■ Derating Curve (Fig.1) (Fig.2) (Fig.3) (Fig.4) (Fig.5) (Fig.6) (Fig.7) (Fig.8) (Fig.9) (Fig.10) (Fig.11)

• 6 S8VM-□□□□□/D (Open-frame type)
• 7 S8VM-□□□□□C□/A□/P□ (Covered type)

Note:
If natural air circulation is limited, use forced air cooling to prevent overheating.

■ The XH connector manufacture method (Only S8VM-050/100/150024A□/P□)

This product is using XH connector made from JAPAN SOLDERLESS TERMINAL MFG CO LTD. Regarding to manufacture of a connector, it becomes the regulation as following.

1. Applicable Wire and Crimping tool
Applicable wire per barrel size is UL1007 (standard wire) and its equivalent standard wire can be used. Wire size is AWG#28 to AWG#22 and insulation outer dia is ø1.0 to ø1.5 mm.
Crimping tool is as below.

Crimping tool	Crimping applicator	Dies
AP-K2N	MKS-L9 or MKS-L	MK/SXH-001-06
	MKS-9C	9C/SXH-001-06

2. Crimping
The reference value of wire strip is 2.1 to 2.6mm. Addording to wire to be used, adjust dials of apolicator to a proper crimp height.
Table of crimp height

Wire size	Insulation O.D (mm)	Crimp height (mm)	
		Conductor part	Insulation part (Ref.value)
UL1007 AWG28	1.2	0.60 to 0.66 (Target: 0.62)	2.0
UL1007 AWG26	1.3	0.65±0.06	2.0
UL1007 AWG24	1.5	0.70±0.06	2.1
UL1007 AWG22	1.8	0.75±0.06	2.2

Notes:
1. Crimp height at wire barrel should be set to pre-determined dimensions.
2. Adjust crimp height at wire insulation barrel to the extent that wire insulation is slightly pressed, and set it so that crimping is not excessively.
3. Crimping condition at wire insulation barrel is as below (Fig.20).

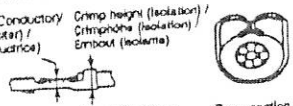
Check the tensile strength at crimped part when operation finishes.
Table of tensile strength at crimped part

Wire size	Requirement N min.	Reference value N
UL1007 AWG28	9.8	19.6 to 29.4
UL1007 AWG26	19.6	39.2 to 49.0
UL1007 AWG24	29.4	58.8 to 68.6
UL1007 AWG22	39.2	68.6 to 88.2

Check of crimping appearance visually for correct crimping is referring to (Fig.21) (Fig.22)

3. Inserting contact into housing
(1) Hold contact with its lance part upland align contact lance guide at housing with contact lance, and then insert contact,parallel to insertion axis.
(2) Insert contact into housing without stopping to innermost. When contact is fully inserted into housing,housing lance clicks and there is feeling of response.
(3) Check after inserting crimped contact into housing.
Check secure locking per each insertion by pulling wire softly with a force of approx.3N

Crimping condition at wire insulation barrel /
Crimpeinstellung an der Isolierhülse /
Sertissage au niveau du fourreau de l'isolation du câble

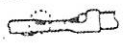


Good / Gut / Bon

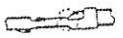
Cross section /
Querschnitt / Coupe

(Fig.20)

Examples of improper crimping / Beispiele einer unsachgemäßen Crimpverbindung / Exemples de mauvais sertissage



Wire conductor protruding length is too long /
Der Leiter ragt zu weit hinaus /
La longueur de dépassement des conducteurs du câble est trop importante



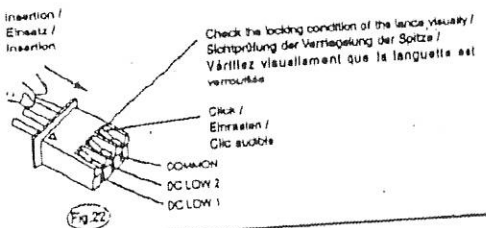
Wire barrel is biting into the wire insulation /
Die Drahtcrimphülse schneidet die Kabelisolierung / La fourreau du câble interfère avec l'isolation du câble

Wire conductor protruding length is too short /
Der Leiter ragt nicht weit genug hinaus /
La longueur de dépassement des conducteurs du câble est trop faible

Wire insulation is not crimped sufficiently /
Die Kabelisolierung ist nicht ausreichend gecrimpt / L'isolation du câble n'est pas serré suffisamment

Wire conductors is not crimped /
Der Leiter ist nicht gecrimpt /
Un conducteur du câble n'est pas serré

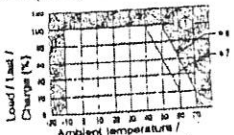
(Fig.21)



(Fig.22)

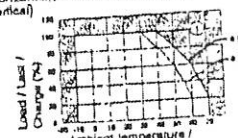
Derating Curve /Leistung Temperaturkurve / Courbe de fonctionnement

S8VM-15W/30W
(Standard mounting / Standard Montage / Montage Standard)
(Horizontal Mounting / Horizontal-Montage / Montage Horizontal)
(Face-up mounting / Vertikal-Montage / Montage vertical)



(Fig.12)

S8VM-100W
(Horizontal Mounting / Horizontal-Montage / Montage Horizontal)(Face-up mounting / Vertikal-Montage / Montage vertical)



(Fig.18)

If 150-W models are to be used for a long period with an input voltage of 90 VAC or l
Wenn Modelle 150-W, während einer langen Periode mit einer Eingang Spannung v
Si les modèles 150-W sont d'être employés pendant une longue période avec une t

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Precautions for Compliance with UL Standards and CSA Standards

Notice to Users of the NB series NB3Q/ NB10W in USA and Canada

Please use the following installation information instead of the general information in the instruction manuals in order to use the product under certified conditions of UL and CSA when the product is installed in the USA or Canada. These conditions are required by NFPA 70, National Electrical Code in the USA and the Canadian Electrical Code, Part I in Canada and may vary from information given in the product manuals or safety precautions.

 2209901-3A

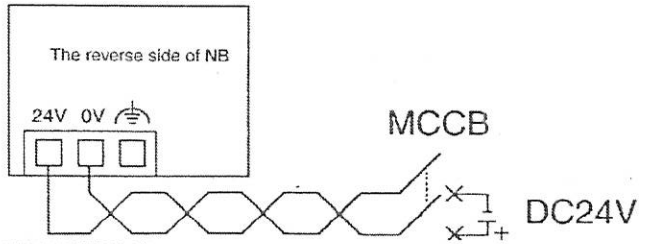
- Surrounding air temperature

  50℃

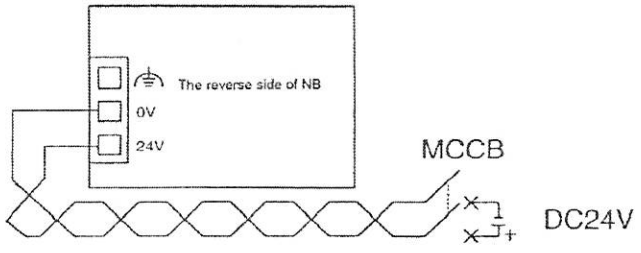
- Wiring for Unit power connector

Connect a 24V-DC isolated power supply to the power input terminals.

NB3Q-TW00B/NB3Q-TW01B



NB10W-TW01B



VEXTA®

HP-4164-2

5-Phase Stepping Motor Unit

CFK II Series

● Photocoupler Input

OPERATING MANUAL

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Thank you for purchasing an Oriental Motor product.
This Operating Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.

06V

Connecting the I/O signals

Connecting the I/O wires into the driver's I/O signal terminal blocks (TB3).

Note

- For the I/O signal cable, use twisted pair with a diameter equivalent to at least AWG24 to 22 (0.2 to 0.34 mm²). To suppress the effect of noise, make the cable as short as possible [6.6 ft. (2 m) max.].
- Separate I/O signal cables at least 12 in. (300 mm) from electromagnetic relays and other than inductance loads. Additionally, route I/O signal cables perpendicular to power-supply cables and motor leads, rather than in a parallel fashion.

Terminal blocks pin assignments

	Terminal blocks	Pin No.	I/O	Signal name	Explanation
Power-supply terminal blocks	TB1	1	Input	POWER	+24 VDC ±10%
		2			GND
Motor terminal blocks	TB2	1	Output	MOTOR	Blue motor lead
		2			Red motor lead
		3			Orange motor lead
		4			Green motor l ead
		5			Black motor lead
I/O terminal blocks	TB3	1	Input	PLS+ (CW+)	Pulse (CW pulse) input * photocoupler anode side
		2		PLS− (CW−)	Pulse (CW pulse) input * photocoupler cathode side
		3		DIR+ (CCW+)	Rotational direction (CCW pulse) input * anode side
		4		DIR− (CCW−)	Rotational direction (CCW pulse) input * cathode
		5		A.W.OFF+	All windings off input anode side
		6		A.W.OFF−	All windings off input cathode side
		7	Output	TIMING+	Excitation timing output collector side
		8		TIMING−	Excitation timing output emitter side
		9	Input	C/S+	Step-angle switching input anode side
		10		C/S−	Step-angle switching input cathode side

* Depends on the setting of the pulse-input selector switch.

- When this switch is set to 1-pulse input mode, the inputs are the pulse input and the rotation-direction input.
- When this switch is set to 2-pulse input mode, the inputs are CW and CCW.

Connecting the CFK513-type motor

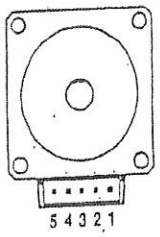
The CFK513-type motors are of the connector type having no leads.
To connect these motors, use the supplied motor cable.
The applicable connector housing/contact, crimping tool and connector configuration are shown below.

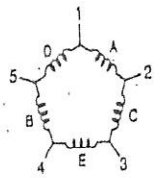
Connector housing/contact, crimping tool

Connector housing	MOLEX 51065-0500
Contact	MOLEX 50212-8xxx
Crimping tool	MOLEX 57176-5000

Connector configuration

Terminal No.	1	2	3	4	5
Motor lead color	Blue	Red	Orange	Green	Black



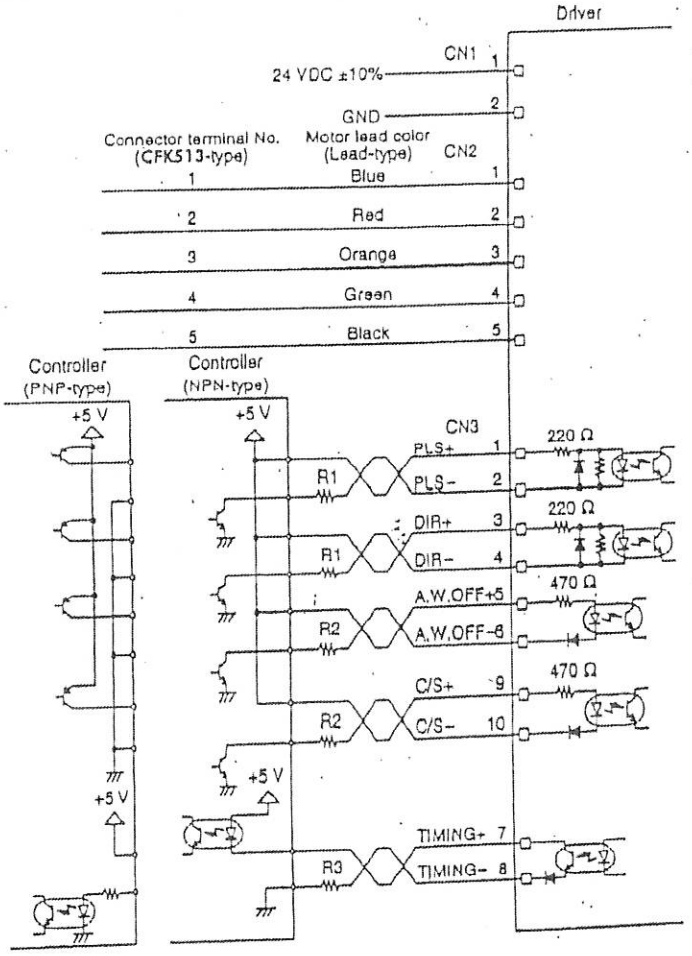


Note

When connecting to the CFK513-type motor, arrange the cable at the connector such that the connected part will not be overly stressed as a result of bending of the cable. Set the cable's radius of curvature as large as possible.

Connection examples

Examples of connections with the motor, power supply and controller are shown below.



Note

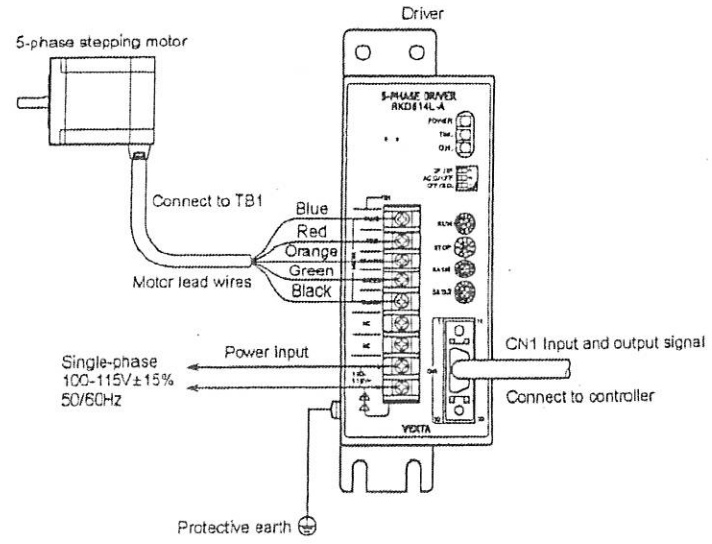
- Make the input-signal voltage 5 VDC minimum and 24 VDC maximum.
  When the input-signal voltage is 5 VDC, external resistors R1 and R2 in the diagram are not necessary. If the input-signal voltage is greater than 5 VDC, connect external resistors R1 and R2, as shown in the diagram, to restrict the input current as follows:
  PLS, DIR: 20 mA max.
  A.W.OFF, C/S: 15 mA max.
- Use an output-signal voltage of 5 VDC minimum and 24 VDC maximum, and use output-signal current of 10 mA max.
  If the output-signal current is greater than 10 mA, connect external resistor R3, as shown in the diagram, to restrict the current to no more than 10 mA.

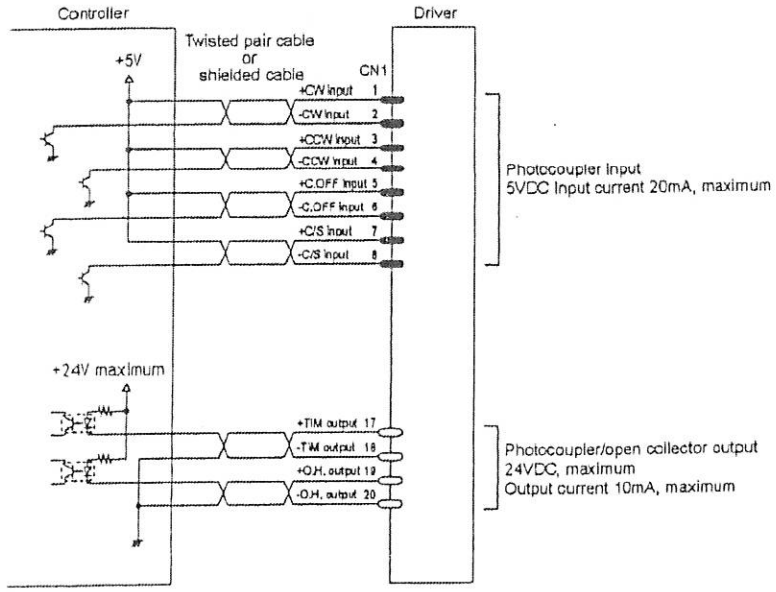
Connection

This section covers the methods and examples of connecting and grounding the driver, motor, power and controller, as well as the input/output signals.

Connection example for a standard type

Example of current sink input and current source output





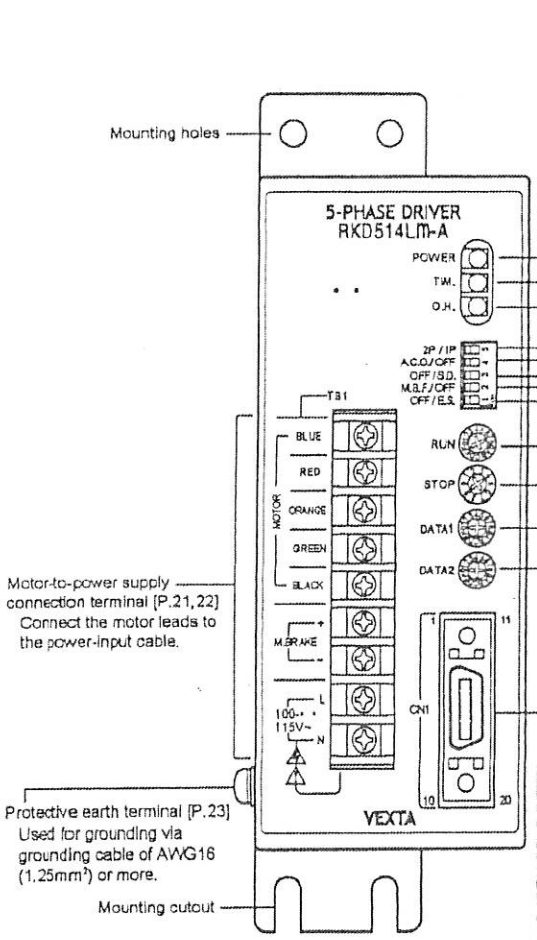
Note

Set the input signal voltage at 5VDC or above but not exceeding 24VDC.

If the input signal voltage exceeds 5VDC, connect an external resistor to limit the driver input current to 10 to 20mA.

Driver

Illustration shows the electromagnetic-brake type.



POWER (green)
Lit when the power is on.

TIM. (green) [P.28]
Lit when the TIM (excitation timing) output is "ON."

O.H. (red) [P.29]
Lit when overheat protection is activated and the O.H. (overheat) output turns "OFF."

Pulse input mode selector switch [P.34]
Allows for the selection of 2-pulse input mode or 1-pulse input mode in accordance with the pulse-output mode in the positioning controller.
The factory setting is "2P: 2-Pulse Input Mode."

A.C.O. function selector switch [P.34]
Set to "OFF" if continuous motor operation is desired when overheat protection is triggered.
The factory setting is "A.C.O.: Automatic Current Off."

Smooth drive function selector switch [P.35]
The smooth drive function offers low-vibration, low-noise features during low-speed operation without changing the step-angle setting. With this function the step angle is automatically divided into 16 microsteps, according to the pulse signal.
This function makes it unnecessary to change the pulse signal (speed, pulse count) from the controller.
This factory setting is "OFF: Smooth Drive Disabled."

Electromagnetic brake function selector switch [P.36]
(motors with an electromagnetic brake only)
This switch controls the function that triggers the electromagnetic brake in order to hold the load in position when the motor stops.
To disable this function, set this switch to the "OFF" side.
The factory setting is "M.B.F.: Electromagnetic Brake Free."

Energy saver mode selector switch [P.36]
(motors with an electromagnetic brake only)
In the energy saver mode, the output current is turned OFF when the motor stops and the load is held in position with the electromagnetic brake.
To disable this mode, set this switch to the "OFF" side.
The factory setting is "OFF: Output Current Off Disabled."

Motor current adjustment switches [P.33]
RUN : Adjusts the motor's operating current.
The factory setting is the rated current "F."
STOP: Adjusts the motor's stopped-state current between 12% and 56% of operating current.
The factory setting is "9", which is 56% of operating current.

Step-angle selector switches [P.32]
Sets the motor's step angle.
Each of the two switches allows for a setting of 16 step angles.
Selection is made through C/S (step-angle selector) input.
The factory settings is "0: 0.72°" with both switches.

Input/output signal connectors [P.23,24,25]
Used to connect to the motor-positioning control and others.

PREVENTATIVE MAINTENANCE

Stepper and Servo Driven
Direct Apply Label Applicators

DAILY:

- Inspect the applicator for loose bolts, springs etc.
- Clean the drive roller and nip roller on the labeling head
- Clean the peel tip on the labeling head

WEEKLY:

- Follow daily preventative maintenance listed above
- Check the set screws in the drive roller for tightness
- Check for water in the air filter mounted on the regulator (Optional)

MONTHLY:

- Follow all of the above preventative maintenance
- Clean label sensor using alcohol swab
- Check and adjust (as necessary) the unwind block tension belt and spring.
- Check the tension of the drive and rewind belts
- Check belts, spring and rewind assembly on the labeler for wear

QUARTERLY:

- Follow all of the above preventative maintenance
- Oil or replace the labeler rewind felt disk (heavy weight oil, we use 80 weight)
- Check drive pulleys and belts on the labeling head for alignment and wear.

This maintenance schedule is designed for Re-Pack Series 3, Series 4, and Direct Apply Syncro Series Labeling Heads.

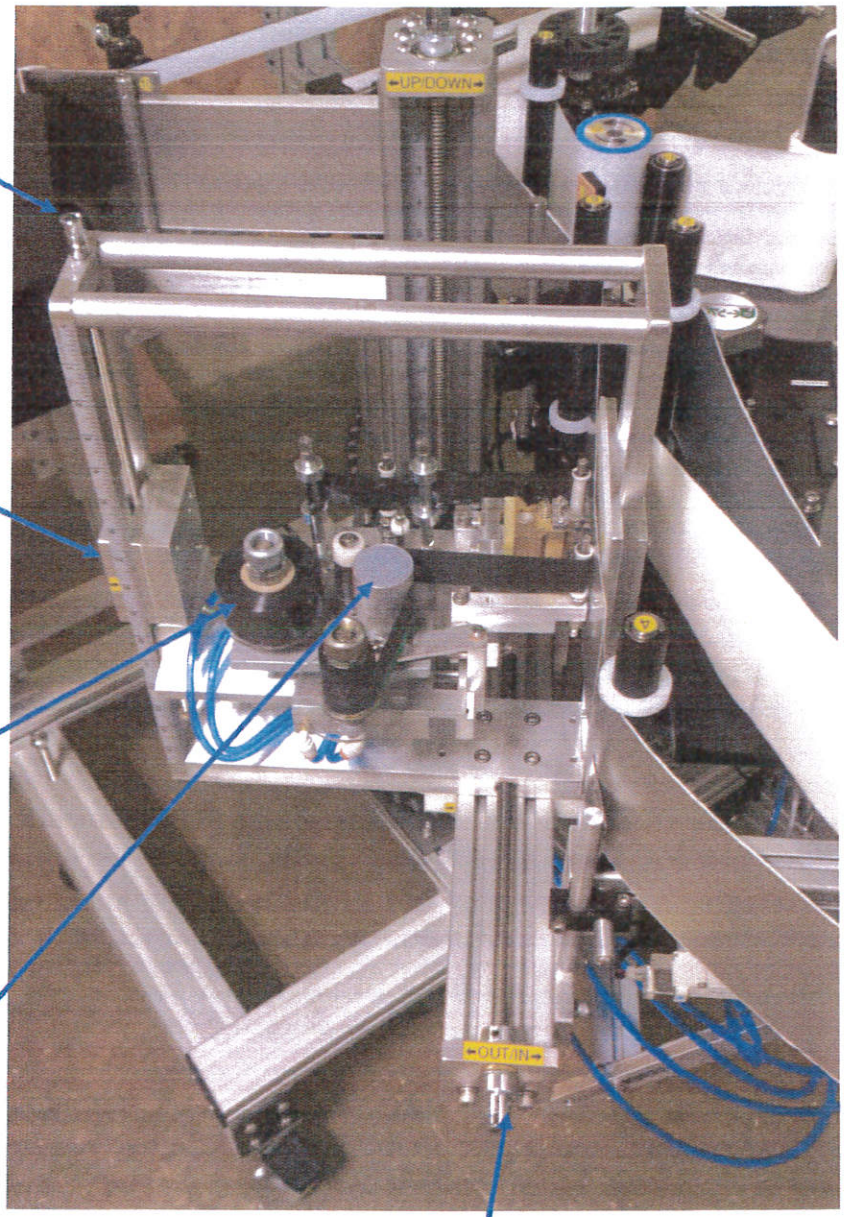
HOT STAMP CODER
BRACKET MECHANICAL ADJUSTMENTS

Up & Down Adjustment

Lock Bolt.
Must be loosened before
moving coder up or down

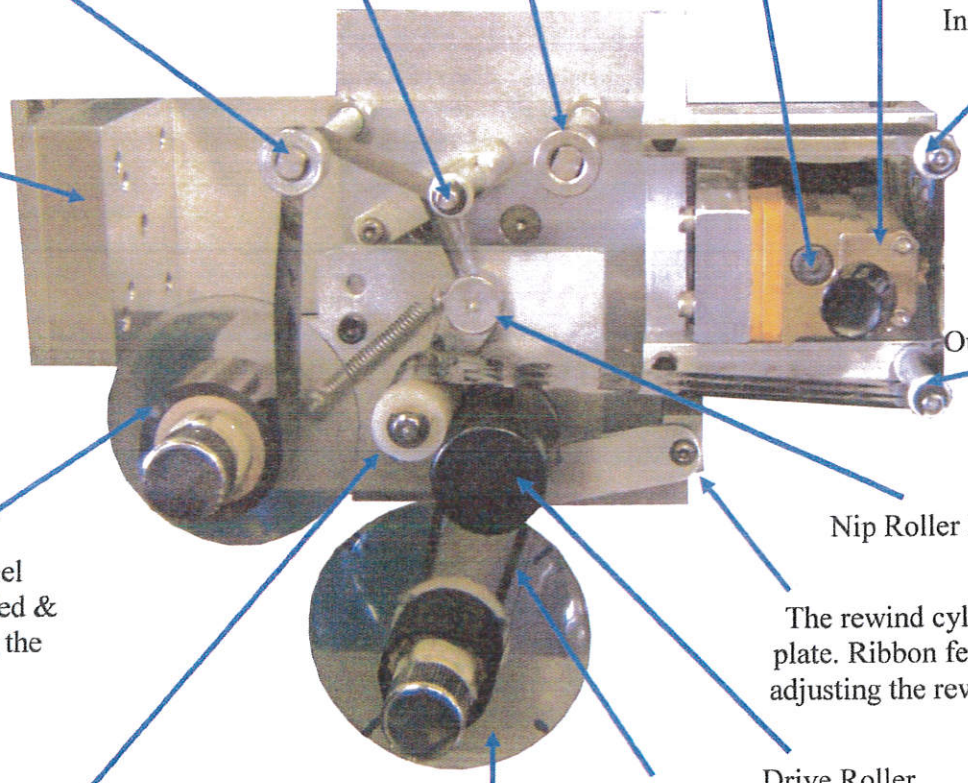
Hot stamp
ribbon supply reel

Hot Stamp Coder



Coder Left to Right Adjustment

HOT STAMP CODER LAYOUT



Tension Roller

Heating Element

Idler Roller

Chase Block

Idler Roller

Infeed Guide Roller

Mounting Block
(attached to adjustable coder mount)

Outfeed Guide Roller

Nip Roller Release Handle

Ribbon Supply Reel
(The ribbon is installed & removed by turning the release knob)

The rewind cylinder is under the plate. Ribbon feed is adjustable by adjusting the rewind cylinder stoke

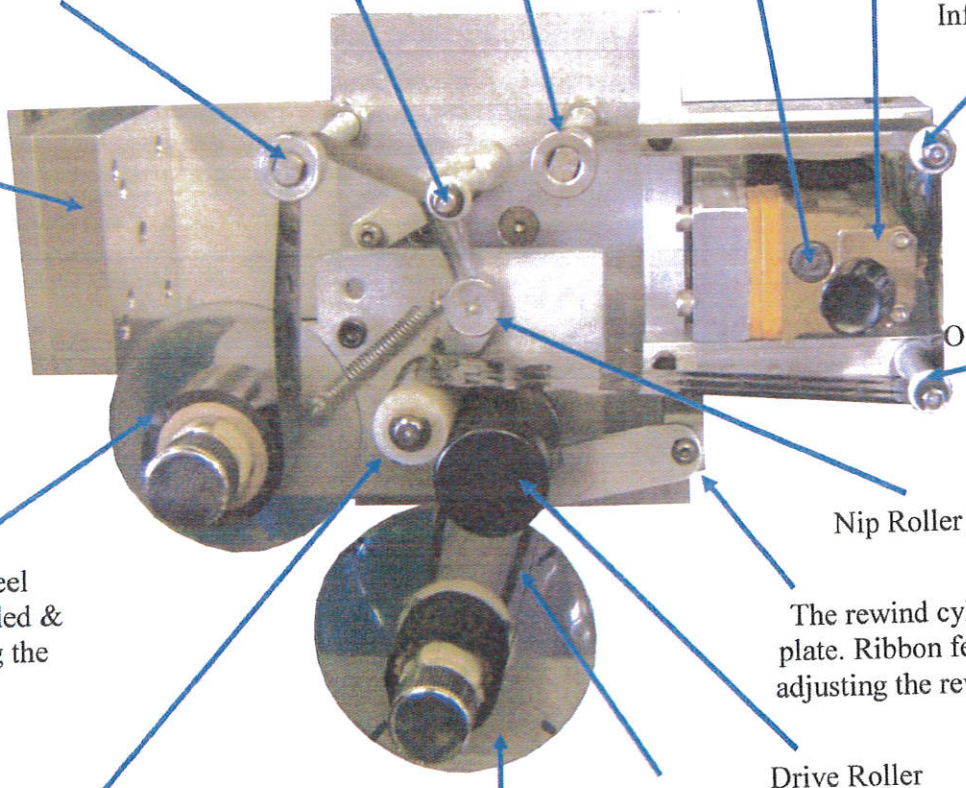
Drive Roller

Rewind Belt

Nip Roller

Rewind of Waste Ribbon
(The ribbon core is installed & removed by turning the release knob)
An empty core must be installed each time a new roll of ribbon is installed

HOT STAMP CODER LAYOUT



Tension Roller

Heating Element

Idler Roller

Chase Block

Idler Roller

Infeed Guide Roller

Mounting Block
(attached to adjustable
coder mount)

Outfeed Guide Roller

Nip Roller Release Handle

Ribbon Supply Reel
(The ribbon is installed &
removed by turning the
release knob)

The rewind cylinder is under the
plate. Ribbon feed is adjustable by
adjusting the rewind cylinder stoke

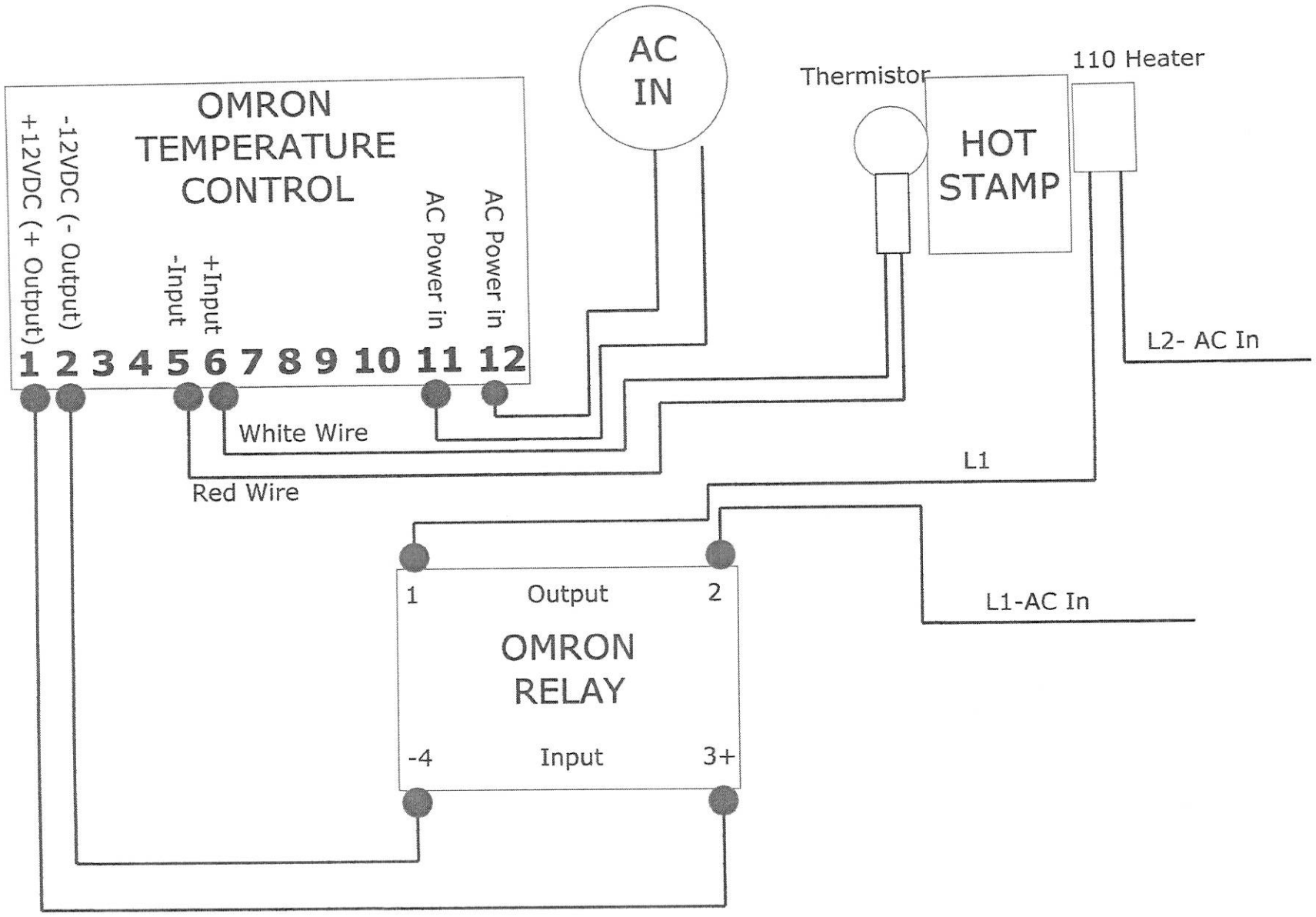
Drive Roller

Rewind Belt

Nip Roller

Rewind of Waste Ribbon
(The ribbon core is
installed & removed by
turning the release knob)
An empty core must be
installed each time a new
roll of ribbon is installed

HEATER WIRING FOR HOT STAMP CODER



Hot Stamp coder

Let's start by explaining how the coder works. At the end of each label feed a stop signal is generated to trigger the main stepping motor to stop. This signal is also used to trigger the hot stamp coder to extend and place a date / lot code on the label. There is a brass block mounted to the end of the cylinder than extends. This block holds print type (the chase block). The chase block is heated. In between the chase block and the label is wax ribbon. When the hot chase block extends it first contacts the wax ribbon and then presses the ribbon against the label. When this happens the numbers and letters in the chase block are transfer on to the label by the wax ribbon. There are (4) major areas to consider when setting up the coder.

1. **Electric signal.** The trigger signal is sent from the labeling head's control box to the solenoid valve near the coder. The signal activates the valve and allows the compressed air to extend the cylinder. The only electronic adjustment is print dwell. This controls the amount of time the cylinder in extended and the print type is in contact with the label. **This adjustment can make the print lighter or darker.**

2. **Air pressure.** You can adjust the amount of air used to fire the cylinder. This will control the speed at which the cylinder moves and the pressure it impacts the label. **This adjustment can make the print lighter or darker.**

3. **Temperature**. There is a temperature controller mounted near the coder. The front of the controller has a display with (2) sets of numbers. The top number is in Red. This is the current temperature of the coder. The bottom set of numbers are in Green. This is the temperature the controller is set to reach. Inside the chase block are a heating unit and a temperature sensor. Information for both devises is sent back to the controller. By using the Up and Down Arrows on the display you can increase or decrease the temperature of the chase block. **This adjustment can make the print lighter or darker.**

4. Mechanical. The coder is mounted on a bracket that has IN & OUT and UP & DOWN adjustments. Use these adjustments to move the coder in to the correct location. **This adjustment will move the location of the print on the label.** Please note, there is also an adjustment on the back of the coder to move it closer to the labels. This adjustment is only used during the factory build and is not normally used in the field by the end user.

E5CN/E5AN/E5EN
Digital Temperature Controllers
User's Manual
Basic Type

Revised March 2009

SET-UP INSTRUCTIONS
FOR HOT STAMP TEMPERATURE CONTROL

Normally we use an Omron E5CN temperature controller. There are two (2) portions to the set-up. First you must set the initial settings. Then you will go into the adjustment level and allow the controller to auto tune.

Initial Settings Level: You enter this level by pressing and holding the key with a circle in the center for more than 3 seconds. This key is located in the lower left hand corner of the controller. Once in initial set-up mode you will see and set the following:

1. Input type, default is 3, we change to 8 which is for a "J-type" thermal coupler.
2. Temperature units, set to "F" for Fahrenheit.
3. "SL-H" This is the upper limits (high) of the temperature controller. Set to 350.
4. "SL-L" This is the lower limits (low) of the temperature controller. Set to 75.
5. Turn the "PID" feature on. Once on PID will appear on the screen.
6. Heating/Cooling. Turn to standard, "STND"
7. Leave at default
8. Leave at default
9. Control period. Default is 20 seconds. Change this to 4 seconds

The initial settings are now correct. Press and hold the circle key for more than 3 seconds to return to the main temperature screen. While in the main temperature screen, use the up and down arrows to set the controller to 160 degrees for auto tune adjustment.

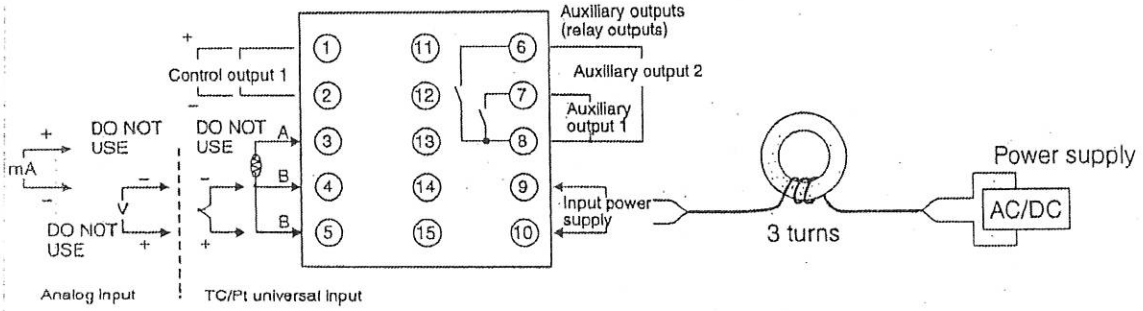
The auto tune adjustment is made through the adjustment level screen. This area is entered by pressing and holding the circle key for less than 1 second.

1. AT execute, set to AT2. Once in auto tune mode, the controller will take 5 to 10 minutes to learn the heater cartridge and thermal coupler. You will know the process is completed when AT2 automatically changes to ATOFF.
2. Press the circle key for less than 1 second to return to the main screen.

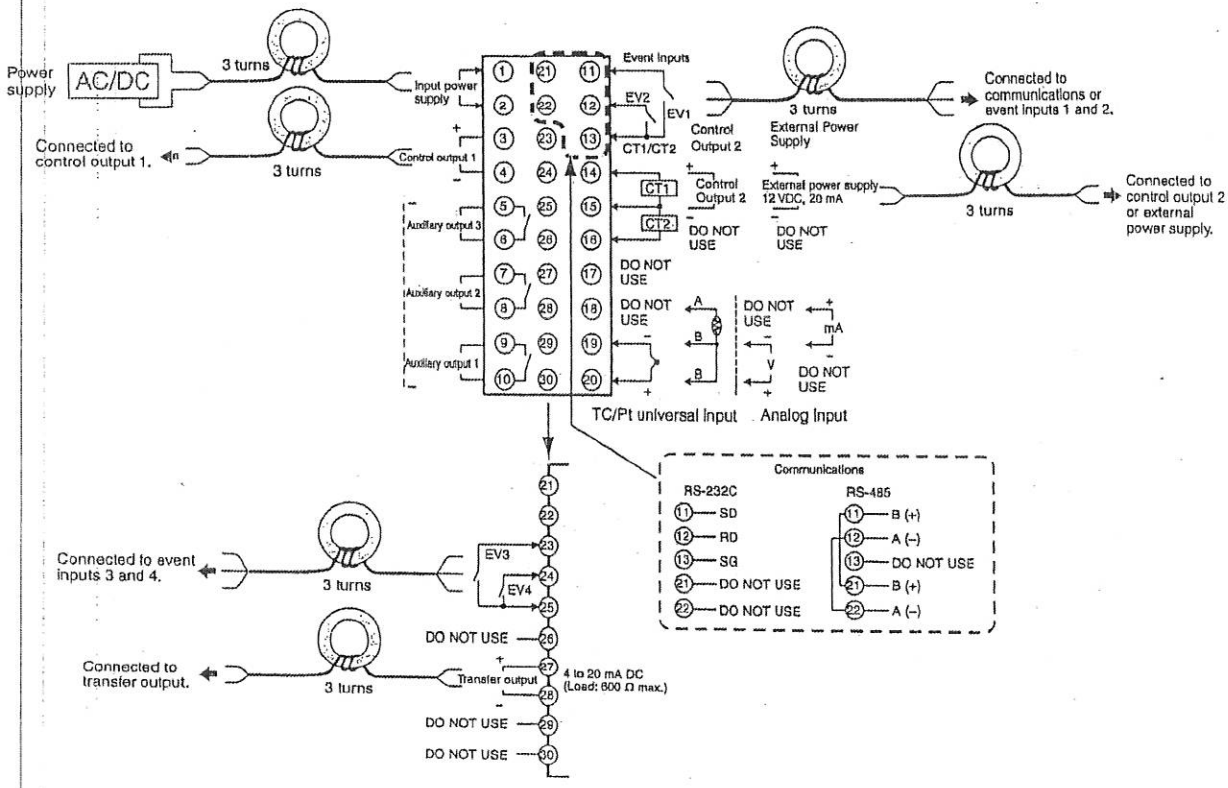
The temperature controller is now ready to use.

Ferrite Core Connection Examples

1. E5CN/E5CN-H



2. E5AN/E5EN/E5AN-H/E5EN-H

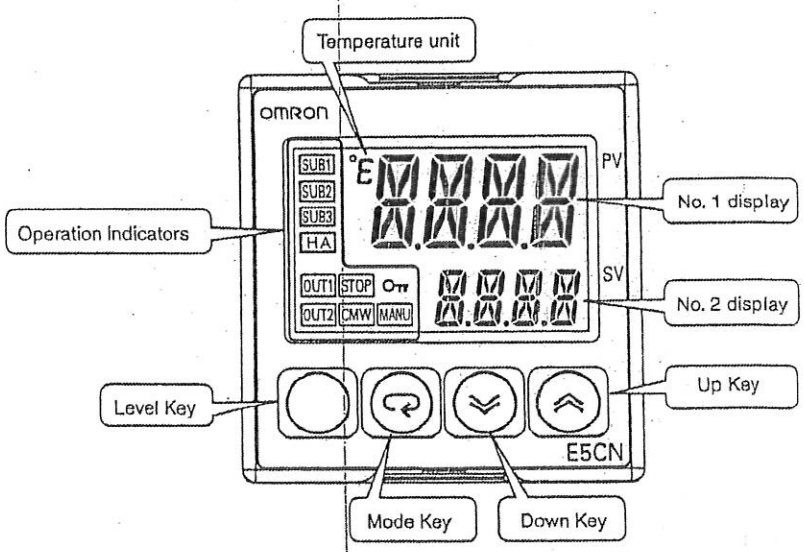


1-1 Names of Parts

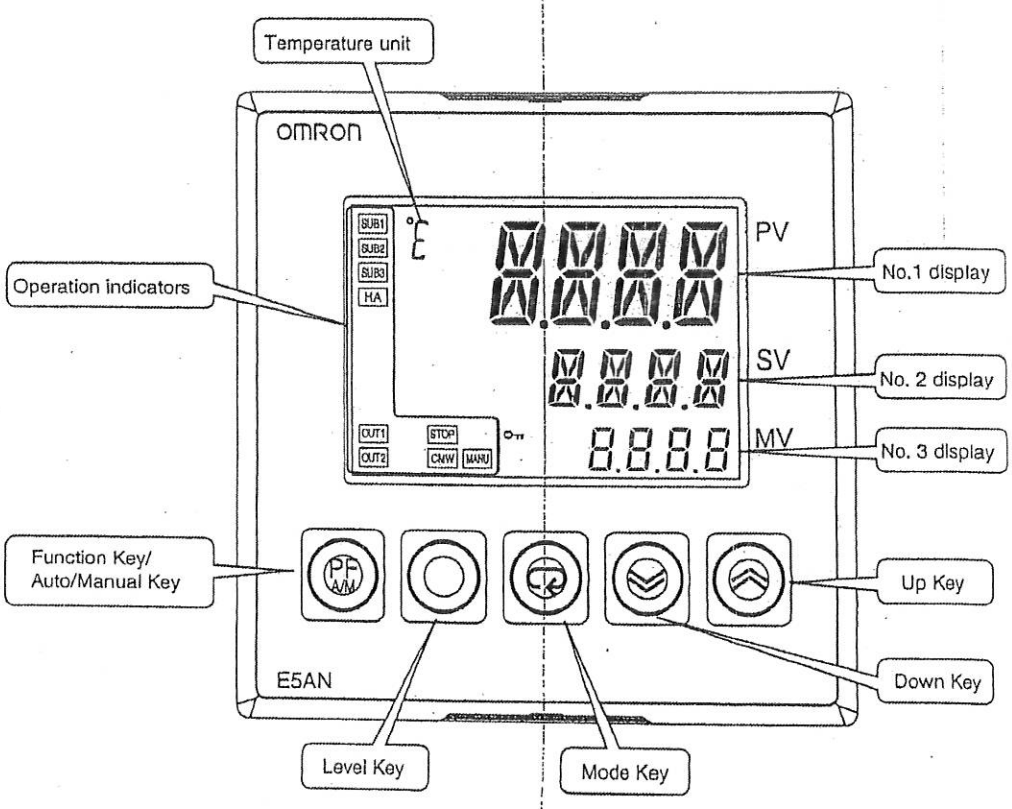
1-1-1 Front Panel

E5CN/CN-U

The front panel is the same for the E5CN and E5CN-U.



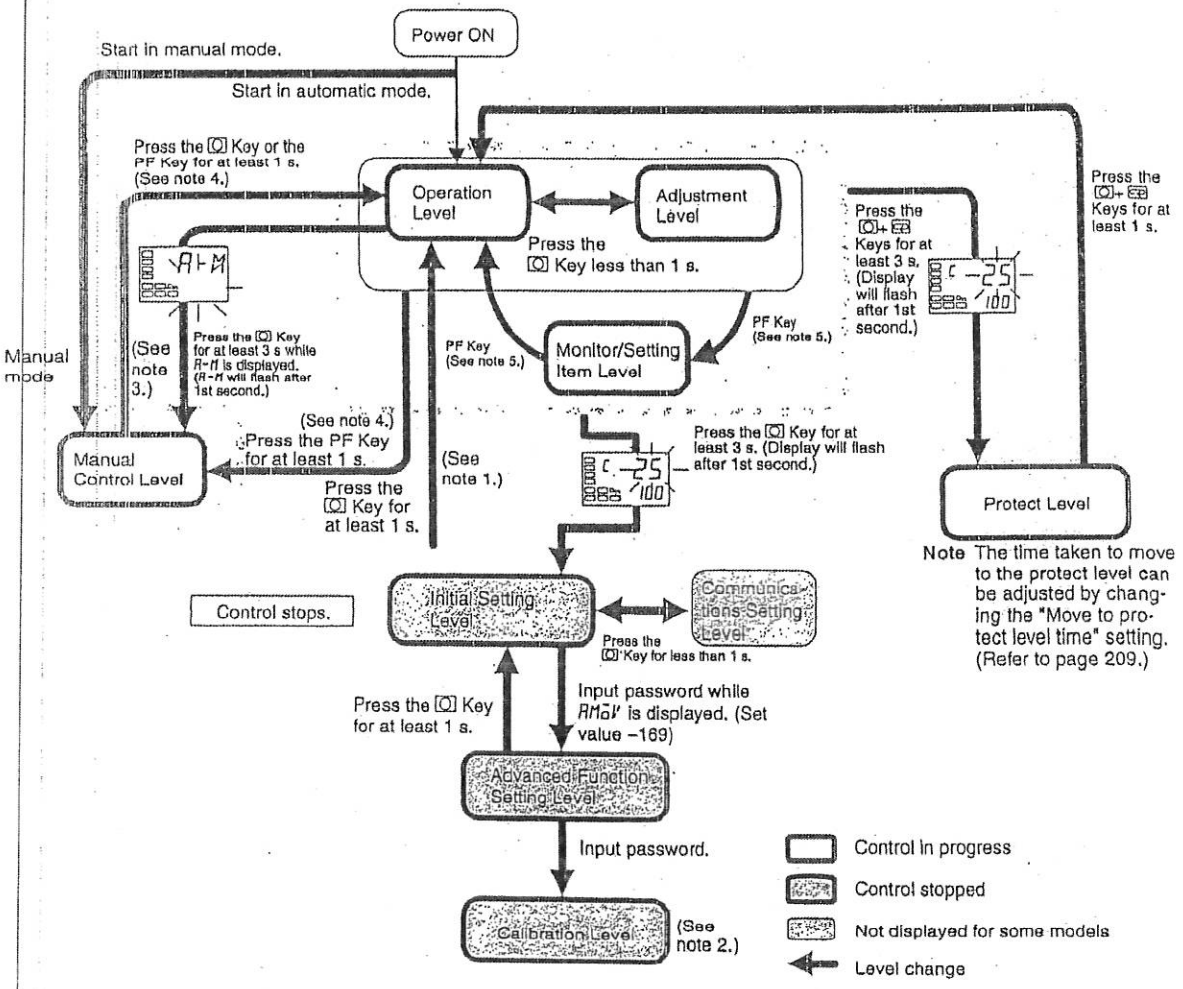
E5AN



1-3 Setting Level Configuration and Key Operations

Parameters are divided into groups, each called a level. Each of the set values (setting items) in these levels is called a parameter. The parameters on the E5CN/CN-U/AN/EN are divided into the following 9 levels.

When the power is turned ON, all of the display lights for approximately one second.



Note

(1) You can return to the operation level by executing a software reset.

(2) You cannot move to other levels by operating the keys on the front panel from the calibration level. You must turn OFF the power supply.

(3) From the manual control level, key operations can be used to move to the operation level only.

Level	Control in progress	Control stopped
Protect level	Can be set.	---
Operation level	Can be set.	---
Adjustment level	Can be set.	---
Manual control level	Can be set.	---
Monitor/setting item level	Can be set.	---
Initial setting level	---	Can be set.

Conventions Used in This Manual

Meanings of Abbreviations

The following abbreviations are used in parameter names, figures and in text explanations. These abbreviations mean the following:

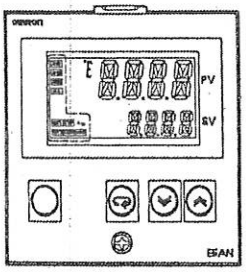
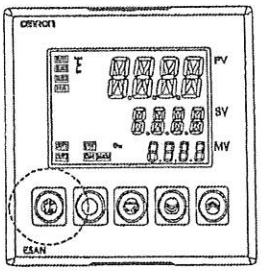
Symbol	Term
PV	Process value
SP	Set point
SV	Set value
AT	Auto-tuning
ST	Self-tuning
HB	Heater burnout
HS	Heater short (See note 1.)
OC	Heater overcurrent
LBA	Loop burnout alarm
EU	Engineering unit (See note 2.)

Note: (1) A heater short indicates that the heater remains ON even when the control output from the Temperature Controller is OFF because the SSR has failed or for any other reason.

(2) "EU" stands for Engineering Unit. EU is used as the minimum unit for engineering units such as °C, m, and g. The size of EU varies according to the input type.
For example, when the input temperature setting range is –200 to +1300°C, 1 EU is 1°C, and when the input temperature setting range is –20.0 to +500.0°C, 1 EU is 0.1°C.
For analog inputs, the size of EU varies according to the decimal point position of the scaling setting, and 1 EU becomes the minimum scaling unit.

	Previous models	Upgraded models
Influence of signal source resistance	• Thermocouple: 0.1°C/Ω (except B, R, S), 0.2°C/Ω (B, R, S) • Platinum resistance thermometer: 0.4°C/Ω	• Thermocouple: 0.1°C/Ω (for all specifications) • Platinum resistance thermometer: 0.1°C/Ω
Current outputs	Current output resolution: Approx. 2,700	Current output resolution: Approx. 10,000
Alarm outputs	E5CN/E5CN-U 250 VAC, 1 A	E5CN/E5CN-U 250 VAC, 3 A

Characteristics

	Previous models	Upgraded models
Model numbers for the E5CN	Models with 24-VAC/VDC power supply specifications Example: E5CN-R2MT-500 (24 VAC/VDC)	A "D" was added to the model numbers for models with 24-VAC/VDC power supply specifications. Example: E5CN-R2MTD-500 (24 VAC/VDC)
Model numbers for the E5AN/EN	Example: E5AN-R3MT-500 (100 to 240 VAC) Example: E5AN-R3MT-500 (24 VAC/VDC)	"-N" was added to all model numbers A "D" was added to the model numbers for models with 24-VAC/VDC power supply specifications. Example: • E5AN-R3MT-500-N (100 to 240 VAC) • E5AN-R3MTD-500-N (24 VAC/VDC)
Front panel	---	PV status display
		PF Key added (E5AN/EN only). 
	---	PV/SP display selection for three-level display (E5AN/EN only) *
Inputs	---	Square root extraction (for models with analog inputs)
Outputs	---	Control output ON/OFF count alarm
	---	MV change rate limiter
Controls	---	40% AT
	---	Automatic cooling coefficient adjustment for heating/cooling control
Alarms	---	PV rate of change alarm
	---	OC alarm (only for models with heater burnout detection)
Other	---	Logic operations
	---	Inverting direct/reverse operation using event inputs or communications commands

* A 2-level display is set when shipped from the factory.
A 3-level display is activated if parameters are initialized.

3. OUT1 (Control Output 1)
   Lights when the control output function assigned to control output 1 turns ON. For a current output, however, OFF for a 0% output only.

   OUT2 (Control Output 2)
   Lights when the control output function assigned to control output 2 turns ON. For a current output, however, OFF for a 0% output only.
4. STOP
   Lights when operation is stopped.

   During operation, this indicator lights when operation is stopped by an event or by key input using the RUN/STOP function.
5. CMW (Communications Writing)
   Lights when communications writing is enabled and is not lit when it is disabled.
6. MANU (Manual Mode)
   Lights when the auto/manual mode is set to manual mode.
7. On (Key)
   Lights when settings change protect is ON (i.e., when the ▲ and ▼ Keys are disabled by protected status.

Temperature Unit

The temperature unit is displayed when parameters are set to display a temperature. The display is determined by the currently set value of the Temperature Unit parameter. *C* indicates °C and *F* indicates °F.

This indicator flashes during ST operation. It is OFF on models with linear inputs.

1-1-3 Using the Keys

This section describes the basic functions of the front panel keys.

PF (Function (Auto/Manual)) Key (E5AN/EN Only)

This is a function key. When it is pressed for at least 1 second, the function set in the PF Setting parameter will operate.

Example: When A-M (auto/manual) is selected in the PF Setting parameter (initial value: A-M), the key operates as an auto/manual switch, switching between Auto Mode and Manual Mode. If the key is pressed for more than 1 second (regardless of key release timing), the mode will switch.

O Key

Press this key to move between setting levels. The setting level is selected in the following order: operation level: adjustment level, initial setting level, communications setting level.

MD Key

Press this key to change parameters within a setting level.

The parameters can be reversed by holding down the key (moving one per second in reverse order).

▲ Key

Each press of this key increments the value displayed on the No. 2 display or advances the setting. Holding the key down speeds up the incrementation.

▼ Key

Each press of this key decrements values displayed on the No. 2 display or reverses the setting. Holding the key down speeds up the incrementation.

O + MD Keys

Press these keys to change to the protect level. For details on operations involving holding these keys down simultaneously, refer to *1-3 Setting Level Configuration and Key Operations*. For details on the protect level, refer to *SECTION 5 Parameters*.

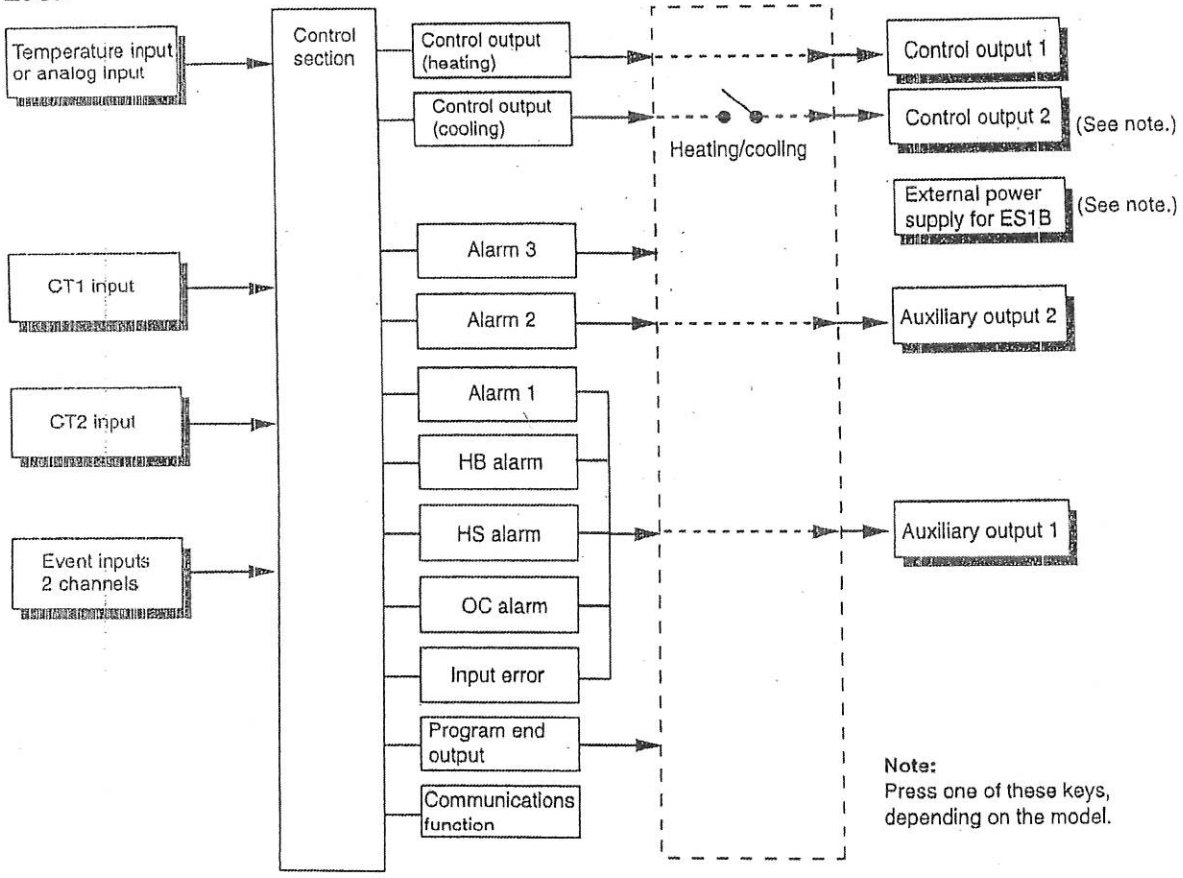
[O] + [∧] Keys
[O] + [∨] Keys

To restrict set value changes (in order to prevent accidental or incorrect operations), these key operations require simultaneously pressing the [O] key along with [∧] or [∨] key. This applies only to the parameter for the password to move to protect level. (Refer to page 146.)

1-2 I/O Configuration and Main Functions

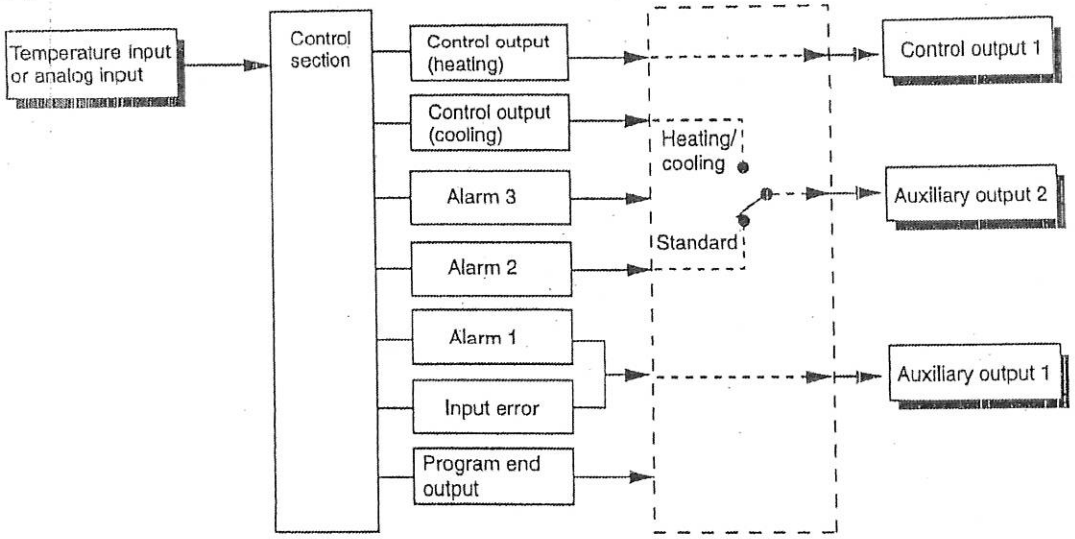
1-2-1 I/O Configuration

E5CN



Note Functions can be assigned individually for each output by changing the set values for the Control Output 1 Assignment, the Control Output 2 Assignment, the Auxiliary Output 1 Assignment, and the Auxiliary Output 2 Assignment parameters in the advanced function setting level.

E5CN-U



Note Functions can be assigned individually for each output by changing the set values for the Control Output 1 Assignment, the Auxiliary Output 1 Assignment, and the Auxiliary Output 2 Assignment parameters in the advanced function setting level.

Model Number Structure

Model Number Legend

Controllers

E5CN-□□M□□-□-500
1 2 3 4 5 6 7

1. Control Output 1
R: Relay output
Q: Voltage output (for driving SSR)
C: Current output
Y: Long-life relay output (hybrid) *1
2. Auxiliary Outputs *2
Blank: None
2: Two outputs
3. Option
M: Option Unit can be mounted.
4. Input Type
T: Universal thermocouple/platinum resistance thermometer
L: Analog current/voltage input
5. Power Supply Voltage
Blank: 100 to 240 VAC
D: 24 VAC/VDC
6. Case Color
Blank: Black
W: Silver
7. Terminal Cover
-500: With terminal cover

Option Units

E53-CN□□□
1 2 3 4

1. Applicable Controller
CN: E5CN or E5CN-H
2. Function 1
Blank: None
Q: Control output 2 (voltage for driving SSR)
P: Power supply for sensor
3. Function 2
Blank: None
H: Heater burnout/SSR failure/Heater overcurrent detection (CT1)
HH: Heater burnout/SSR failure/ Heater overcurrent detection (CT2)
B: Two event inputs
03: RS-485 communications
H03: Heater burnout/SSR failure/ Heater overcurrent detection (CT1) + RS-485 communications
HB: Heater burnout/SSR failure/ Heater overcurrent detection (CT1) + Two event inputs
HH03: Heater burnout/SSR failure/ Heater overcurrent detection (CT2) + RS-485 communications
4. Version
N2: Applicable only to models released after January 2008

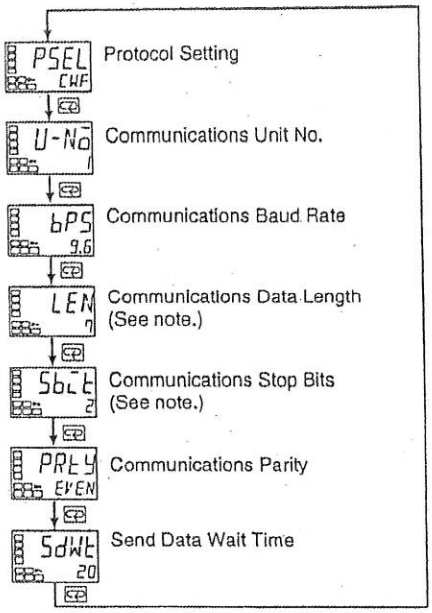
E5CN-□□□U
1 2 3 4

1. Output Type
R: Relay output
Q: Voltage output (for driving SSR)
C: Current output
2. Number of Alarms
Blank: No alarm
1: One alarm
2: Two alarms
3. Input Type
T: Universal thermocouple/platinum resistance thermometer
L: Analog Input
4. Plug-in type
U: Plug-in type

Note Not all combinations of function 1 and function 2 specifications are possible for Option Units (E53-□□□□).

*1 Always connect an AC load to a long-life relay output. The output will not turn OFF if a DC load is connected because a triac is used for switching the circuit. For details, check the conditions in *Ratings*.

*2 Auxiliary outputs are contact outputs that can be used to output alarms or results of logic operations.

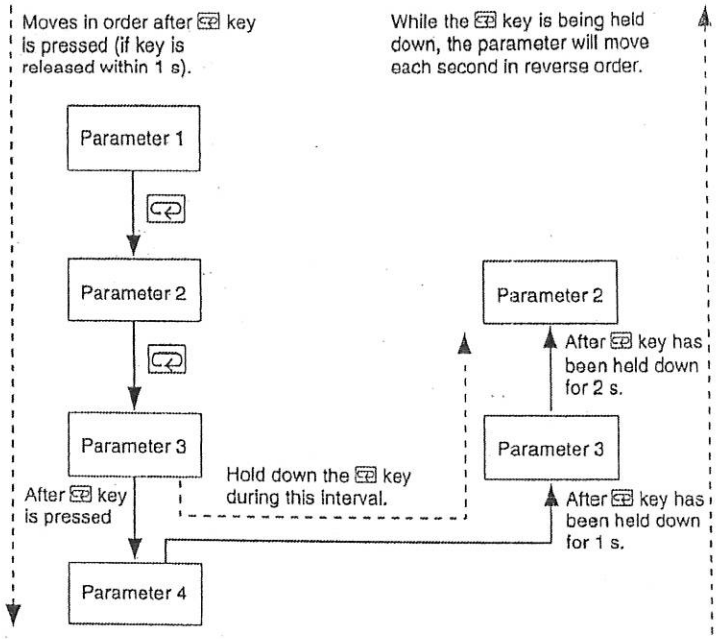


Note The Protocol Setting parameter is displayed only when CompoWay/F communications are being used.

Setting Communications Data

Match the communications specifications of the E5CN/AN/EN and the host computer. If a 1:N connection is being used, ensure that the communications specifications for all devices in the system (except the communications Unit No.) are the same.

Parameter name	Symbol	Setting (monitor) value	Selection symbols	Default	Unit
Protocol Setting	PSEL	CompoWay/F (SYSWAY), Modbus	CWF, Mod	CompoWay/F (SYSWAY)	None
Communications Unit No.	U-No	0 to 99		1	None
Communications Baud Rate	bPS	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6	1.2, 2.4, 4.8, 9.6, 19.2, 38.4, 57.6	9.6	kbps
Communications Data Length	LEN	7, 8		7	Bits
Communications Stop Bits	Sbit	1, 2		2	Bits
Communications Parity	PRTY	None, Even, Odd	NONE, EVEN, odd	Even	None
Send Data Wait Time	SdWE	0 to 99		20	ms



1-3-2 Saving Settings

- If you press the Key at the final parameter, the display returns to the top parameter for the current level.
- To change parameter settings, specify the setting using the or Key, and either leave the setting for at least two seconds or press the Key. This saves the setting.
- When another level is selected after a setting has been changed, the contents of the parameter prior to the change is saved.
- When you turn the power OFF, you must first save the settings (by pressing the Key). The settings are sometimes not changed by merely pressing the or Keys.

1-4 Communications Function

The E5CN/AN/EN are provided with a communications function that enables parameters to be checked and set from a host computer. If the communications function is required, use the E53-CN□03N2 with the E5CN, or the E53-EN03 or E53-EN01 with the E5AN/EN. For details on the communications function, see the separate *Communications Manual Basic Type*. Use the following procedure to move to the communications setting level.

1,2,3...

1. Press the Key for at least three seconds to move from the operation level to the initial setting level.
2. Press the Key for less than one second to move from the initial setting level to the communications setting level.
3. Select the parameters as shown below by pressing the Key.
4. Press the or Key to change the parameter setting.

3-2 Setting the Input Type

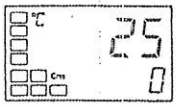
The Controller supports four input types: platinum resistance thermometer, thermocouple, infrared temperature sensor, and analog inputs. Set the input type that matches the sensor that is used. In the product specifications, there are models with thermocouple/resistance thermometer inputs (universal inputs) and models with analog input. The settings differ depending on the model. Check to make sure which model you are using.

3-2-1 Input Type

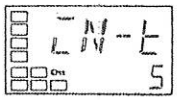
The following example shows how to set a K thermocouple for –20.0 to 500.0°C.

Operating Procedure

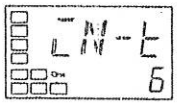
Operation Level



Initial Setting Level



Input Type



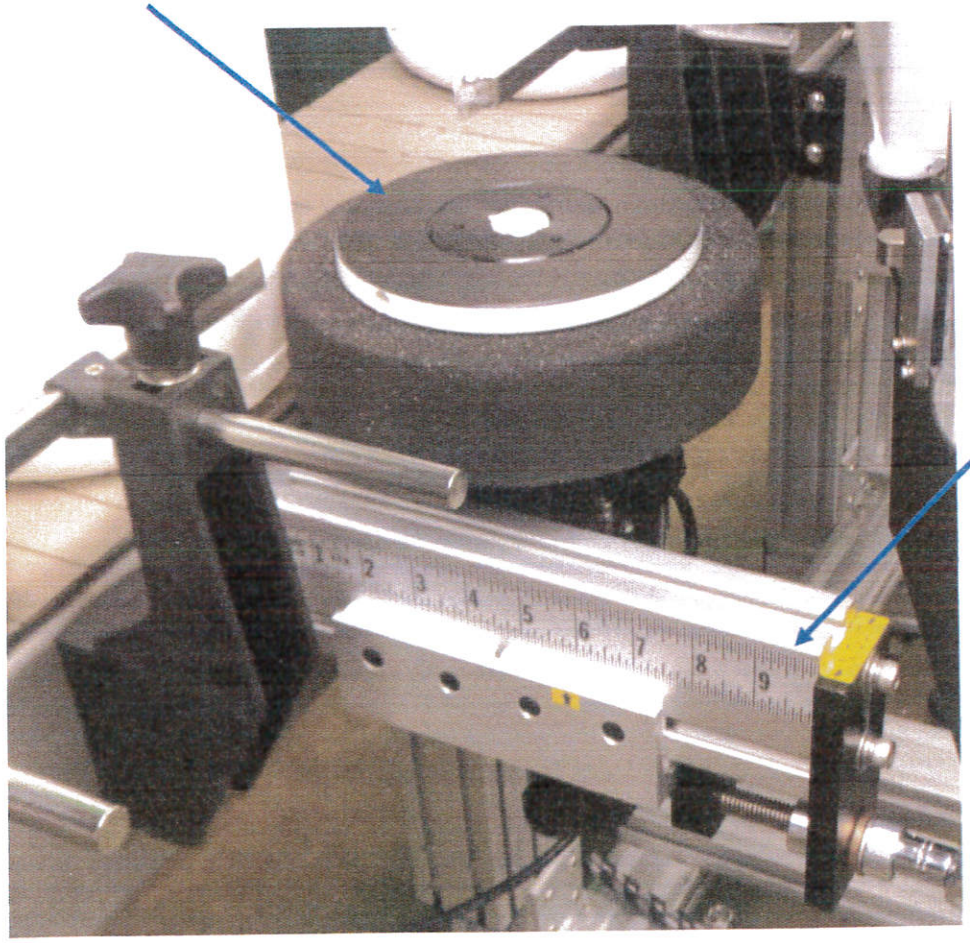
1. Press the [O] Key for at least three seconds to move from the operation level to the initial setting level.

2. Press the [↑] Key to enter the set value of the desired sensor.
   When you use a K thermocouple (–20.0 to 500.0°C), enter 6 as the set value.

Hint: The key operation is saved two seconds after the change, or by pressing the [O] or [↵] Key.

SPACING WHEEL

Spacing Wheel



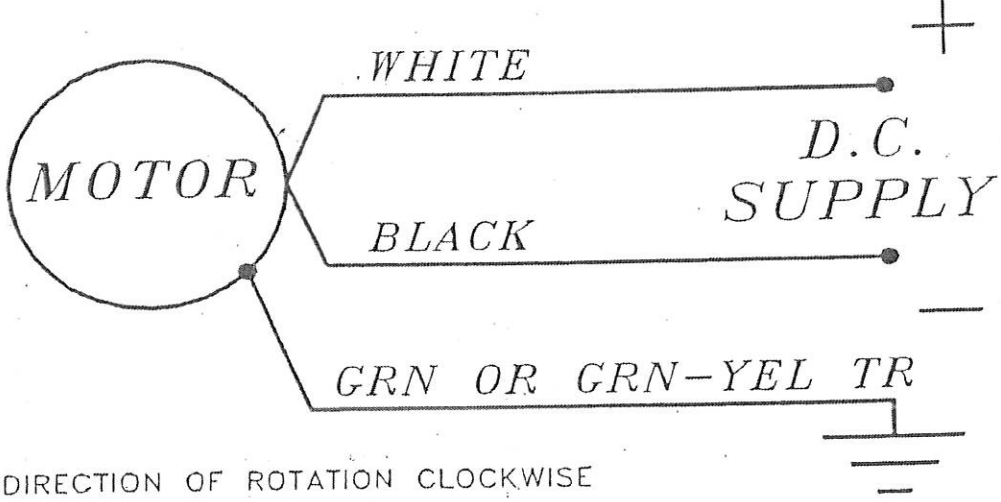
Spacing Wheel
In & Out Adjustment

- The speed control pot for the spacing wheel is located on the main control box

- Slowing the wheel's rotation will increase product spacing.

Manual Photo #218

MOTOR CONNECTION DIAGRAM
PM MOTORS & GEARMOTORS
2 WIRE REVERSIBLE



DIRECTION OF ROTATION CLOCKWISE
VIEWING OUTPUT SHAFT.

TO REVERSE DIRECTION OF ROTATION,
TRANSPOSE WHITE & BLACK LEADS.

07410101 F

GROUND WIRE (⏚) OMITTED
BY CUSTOMER REQUEST ONLY

BODINE ELECTRIC COMPANY

MOTOR/GEARMOTOR SAFETY, INSTALLATION, USE, AND MAINTENANCE INFORMATION

Bodine Electric Co., 2500 W. Bradley Pl., Chicago, IL 60618 U.S.A.

Form P/N 074 00045 Printed in U.S.A. (CH)

Congratulations . . . and thanks on your selection of a Bodine Motor/Gearmotor. With your new drive unit you will find yourself enjoying the same high performance and relatively trouble free operation that have been characteristic of Bodine products since 1905. We call it ADE (After Delivery Economies).

The Bodine Electric Company prides itself on the quality of design and manufacture of its products. Great care is taken in an attempt to provide products free of defective design, workmanship, or materials. It will be considered a favor to have cases of unsatisfactory service from Bodine products brought to our attention.

SAFETY

"The use of electric motors and generators, like that of all other utilization of concentrated power, is potentially hazardous. The degree of hazard can be greatly reduced by proper design, selection, installation, and use, but hazards cannot be completely eliminated. The reduction of hazard is the joint responsibility of the user, the manufacturer of the driven or driving equipment, and the manufacturer of the motor or generator."■

Bodine products are designed and manufactured to comply to applicable safety standards and in particular to those issued by ANSI (American National Standards Institute), NEMA (National Electrical Manufacturers Association), U.L. (Underwriters Laboratories, Inc.), and CSA (Canadian Standards Association).

Most Bodine products are "third party approved" with respect to construction. Motors and gearmotors having component recognition by U.L. Inc. have a "C" or "ᴿᵁᴸ" symbol in the left-most unlabeled space on the bottom row of their nameplates. Those that are CSA certified have a "Ⓒ" mark in the same location. If you need specific information regarding the "third party approval" of Bodine products, contact your Bodine representative, or the home office.

However, since even well-built apparatus can be installed or operated in a hazardous manner, it is important that safety considerations be observed by the user. With respect to the load and environment, the user must properly *select, install,* and *use* the apparatus—for guidance on all three aspects see safety standards publication No. ANSI/NEMA MG-2.■

■Standards Publication No. ANSI/NEMA MG-2. "Safety Standard for Construction and Guide for Selection, Installation and Use of Electric Motors and Generators."

Available from:
National Electrical Manufacturers Assoc.
2101 L Street N.W.
Washington, D.C. 20037, U.S.A.

SELECTION

Before proceeding with the installation, the user should review the application to confirm that the proper drive has been selected. This should be done after reading this notice and all applicable safety standards. If in doubt, contact your Bodine Representative or the Home Office if there is no Representative in your area. Any selection or application suggestions made by Bodine are only to assist the customer—and in all cases, determination of fitness for purpose or use is solely the customer's responsibility.

Unless otherwise agreed to by Bodine, all nameplate ratings are based on the following *normal operating conditions:*

1. Duty—8 hours per day; 5 days per week if nameplated continuous duty (CONT), without frequent reversals or starts and stops. Products intended for intermittent duty show a time rating on the nameplate based on keeping the winding temperature within the maximum allowable temperature of the insulation system when the motor is started with windings within 5°C of the ambient temperature.
2. Ambient temperature 0 to 40°C (104°F).
3. Load—Uniform and free from shock or high inertia.
4. Voltage—Within 10% of nameplate rating.
5. Frequency—Within 5% of nameplate rating.
6. Combined variation of voltage and frequency—Within a total of 10% providing frequency variation does not exceed 5%.

Consult Bodine if variations from the above conditions are contemplated.

INSTALLATION

It is the responsibility of the equipment manufacturer or individual installing the apparatus to take diligent care in installing it. The National Electrical Code (NEC), sound local electrical and safety codes, and when applicable, the Occupational Safety and Health Act (OSHA) should be followed when installing the apparatus to reduce hazards to persons and property.

Inspection

Examine for damage from shipment before connecting. Any claim(s) for shipping damage should be made to the freight carrier. Do not attempt to turn the output shaft of a gearmotor with an externally applied torque arm.

Mounting

Any screws, or similar devices, that penetrate the motor frame either for mounting the Bodine product or mounting something to the product should be limited in length so as not to come in contact with, or in close proximity to, intended features that conduct electricity. Spacings as high as .158" may be required based on voltages and circuitry involved. Consult factory if necessary.

Preferred mounting positions for Bodine products are illustrated in selection literature. Gearmotor mountings other than those shown are not recommended on some *gearmotors* due to (a) the possibility of gearhead lubricant leakage into the motor portion and (b) possible leakage from gearhead breather and oil level holes. Also, for parallel-shaft gearmotors, the proper lubricant quantity provided for horizontal mounting is not sufficient for vertical mounting. By making the proper adjustments (normally done at the factory), mountings other than the preferred positions of gearmotors are possible.

Connection

Follow nameplate for voltage, frequency, and phase of power supply. See accompanying wiring diagram as to connections for rotation (and capacitor, resistor, relay, protector, if required). *When connecting, make sure that your motor/gearmotor is securely and adequately grounded—failure to ground properly may cause serious injury to personnel.* (If wiring diagram shipped with drive unit becomes lost or missing, contact Bodine, providing serial number (NO) and (TYPE) information shown on the nameplate of the unit).

Wiring

For wire sizes and electrical connections refer to the National Electric Code (NEC)—Article 430—"Motors, Motor Circuits, and Controllers" and/or applicable local area codes. If extension cords are used, they should be kept short for minimum voltage drop. Long or inadequately sized cords can cause motor failure, particularly with hard starting loads when current draw tends to be at its highest.

USE

Additional Safety Considerations

The chance of electric shocks, fires, or explosions can be reduced by giving proper consideration to the use of grounding, thermal and over current protection, type of enclosure, and good maintenance procedures.

The following information *supplements* the foregoing safety considerations: This information is not purported to be all-inclusive and the aforementioned references should be consulted.

1. Do not insert objects into the ventilation openings of products.
2. Sparking of starting switches in AC motors so equipped, and of brushes in commutator type motors, can be expected during normal operation. In addition, open-type enclosures may eject flame in the event of an insulation failure. Therefore, avoid, protect from, or prevent the presence of flammable or combustible materials in the area of motors/gearmotors.
3. Bodine totally enclosed products are not explosion proof or dust ignition proof nor does Bodine offer such products for hazardous locations (flammable/explosive gas, vapor, dust). When dealing with hazardous locations, an *approved* explosion proof or dust ignition proof product is the recommended approach. Exceptions are allowed by the National Electrical Code: The NEC and the NEMA safety standard should be studied thoroughly before exercising this option.
4. Open, ventilated motors are suitable for clean, dry locations where cooling air is not restricted. Enclosed motors/gearmotors are suitable for dirty, damp locations. For outdoor use, wash downs, etc., enclosed motors must be protected by a cover while still allowing adequate air flow.
5. Moisture will increase the electrical shock hazard of electrical insulation. Therefore, consideration should be given to the avoidance of (or protection from) liquids in the area of motors. Use of totally enclosed motors/gearmotors will reduce the hazard if all openings are sealed.
6. Products equipped with thermal protectors are labeled "THERMALLY PROTECTED." If severe over-loading, jamming, or other abnormal operating conditions occur, such heat sensitive protectors operate to open the electric power supply circuit. Motors/gearmotors with "automatic" thermal protectors MUST NOT be used where automatic restarting of the drive unit could be hazardous in that clothing or parts of the human body could be in electrical or physical contact with a machine that *starts unexpectedly* when the thermal protector cools down. MANUAL RESET protectors or suitable electric supply disconnect devices/procedures should be used where such hazards could be created.

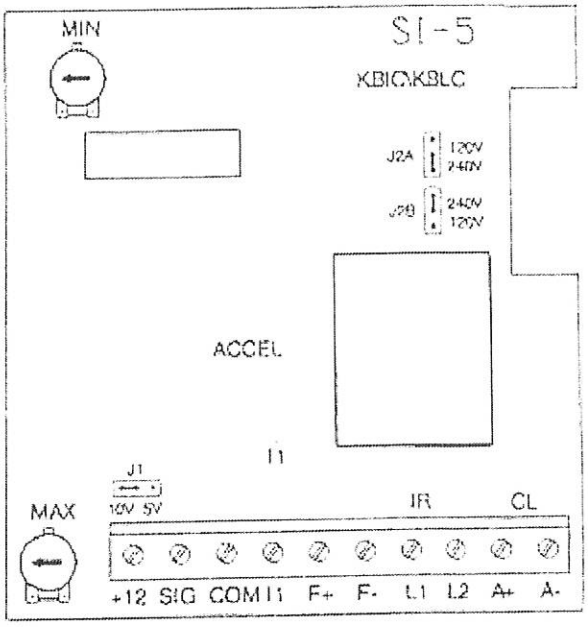
INSTALLATION AND OPERATING INSTRUCTIONS

SI-5, SI-6

Barrier Terminal Board
Signal Isolators
for
KBIC® & KBMM™
DC Motor Speed Controls

CE c UL us

See Safety Warning on Page 1



SI-5 (P.N 9443) for KBIC — SI-6 (P.N 9444) for KBMM

PENTA KB POWER™

A COMPLETE LINE OF MOTOR DRIVES

I. INTRODUCTION

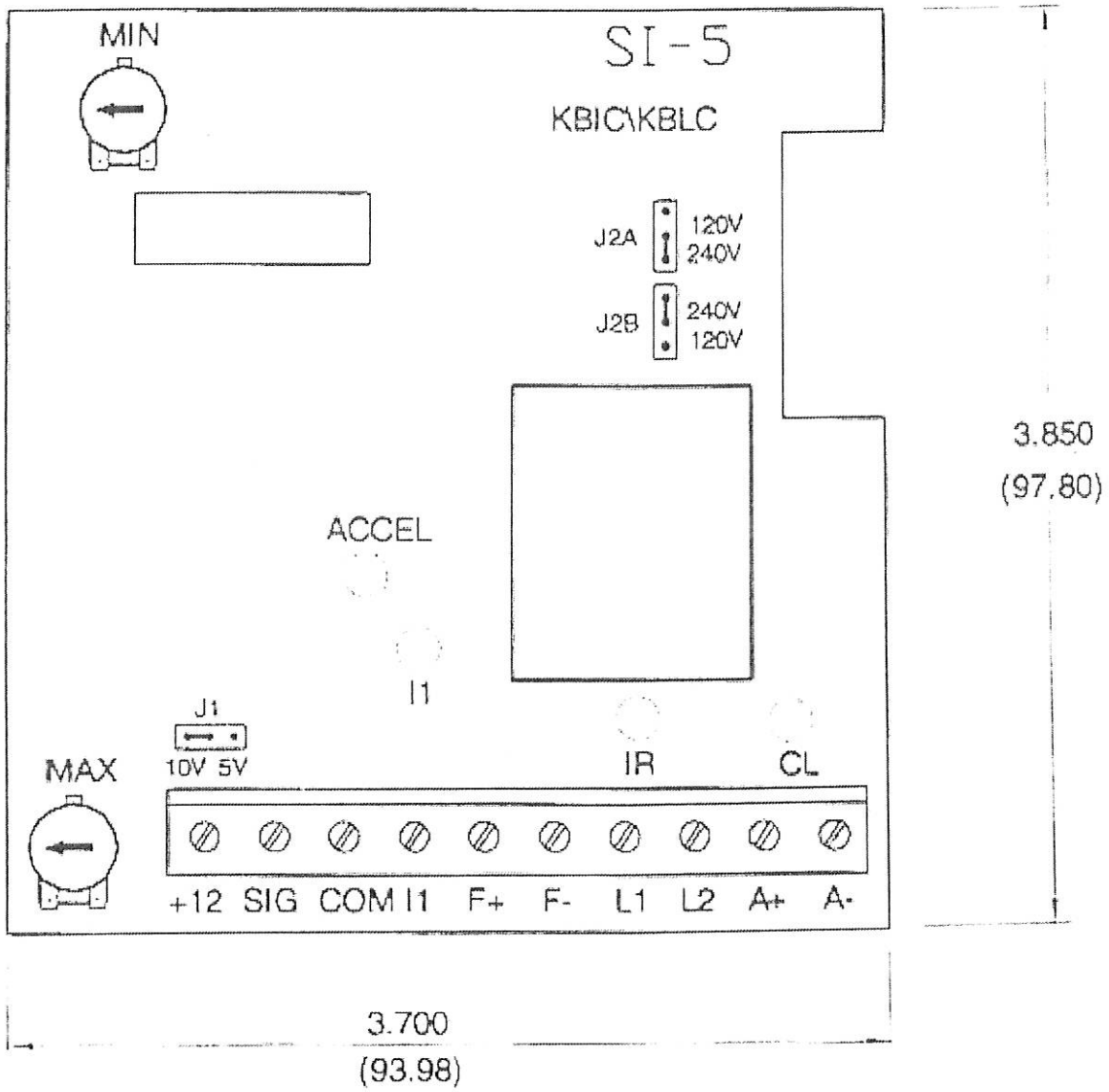
The SI-5 and SI-6 Barrier Terminal Board Signal Isolators "SI" convert standard KBIC® and KBMM™ controls to an isolated input. They isolate, amplify and condition DC voltage and current signals from any source, such as motors, tachometers and transducers. The isolators contain a selectable jumper (J1) that allows for either a 0-5 or 0-10VDC input signal. By using external resistors, the input signal can be changed to 0-100VDC, 0-200VDC and 4-20ma. The output voltage is 0-10VDC which can be rescaled via the built-in MIN and MAX trimpots. Selectable AC line jumpers (J2A, J2B) allow the SI-5 and SI-6 to be used either with 120 or 240VAC controls. In addition, an isolated +12VDC power supply voltage is furnished which can be used to power remote transducers or a remote speed potentiometer. Installation is made by simply mating the SI-5 with the KBIC® and the SI-6 with the KBMM™ speed controls via the built-in quick-connect terminals.

TABLE 1 – GENERAL PERFORMANCE SPECIFICATIONS

AC Power Requirements	120 or 240VAC 50/60Hz
Signal Input Voltage	0-5, 0-10, 0-100[1], 0-200[2]
Signal Input Current	4-20ma[3]
Maximum Output Voltage	11 volts DC
Maximum Output Current	10ma
Range of MIN Trimpot	± 3 volts
Range of MAX Trimpot	0-2 times input voltage (11VDC Max.)
Linearity	± .1%[4]
Temperature Drift	4mV per °C
Temperature Operating Range	Range 0-50 °C

NOTES: (1) Requires the addition of a 330K-1W resistor in series with input signal (J1 set to "10V")
(2) Requires the addition of a 680K-2W resistor in series with input signal (J1 set to "10V")
(3) Requires the addition of a 270 ohm-1/2W resistor in parallel with input signal (J1 set to "5V")
(4) Linearity of SI-5 and SI-6 does not include the linearity specification of the speed control

FIG. 1A – SI-5 LAYOUT AND MECHANICAL SPECIFICATIONS INCHES / [mm]



II. INSTALLATION.

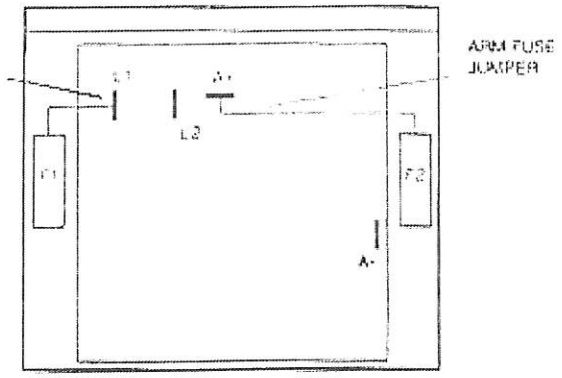
Application Notes:

(1) To facilitate installation the Plug-in Horsepower Resistor® should be inserted in KBIC® or KBMM™ before installing the "SI."

(2) KBMM™ - Before installing the SI-6 into the KBMM™ it is necessary to remove the AC line fuse jumper from L1 and the armature fuse jumper from A+. Using long-nose pliers carefully, rock the O-O terminals back and forth to remove jumper. It is recommended that these fuses be reconnected after the SI-6 installation (see FIG. 2). The fuse holders may be left in place on the KBMM™ or removed to be rewired.

(3) If tachometer feedback is required for the KBMM™, it is necessary to cut jumper J1 on the KBMM™ before mating to the SI-6. (See Section III E (v), page 10.)

FIG. 2 – KBMM



Orient the "SI" so that the quick-connect terminals line up to the mating terminals on the speed control. (Start with the potentiometer terminals P1, P2 and P3.)

Apply gradual pressure between the "SI" and control until the quick-connect terminals are fully engaged.

FIG. 3 – AC LINE VOLTAGE JUMPER SETTINGS

J2 Set for 120 VAC	J2 Set for 240 VAC
J2A 120V / 240V	J2A 120V / 240V
J2B 240V / 120V	J2B 240V / 120V

III. WIRING.

Caution! Before wiring the AC line to the "SI" it is necessary to set both jumpers J2A and J2B to the proper AC line input voltage, "120" or "240" VAC. Be sure the speed control model, "SI" setting, and input AC line voltage all correspond to the same AC line voltage.

TABLE 2 – FIELD CONNECTIONS (Shunt Wound Motors Only)

AC LINE VOLTAGE	SHUNT FIELD VOLTAGE (VDC)	SHUNT FIELD CONNECTION	FIELD TYPE
120	100	F+, F-	Full Voltage
120	50	F+, L1	Half Voltage
240	200	F+, F-	Full Voltage
240	100	F+, L1	Half Voltage

FIG. 6A – FULL VOLTAGE FIELD

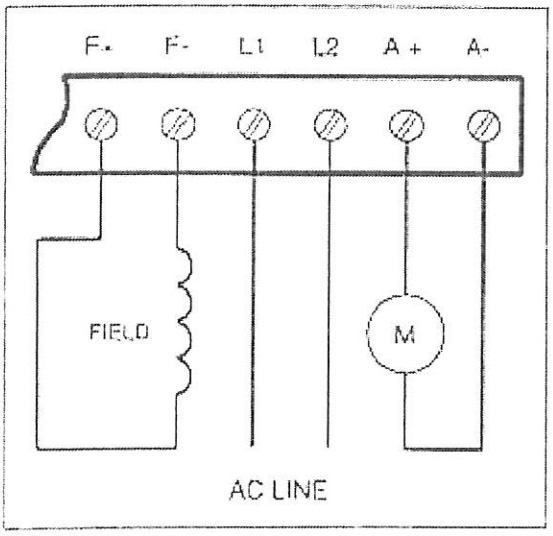


FIG. 6B – HALF VOLTAGE FIELD

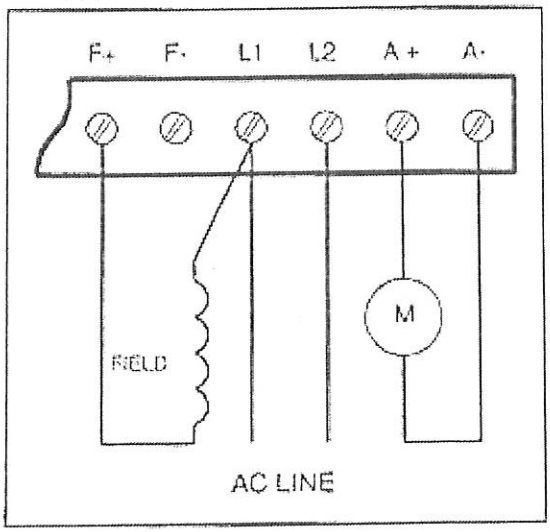


TABLE 3 – AC LINE VOLTAGE WITH CORRESPONDING CONTROL MODEL

AC LINE INPUT VOLTAGE (VAC)	KBIC MODELS	KBMM™ MODELS	SI-6, SI-6 J2 JUMPER SETTING
120	KBIC-120, 125	KBMM-125	J2A, J2B - "120"
240	KBIC-240, 225	KBMM-225	J2A, J2B, - "240"
	KBIC-240D, 240DS	KBMM-225D	

WARNING! High voltage exists in this control! Read Safety Warning on page 1. This warning must be read and understood before proceeding to adjust or operate control with power on or severe injury, electrocution and/or fire can result. Do not adjust trimpots with power on if possible. If adjustments are made with power on, insulated adjustment tools must be used and safety glasses must be worn.

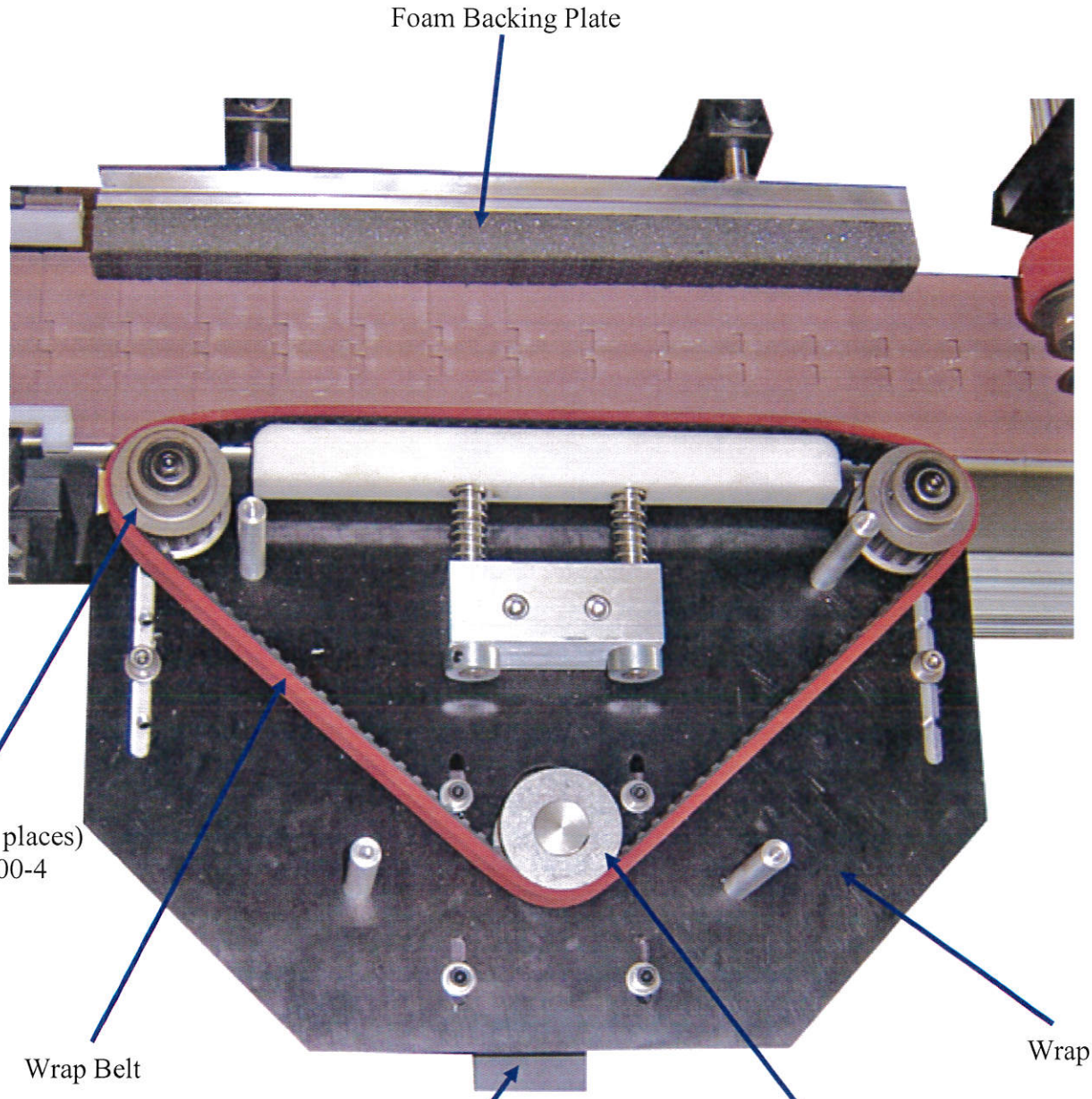
A. Operation – After AC line, motor and input signal wiring is complete, the SI and speed control combination can be operated. Turn AC power on. Increase signal input to maximum. The motor should increase in speed proportionately to the input signal magnitude.

B. Calibration.

i. Maximum Speed (MAX) – With the input signal at maximum, the maximum motor speed should be adjusted to the desired level with the MAX trimpot on the SI. (See fig. 13, page 13.)

ii. Minimum Speed (MIN) – After adjusting the maximum speed, decrease the input signal to minimum. Using the MIN trimpot on the "SI," adjust the motor minimum speed to the desired levelsee fig. 14 on page 14. Note: For zero signal output adjust MIN trimpot on "SI" so that a nominal output voltage is achieved (.1 - 5 VDC). Then slowly reduce the MIN trimpot setting to zero. (Note: On KBMM™ controls, the MIN speed trimpot on the control itself is operational and must be set to a zero settingapproximately 9 o'clock position.) The system is now adjusted so that the motor speed will follow the input signal over the desired range.

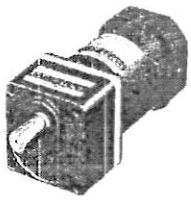
WRAP STATION
(TOP VIEW)



Manual Photo #192-519

90 W (1/8 HP)

World K Series
(Gearhead Sold Separately)



V Series/Combination Type
(Pre-assembled Gearmotor)

Specifications — Continuous Rating

World K Series (General Purpose)

Model Upper Model Name: Pinion Shaft Type Lower Model Name( ): Round Shaft Type			Output Power		Voltage	Frequency	Current	Starting Torque		Rated Torque		Rated Speed	Capacitor
Lead Wire Type Dimension (1)	Terminal Box Type Dimension (2)	Conduit Box Type Dimension (3)	HP	W	VAC	Hz	A	oz-in	mN·m	oz-in	mN·m	r/min	μF
5IK90GU-AWU (5IK90A-AWU)	5IK90GU-AWTU (5IK90A-AWTU)	5IK90GU-FCH (5IK90A-FCH)	1/8	90	Single-Phase 110	60	1.45	63	450	83	585	1500	20
					Single-Phase 115	60	1.44						
5IK90GU-CWE (5IK90A-CWE)	5IK90GU-CWTE (5IK90A-CWTE)	5IK90GU-ECH (5IK90A-ECH)			Single-Phase 220	50	0.74	63	450	103	730	1200	6
					Single-Phase 220	60	0.82			85	605	1450	
					Single-Phase 230	50	0.76			103	730	1200	
					Single-Phase 230	60	0.81			85	605	1450	
5IK90GU-SW (5IK90A-SW)	5IK90GU-SWT (5IK90A-SWT)	5IK90GU-SH (5IK90A-SH)			Three-Phase 200	50	0.64	120	850	96	680	1300	—
					Three-Phase 200	60	0.59	99	700	80	570	1550	
					Three-Phase 220	60	0.60	99	700	80	570	1600	
					Three-Phase 230	60	0.61	99	700	80	570	1600	

TP: Contains a built-in thermal protector. If a motor overheats for any reason, the thermal protector is opened and the motor stops. When the motor temperature drops, the thermal protector closes and the motor restarts. Be sure to turn the motor off before inspecting.
The "U" and "E" at the end of the model name indicate that the unit includes a capacitor. These two letters are not listed on the motor nameplate.
When the motor is approved under various safety standards, the model name on the nameplate is the approved model name. Page G-10
Details of Safety Standard Page G-2
The conduit box type of the motors are not VDE approved. The conduit box type does not have a specification for Single-Phase 220 VAC 50 Hz.

V Series (Quiet Operation, High Strength, Long Life)

Model Combination Type		Output Power		Voltage	Frequency	Current	Starting Torque		Rated Torque		Rated Speed	Capacitor
Lead Wire Type Dimension (4)	Terminal Box Type Dimension (5)	HP	W	VAC	Hz	A	oz-in	mN·m	oz-in	mN·m	r/min	μF
VHI590A-□U	VHI590AT-□U	1/8	90	Single-Phase 110	60	1.56	63	450	83	585	1500	25
				Single-Phase 115	60	1.55						
VHI590C-□E	VHI590CT-□E			Single-Phase 220	50	0.74	63	450	103	730	1200	6
				Single-Phase 220	60	0.82			85	605	1450	
				Single-Phase 230	50	0.76			103	730	1200	
				Single-Phase 230	60	0.81			85	605	1450	
VHI590S-□	VHI590ST-□			Three-Phase 200	50	0.64	120	850	96	680	1300	—
				Three-Phase 200	60	0.59	99	700	80	570	1550	
				Three-Phase 220	60	0.60	99	700	80	570	1600	
				Three-Phase 230	60	0.61	99	700	80	570	1600	

TP: Contains a built-in thermal protector. If a motor overheats for any reason, the thermal protector is opened and the motor stops. When the motor temperature drops, the thermal protector closes and the motor restarts. Be sure to turn the motor off before inspecting.
The "U" and "E" at the end of the model name indicate that the unit includes a capacitor. These two letters are not listed on the motor nameplate.
When the motor is approved under various safety standards, the model name on the nameplate is the approved model name. Page G-11
Details of Safety Standard Page G-2
Models above are provided as combination type with motor and gearhead pre-assembled.
Enter gear ratio in the box (□) within the model name.
The values in the table are for the motor only.

Gearheads for World K Series (Sold Separately)

Parallel Shaft

Gearhead Model	Gear Ratio
5GU□KA	3~180
5GU□KHA (High Power Type)	50~180
5GU10XKB (Decimal Gearhead) [for 5GU□KA]	
5GU10XK (Decimal Gearhead) [for 5GU□KHA]	

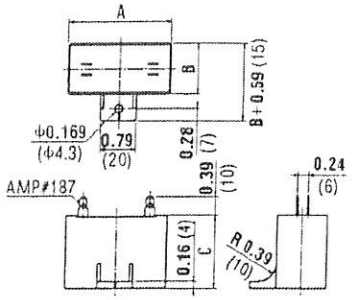
Enter the gear ratio in the box (□) within the model name.

Right-Angle

Type	Gearhead Model	Gear Ratio
Hollow Shaft	5GU□RH	3.6~180
Solid Shaft	5GU□RAA	3~180

Enter the gear ratio in the box (□) within the model name.
Right-Angle Gearheads Page A-189

Capacitor (included with single-phase motors)



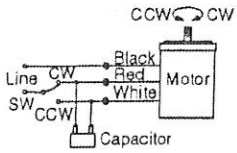
Motor Model	Capacitor Model	Dimensions in. (mm) A	B	C	Weight oz. (g)
5IK90GU-AW(T)U 5IK90A-AW(T)U	CH200CFAUL	2.28 (58)	1.14 (29)	1.61 (41)	3.4 (95)
5IK90GU-CW(T)E 5IK90A-CW(T)E VHI590C-□E VHI590CT-□E	CH60BFAUL	2.28 (58)	1.14 (29)	1.61 (41)	3.0 (85)
VHI590A-(T)U VHI590AT-□U	CH250CFAUL	2.28 (58)	1.38 (35)	1.97 (50)	4.9 (140)

If you need to order a capacitor without a motor, add "-C" to the capacitor model name shown. A capacitor cap is included with a capacitor.

Connection Diagrams

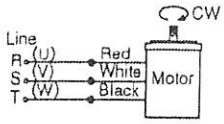
Lead Wire Type

5IK90GU-AWU
5IK90GU-CWE
VHI590A-□U
VHI590C-□E



To rotate the motor in a clockwise (CW) direction, flip switch SW to CW.
To rotate it in a counterclockwise (CCW) direction, flip switch SW to CCW.

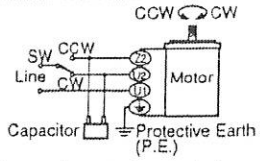
5IK90GU-SW
VHI590S-□



To change the rotation direction, change any two connections between U, V and W.

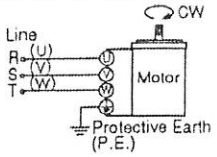
Terminal Box Type

5IK90GU-AWTU
5IK90GU-CWTE
VHI590AT-□U
VHI590CT-□E



To rotate the motor in a clockwise (CW) direction, flip switch SW to CW.
To rotate it in a counterclockwise (CCW) direction, flip switch SW to CCW.

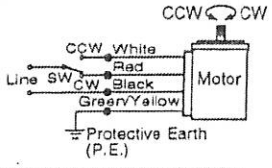
5IK90GU-SWT
VHI590ST-□



To change the rotation direction, change any two connections between U, V and W.

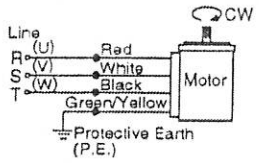
Conduit Box Type

5IK90GU-FCH
5IK90GU-ECH



To rotate the motor in a clockwise (CW) direction, flip switch SW to CW.
To rotate it in a counterclockwise (CCW) direction, flip switch SW to CCW.

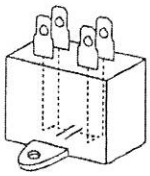
5IK90GU-SH



To change the rotation direction, change any two connections between U, V and W.

Inner Connection Diagram for 4-Terminal Capacitor

Terminals of the capacitor are connected as shown in the figure. For lead wire connection, use one lead wire per terminal.



The direction of motor rotation is as viewed from the shaft end of the motor.
CW represents the clockwise direction, while CCW represents the counterclockwise direction.
Connection diagrams are also valid for the equivalent round shaft type.
How to connect a capacitor Page A-225

Note:
Change the direction of single-phase motor rotation only after bringing the motor to a stop. If an attempt is made to change the direction of rotation while the motor is rotating, the motor may ignore the reversing command or change its direction of rotation after some delay.

List of Motor and Gearhead Combinations for V Series

Model numbers for motor and gearhead combinations are shown below.

Model	Motor Model	Gearhead Model
VHI590A-□U	VHI590A-GVR	GVR5G□
VHI590C-□E	VHI590C-GVR	
VHI590S-□	VHI590S-GVR	
VHI590AT-□U	VHI590AT-GVR	
VHI590CT-□E	VHI590CT-GVR	
VHI590ST-□	VHI590ST-GVR	

Enter the gear ratio in the box (□) within the model name.

Gearmotor — Torque Table

World K Series (General Purpose)

The maximum permissible torque when a decimal gearhead with a gear ratio of 10:1 is:

5GU□KA: 177 lb-in (20 N·m)

5GU□KHA: 260 lb-in (30 N·m)

Single-Phase 115/230 VAC 60 Hz, Three-Phase 230 VAC 60 Hz

Unit = Upper values: lb-in/Lower values: N·m

	Model \ Speed r/min	600	500	360	300	240	200	144	120	100	72	60	50	36	30	24	20	18	15	12	10
	Gear Ratio	**3**	**3.6**	**5**	**6**	**7.5**	**9**	**12.5**	**15**	**18**	**25**	**30**	**36**	**50**	**60**	**75**	**90**	**100**	**120**	**150**	**180**
1/750 HP 1 W	5IK90GU-AWU / 5IK90GU-AWTU / 5GU□KA	12.3 1.4	15 1.7	21 2.4	24 2.8	31 3.6	38 4.3	46 5.3	56 6.4	68 7.7	85 9.7	102 11.6	123 13.9	170 19.3	177 20	177 20	177 20	177 20	177 20	177 20	177 20
1/125 HP 6 W	5IK90GU-FCH / 5GU□KHA	—	—	—	—	—	—	—	—	—	—	—	—	170 19.3	200 23.2	220 25.9	260 30	260 30	260 30	260 30	260 30
1/50 HP 15 W	5IK90GU-CWE / 5IK90GU-CWTE / 5GU□KA	13.2 1.5	15.9 1.8	22 2.5	25 2.9	32 3.7	38 4.4	48 5.5	58 6.6	69 7.9	88 10.0	106 12.0	127 14.4	177 20	177 20	177 20	177 20	177 20	177 20	177 20	177 20
1/50 HP 15 W	5IK90GU-ECH / 5GU□KHA	—	—	—	—	—	—	—	—	—	—	—	—	177 20	210 24	230 26.8	260 30	260 30	260 30	260 30	260 30
1/30 HP 25 W	5IK90GU-SW / 5IK90GU-SWT / 5GU□KA	12.3 1.4	15 1.7	20 2.3	24 2.8	30 3.5	37 4.2	46 5.2	54 6.2	66 7.5	83 9.4	100 11.3	119 13.5	166 18.8	177 20	177 20	177 20	177 20	177 20	177 20	177 20
1/30 HP 25 W	5IK90GU-SH / 5GU□KHA	—	—	—	—	—	—	—	—	—	—	—	—	166 18.8	200 22.6	220 25.2	260 30	260 30	260 30	260 30	260 30

KA type is standard gearhead. **KHA** type is high-powered gearhead.

Single-Phase 230 VAC 50 Hz

Unit = Upper values: lb-in/Lower values: N·m

	Model \ Speed r/min	500	416	300	250	200	166	120	100	83	60	50	41	30	25	20	16	15	12.5	10	8.3
	Gear Ratio	**3**	**3.6**	**5**	**6**	**7.5**	**9**	**12.5**	**15**	**18**	**25**	**30**	**36**	**50**	**60**	**75**	**90**	**100**	**120**	**150**	**180**
1/19 HP 40 W	5IK90GU-CWE / 5IK90GU-CWTE / 5GU□KA	15.9 1.8	18.5 2.1	26 3.0	30 3.5	38 4.4	46 5.3	59 6.7	70 8.0	84 9.6	106 12.0	128 14.5	153 17.3	177 20	177 20	177 20	177 20	177 20	177 20	177 20	177 20
1/12 HP 60 W	5IK90GU-ECH / 5GU□KHA	—	—	—	—	—	—	—	—	—	—	—	—	210 24.1	250 28.9	260 30	260 30	260 30	260 30	260 30	260 30

KA type is standard gearhead. **KHA** type is high-powered gearhead.

V Series (Quiet Operation, High Strength, Long Life)

Single-Phase 115/230 VAC 60 Hz, Three-Phase 230 VAC 60 Hz

Unit = Upper values: lb-in/Lower values: N·m

	Model \ Speed r/min	360	300	200	120	100	60	50	30	20	15	10
	Gear Ratio	**5**	**6**	**9**	**15**	**18**	**30**	**36**	**60**	**90**	**120**	**180**
1/4 HP 200 W	VHI590A-□U VHI590AT-□U	23 2.6	28 3.2	41 4.7	69 7.9	80 9.1	133 15.1	160 18.1	260 30.2	350 40	350 40	350 40
1/19-1/8 HP 40-90 W (Note)	VHI590C-□E VHI590CT-□E	23 2.7	29 3.3	43 4.9	72 8.2	83 9.4	138 15.6	165 18.7	270 31.2	350 40	350 40	350 40
	VHI590S-□ VHI590ST-□	23 2.6	27 3.1	40 4.6	68 7.7	77 8.8	130 14.7	155 17.6	260 29.4	350 40	350 40	350 40

Single-Phase 230 VAC 50 Hz

Unit = Upper values: lb-in/Lower values: N·m

	Model \ Speed r/min	300	250	166	100	83	50	41	25	16	12.5	8.3
	Gear Ratio	**5**	**6**	**9**	**15**	**18**	**30**	**36**	**60**	**90**	**120**	**180**
	VHI590C-□E VHI590CT-□E	29 3.3	34 3.9	52 5.9	87 9.9	100 11.3	166 18.8	200 22.6	330 37.7	350 40	350 40	350 40

Gearheads and decimal gearheads are sold separately. Decimal gearheads are not available for **V** Series.

Enter the gear ratio in the box (□) within the model name. A colored background indicates gear shaft rotation in the same direction as the motor shaft; a white background indicates rotation in the opposite direction.

The speed is calculated by dividing the motor's synchronous speed (50 Hz: 1500 r/min, 60 Hz: 1800 r/min) by the gear ratio. The actual speed is 2--20% less than the displayed value, depending on the size of the load.

Gearmotor — Torque Table when Right-Angle Gearhead is Attached

Right-Angle Gearheads are available for the World **K** Series only.

Page A-196

Permissible Overhung Load and Permissible Thrust Load

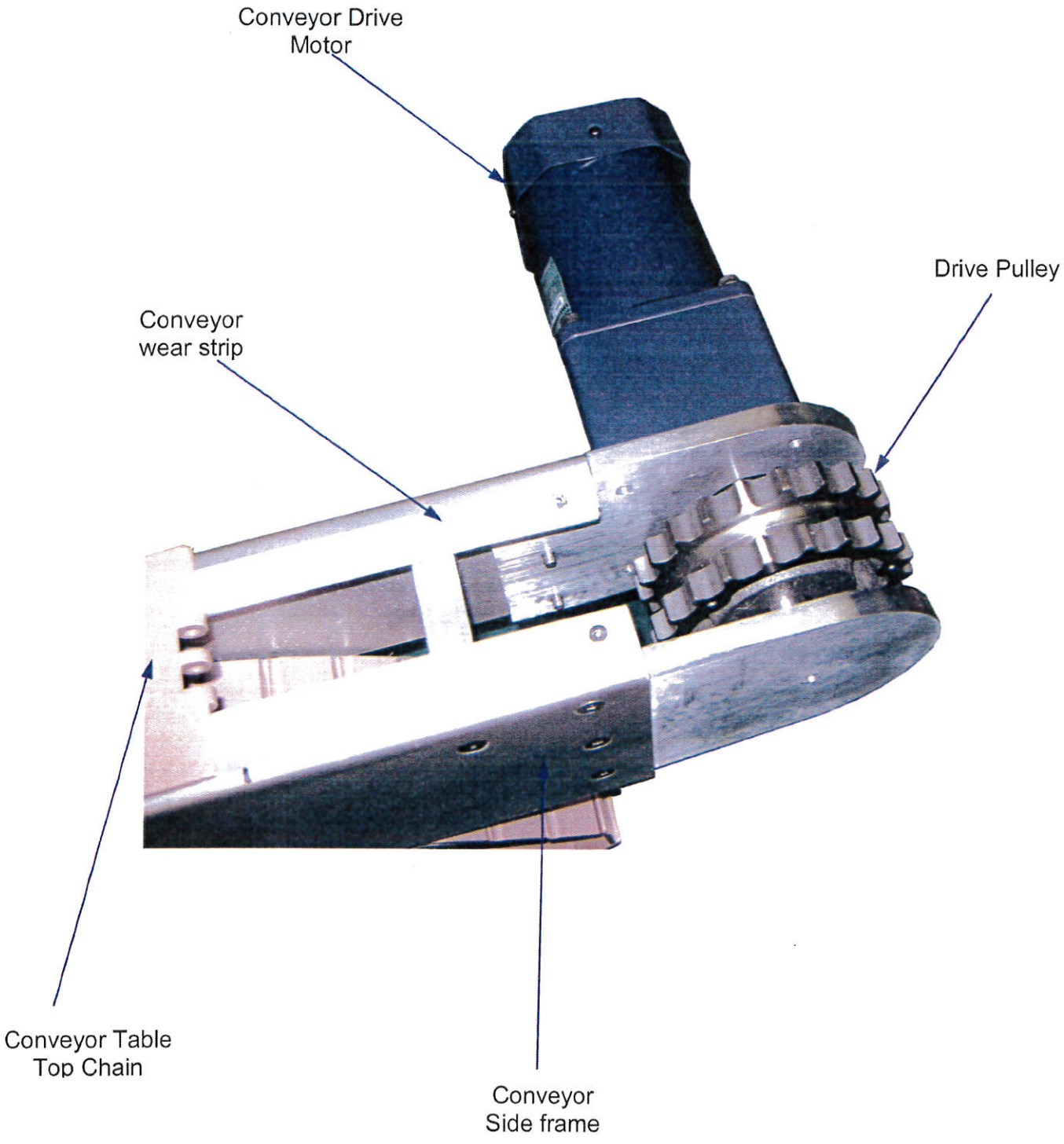
Motor (Round shaft type) Page A-11

Gearhead Page A-11

Permissible Load Inertia J for Gearhead

Page A-12

Labeling Systems Conveyor Drive Motor & Pulley

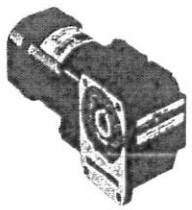


Manual Photo #109

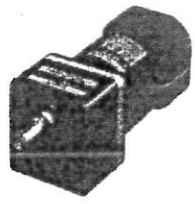
Induction Motors

90 W (1/8 HP)

Frame Size: □ 3.54 in. (□ 90 mm)



World **K** Series
(Gearhead Sold Separately)



V Series/Combination Type
(Pre-assembled Gearmotor)

Specifications — Continuous Rating

World K Series (General Purpose)

Model Upper Model Name: Pinion Shaft Type Lower Model Name( ): Round Shaft Type			Output Power		Voltage	Frequency	Current	Starting Torque		Rated Torque		Rated Speed	Capacitor
Lead Wire Type Dimension ①	Terminal Box Type Dimension ②	Conduit Box Type Dimension ③	HP	W	VAC	Hz	A	oz-in	mN·m	oz-in	mN·m	r/min	μF
5IK90GU-AWU (5IK90A-AWU)	5IK90GU-AWTU (5IK90A-AWTU)	5IK90GU-FCH (5IK90A-FCH)	1/8	90	Single-Phase 110	60	1.45	63	450	83	585	1500	20
					Single-Phase 115	60	1.44						
5IK90GU-CWE (5IK90A-CWE)	5IK90GU-CWTE (5IK90A-CWTE)	5IK90GU-ECH* (5IK90A-ECH)*			Single-Phase 220 *	50	0.74	63	450	103	730	1200	6
					Single-Phase 220	60	0.82			85	605	1450	
					Single-Phase 230	50	0.76			103	730	1200	
					Single-Phase 230	60	0.81			85	605	1450	
5IK90GU-SW (5IK90A-SW)	5IK90GU-SWT (5IK90A-SWT)	5IK90GU-SH (5IK90A-SH)			Three-Phase 200	50	0.64	120	850	96	680	1300	—
					Three-Phase 200	60	0.59	99	700	80	570	1550	
					Three-Phase 220	60	0.60	99	700	80	570	1600	
					Three-Phase 230	60	0.61	99	700	80	570	1600	

(TP) Contains a built-in thermal protector. If a motor overheats for any reason, the thermal protector is opened and the motor stops. When the motor temperature drops, the thermal protector closes and the motor restarts. Be sure to turn the motor off before inspecting.

- The **'U'** and **'E'** at the end of the model name indicate that the unit includes a capacitor. These two letters are not listed on the motor nameplate. When the motor is approved under various safety standards, the model name on the nameplate is the approved model name. →Page G-10
- **Details of Safety Standard** →Page G-2

* The conduit box type of the motors are not VDE approved. The conduit box type does not have a specification for Single-Phase 220 VAC 50 Hz.

V Series (Quiet Operation, High Strength, Long Life)

Model Combination Type		Output Power		Voltage	Frequency	Current	Starting Torque		Rated Torque		Rated Speed	Capacitor
Lead Wire Type Dimension ④	Terminal Box Type Dimension ⑤	HP	W	VAC	Hz	A	oz-in	mN·m	oz-in	mN·m	r/min	μF
VHI590A-□U	VHI590AT-□U	1/8	90	Single-Phase 110	60	1.56	63	450	83	585	1500	25
				Single-Phase 115	60	1.55						
VHI590C-□E	VHI590CT-□E			Single-Phase 220	50	0.74	63	450	103	730	1200	6
				Single-Phase 220	60	0.82			85	605	1450	
				Single-Phase 230	50	0.76			103	730	1200	
				Single-Phase 230	60	0.81			85	605	1450	
VHI590S-□	VHI590ST-□			Three-Phase 200	50	0.64	120	850	96	680	1300	—
				Three-Phase 200	60	0.59	99	700	80	570	1550	
				Three-Phase 220	60	0.60	99	700	80	570	1600	
				Three-Phase 230	60	0.61	99	700	80	570	1600	

(TP) Contains a built-in thermal protector. If a motor overheats for any reason, the thermal protector is opened and the motor stops. When the motor temperature drops, the thermal protector closes and the motor restarts. Be sure to turn the motor off before inspecting.

- The **'U'** and **'E'** at the end of the model name indicate that the unit includes a capacitor. These two letters are not listed on the motor nameplate. When the motor is approved under various safety standards, the model name on the nameplate is the approved model name. →Page G-11
- **Details of Safety Standard** →Page G-2
- Models above are provided as combination type with motor and gearhead pre-assembled.
- Enter gear ratio in the box (□) within the model name.
- The values in the table are for the motor only.

Gearheads for World K Series (Sold Separately)

Parallel Shaft

Gearhead Model	Gear Ratio
5GU□KA	**3~180**
5GU□KHA (High Power Type)	**50~180**
5GU10XKB (Decimal Gearhead) [for **5GU□KA**]	
5GU10XK (Decimal Gearhead) [for **5GU□KHA**]	

- Enter the gear ratio in the box (□) within the model name.

Right-Angle

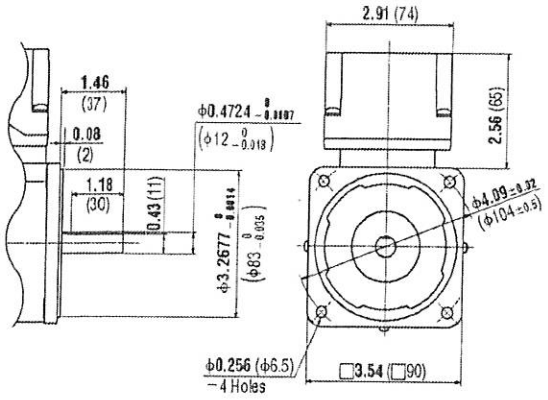
Type	Gearhead Model	Gear Ratio
Hollow Shaft	**5GU□RH**	**3.6~180**
Solid Shaft	**5GU□RAA**	**3~180**

- Enter the gear ratio in the box (□) within the model name.
- **Right-Angle Gearheads** →Page A-189

Dimensions A-49 | Connection Diagrams A-50 | List of Motor and Gearhead Combinations V Series A-52

Round Shaft Type
5IK90A-FCH
5IK90A-ECH
Weight: 8.1 lb. (3.7 kg)

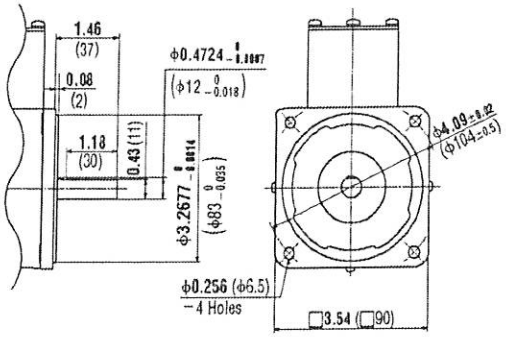
DXF A815



●Details of Terminal Box › Page A-224

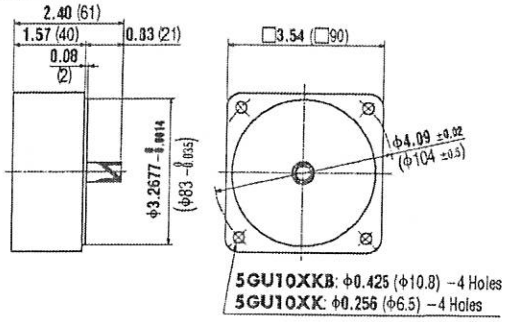
Round Shaft Type
5IK90A-SH
Weight: 7.3 lb. (3.3 kg)

DXF A816



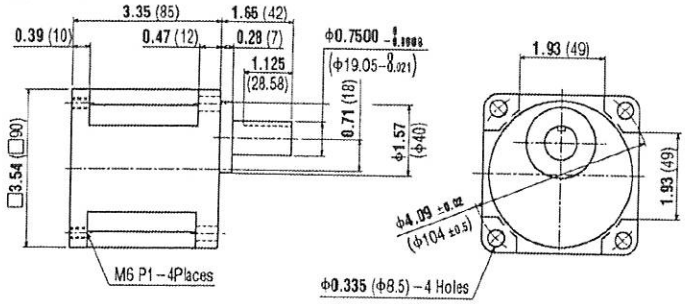
● Decimal Gearheads (for World K Series)
5GU10XKB (for **5GU□KA**)
5GU10XK (for **5GU□KHA**)
Weight: 1.3 lb. (0.6 kg)

DXF A029

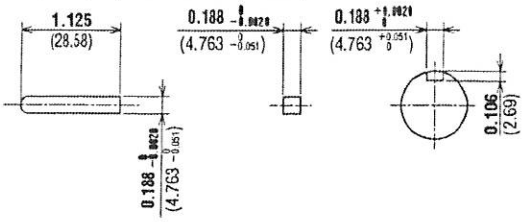


● High-Power Type Gearhead (for World K Series)
5GU□KHA Weight: 4.2 lb. (1.9 kg)

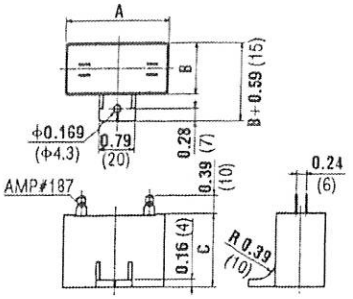
DXF A038U



●Key and Key Slot (Scale 1/2)
(The key is provided with the gearhead)



Capacitor (included with single-phase motors)



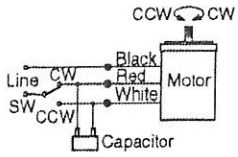
Motor Model	Capacitor Model	Dimensions in. (mm) A	B	C	Weight oz. (g)
5IK90GU-AW(T)U 5IK90A-AW(T)U	CH200CFAUL	2.28 (58)	1.14 (29)	1.61 (41)	3.4 (95)
5IK90GU-CW(T)E 5IK90A-CW(T)E VHI590C-□E VHI590CT-□E	CH60BFAUL	2.28 (58)	1.14 (29)	1.61 (41)	3.0 (85)
VHI590A-(T)U VHI590AT-□U	CH250CFAUL	2.28 (58)	1.38 (35)	1.97 (50)	4.9 (140)

- If you need to order a capacitor without a motor, add "-C" to the capacitor model name shown. A capacitor cap is included with a capacitor.

Connection Diagrams

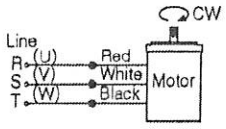
Lead Wire Type

5IK90GU-AWU
5IK90GU-CWE
VHI590A-□U
VHI590C-□E



To rotate the motor in a clockwise (CW) direction, flip switch SW to CW.
To rotate it in a counterclockwise (CCW) direction, flip switch SW to CCW.

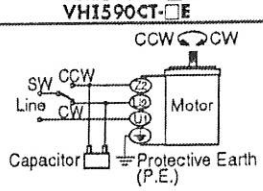
5IK90GU-SW
VHI590S-□



To change the rotation direction, change any two connections between U, V and W.

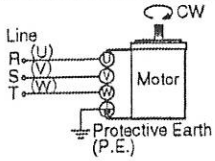
Terminal Box Type

5IK90GU-AWTU
5IK90GU-CWTE
VHI590AT-□U
VHI590CT-□E



To rotate the motor in a clockwise (CW) direction, flip switch SW to CW.
To rotate it in a counterclockwise (CCW) direction, flip switch SW to CCW.

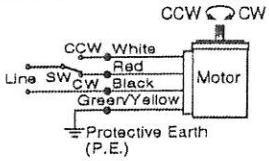
5IK90GU-SWT
VHI590ST-□



To change the rotation direction, change any two connections between U, V and W.

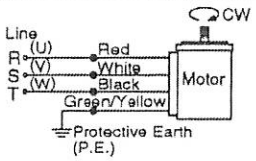
Conduit Box Type

5IK90GU-FCH
5IK90GU-ECH



To rotate the motor in a clockwise (CW) direction, flip switch SW to CW.
To rotate it in a counterclockwise (CCW) direction, flip switch SW to CCW.

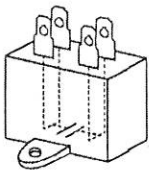
5IK90GU-SH



To change the rotation direction, change any two connections between U, V and W.

Inner Connection Diagram for 4-Terminal Capacitor

Terminals of the capacitor are connected as shown in the figure. For lead wire connection, use one lead wire per terminal.



- The direction of motor rotation is as viewed from the shaft end of the motor.
- CW represents the clockwise direction, while CCW represents the counterclockwise direction.
- Connection diagrams are also valid for the equivalent round shaft type.
- **How to connect a capacitor**→Page A-225

Note:

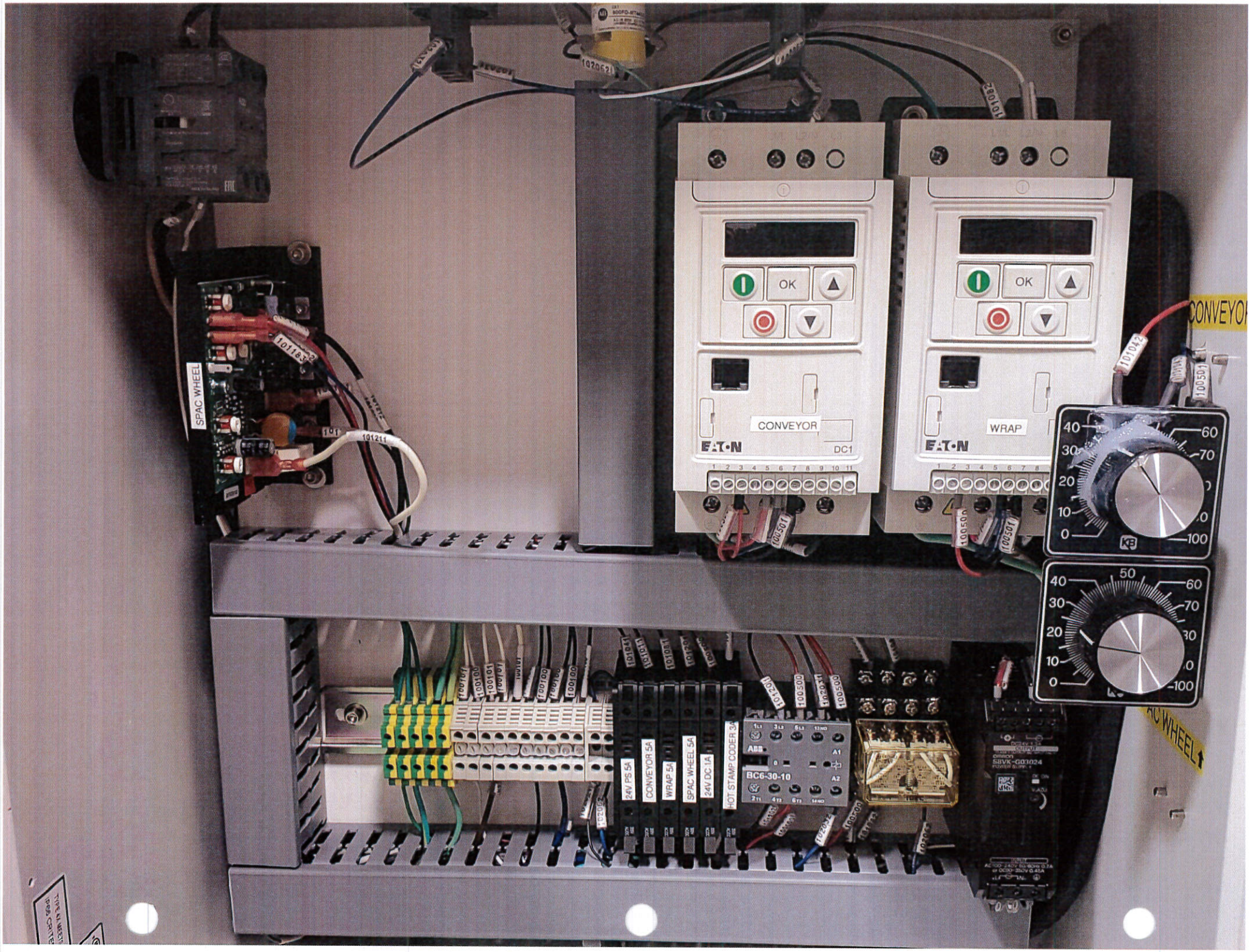
- Change the direction of single-phase motor rotation only after bringing the motor to a stop. If an attempt is made to change the direction of rotation while the motor is rotating, the motor may ignore the reversing command or change its direction of rotation after some delay.

List of Motor and Gearhead Combinations for V Series

Model numbers for motor and gearhead combinations are shown below.

Model	Motor Model	Gearhead Model
VHI590A-□U	VHI590A-GVR	GVR5G□
VHI590C-□E	VHI590C-GVR	
VHI590S-□	VHI590S-GVR	
VHI590AT-□U	VHI590AT-GVR	
VHI590CT-□E	VHI590CT-GVR	
VHI590ST-□	VHI590ST-GVR	

- Enter the gear ratio in the box (□) within the model name.


SPAC WHEEL
CONVEYOR
DC1
WRAP
24V PS 5A
CONVEYOR 5A
WRAP 5A
SPAC WHEEL 5A
24V DC 1A
HOT STAMP CODER 3A
BC6-30-10

ACS55

User's Guide

for type ACS55
AC Drives
from 0.18 to 2.2 kW

English	EN
Dansk	DA
Deutsch	DE
Español	ES
Suomi	FI
Français	FR
Italiano	IT
Nederlands	NL
Português	PT
Русский	RU
Svenska	SV
中文	CN
한국어	KR

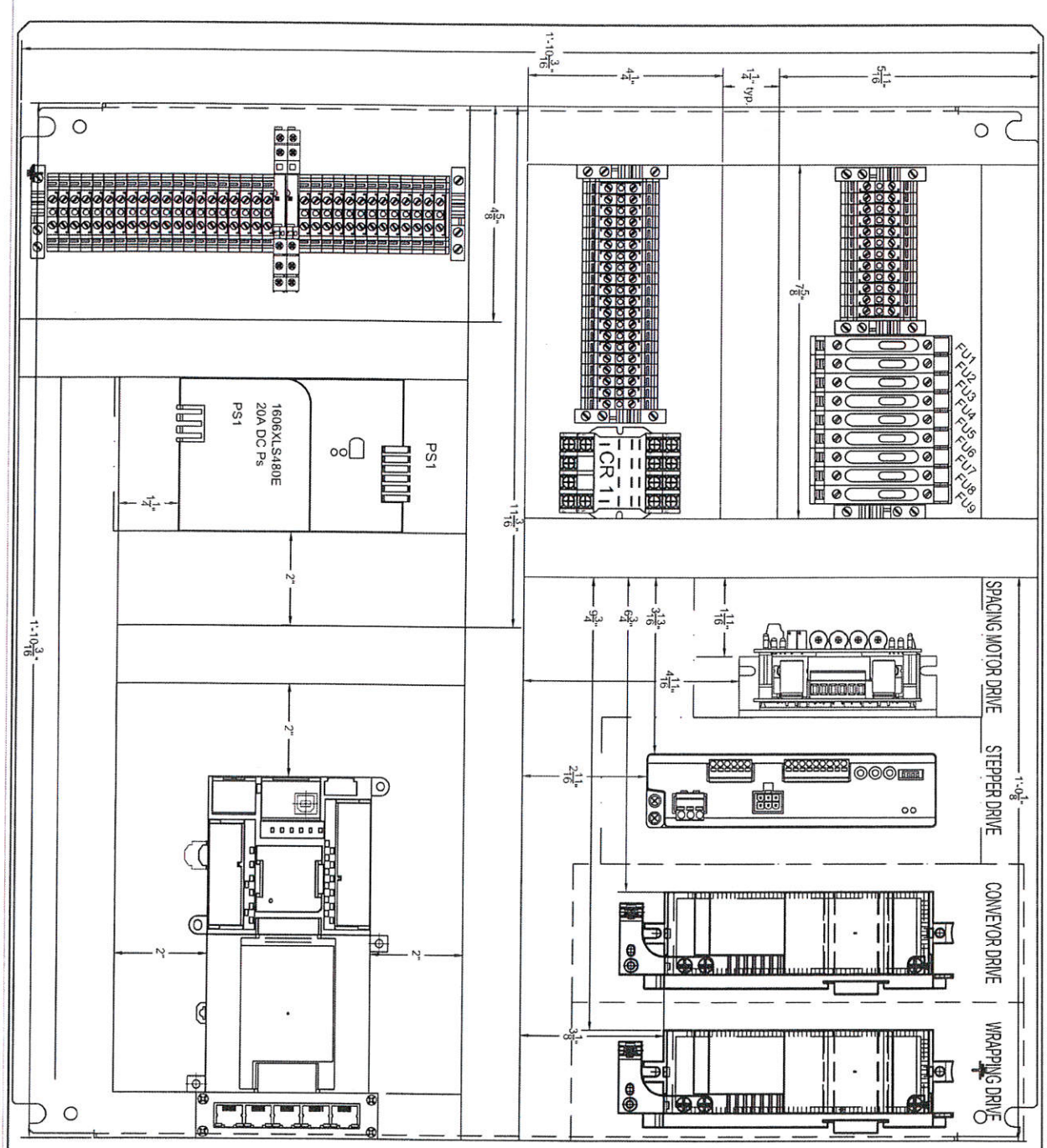
ABB

User's Guide

for type ACS55
AC Drives
from 0.18 to 2.2 kW

English EN

The compete manual for this product is an excess of 200 pages long.
For the complete manual please go to Rockwellautomation.com

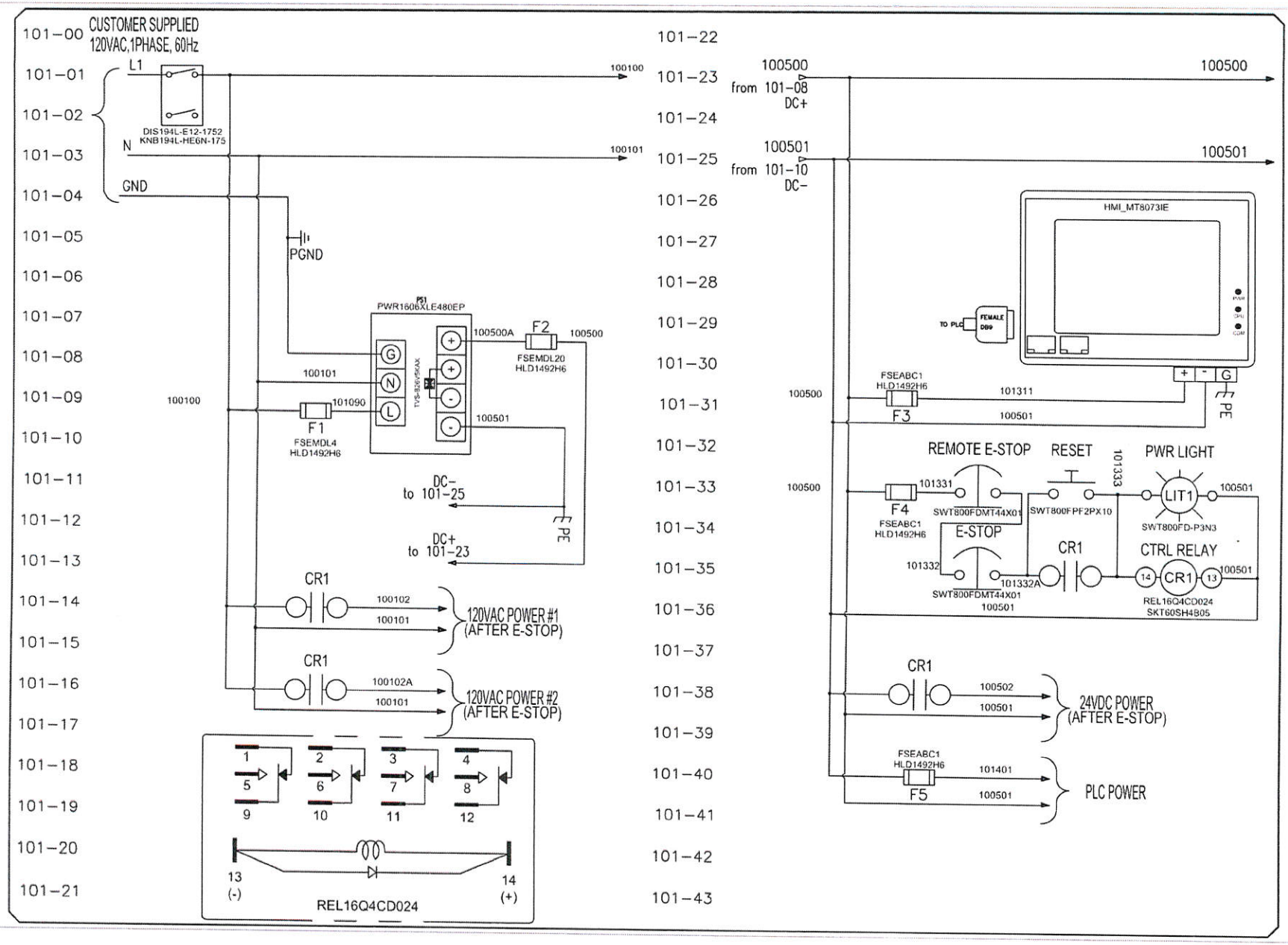


Power Distribution: the following color code shall be used for the power distribution.

	PHASE A	PHASE B	PHASE C	NEUTRAL
(Δ) 480 3ø 3W	BLACK *	BLACK	BLACK *	N/A
(Y) 480V/277V 3ø 4W	BROWN	ORANGE	YELLOW	GRAY
120V/240V 1ø 3W	RED	BLUE	N/A	WHITE
Install brown tape on Phase A and yellow tape on Phase C				

Control Wiring:

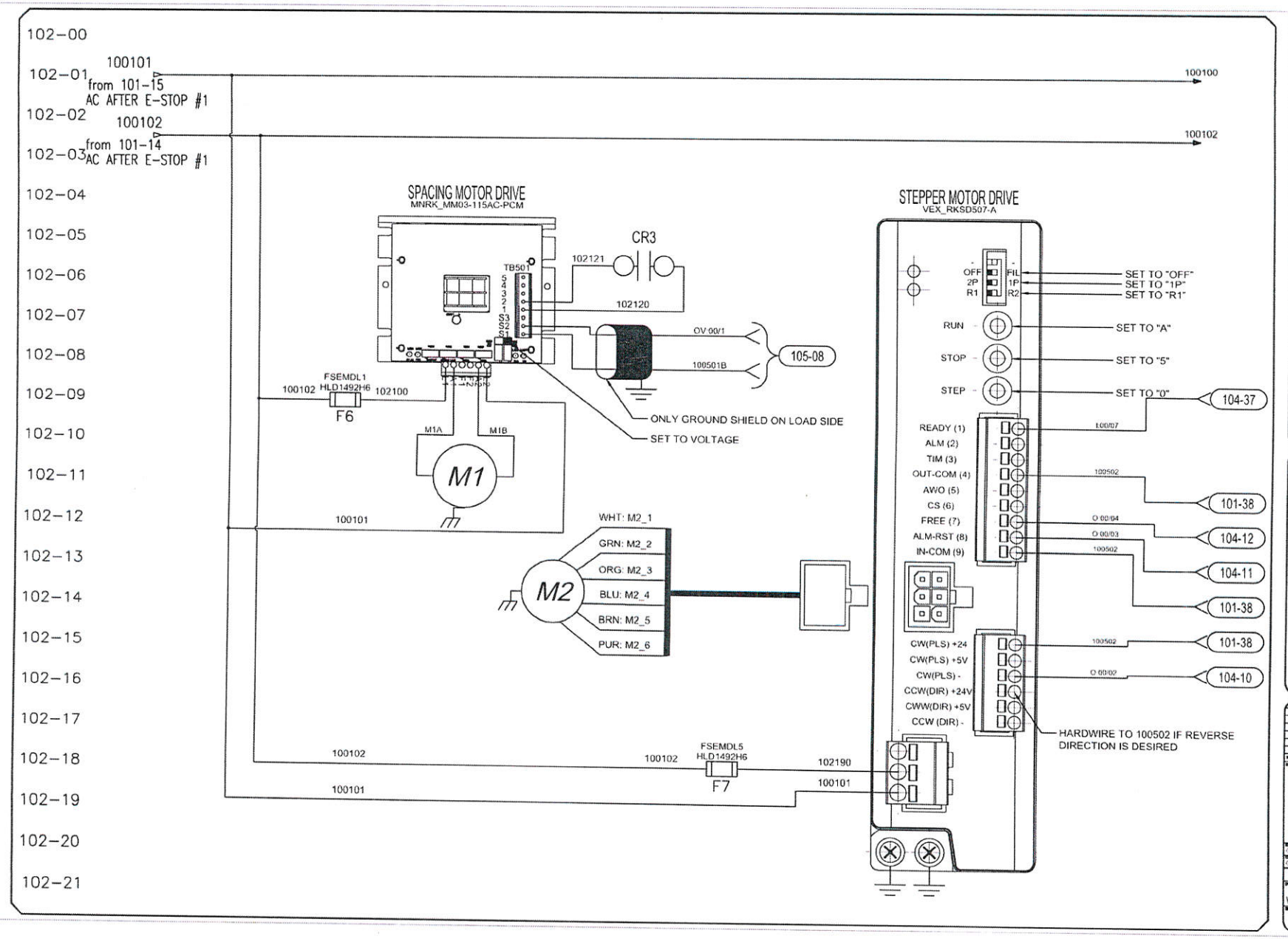
AC LINE	BLACK OR RED
AC COMMON	WHITE
AC GROUND	GREEN OR GREEN WITH YELLOW
SAFETY INTERLOCK WIRING	RED
LOW VOLTAGE (<50) VDC+	BLUE OR BLACK OR WHITE WITH BLUE
HIGH VOLTAGE (<50) VDC-	BLUE OR BLUE WITH BLACK
ANALOG 24VDC-	BLACK
ANALOG 24VDC+	RED OR WHITE



NO.	DATE	REVISION	BY

DRAWN BY	PLOT DATE
Chad Martin	27-Mar-20
CHECKED BY	ORIG. ISS. DATE
Chad Martin	29-Jan-20

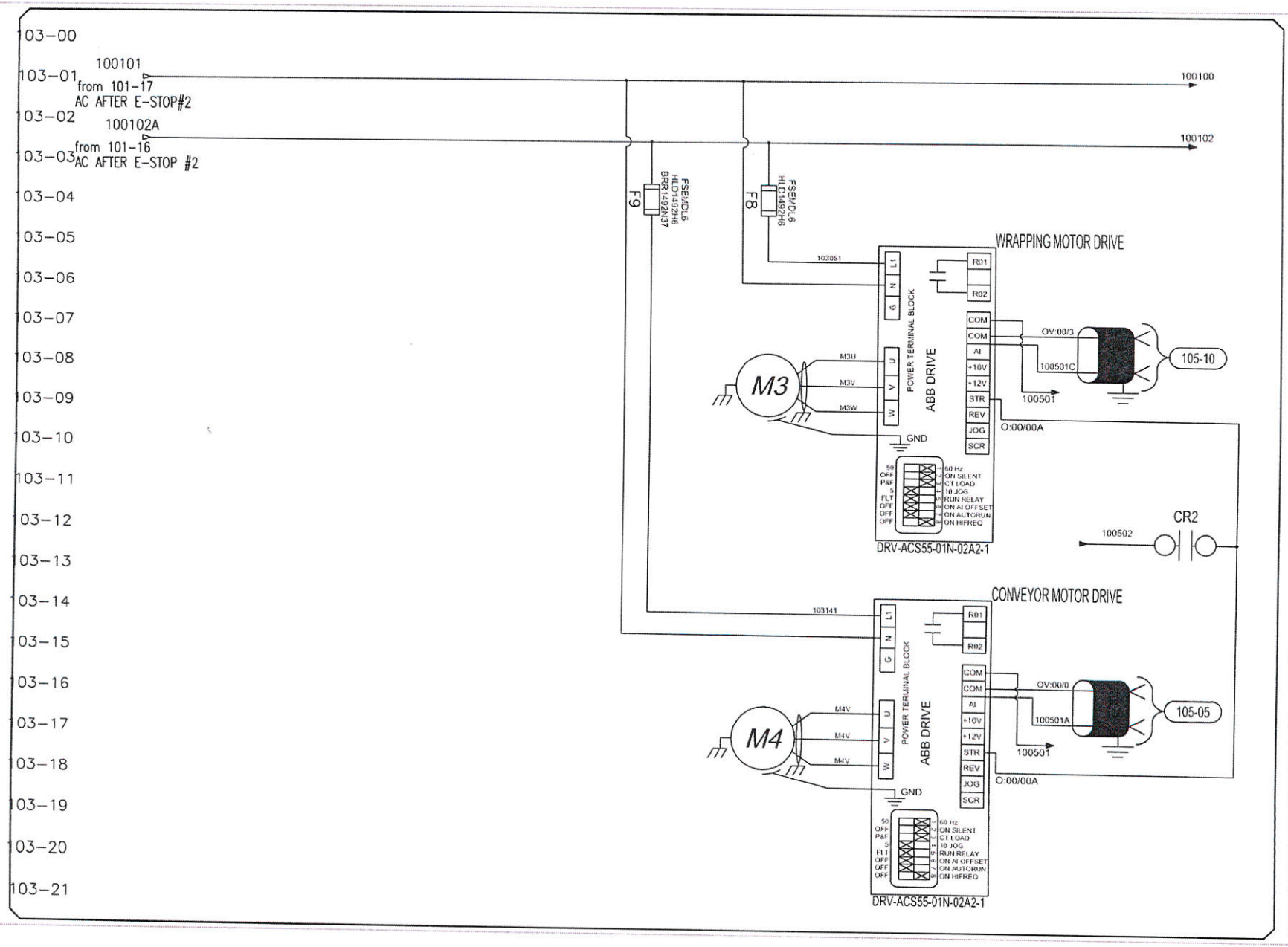
DRG. NO.
W-RB-OFW-0006
SHEET NO.
2 OF 7



Chad Martin	27-Mar-20
Chad Martin	29-Jan-20

W-RB-OFW-0006

3 OF 7



DRAWN	PLOT DATE
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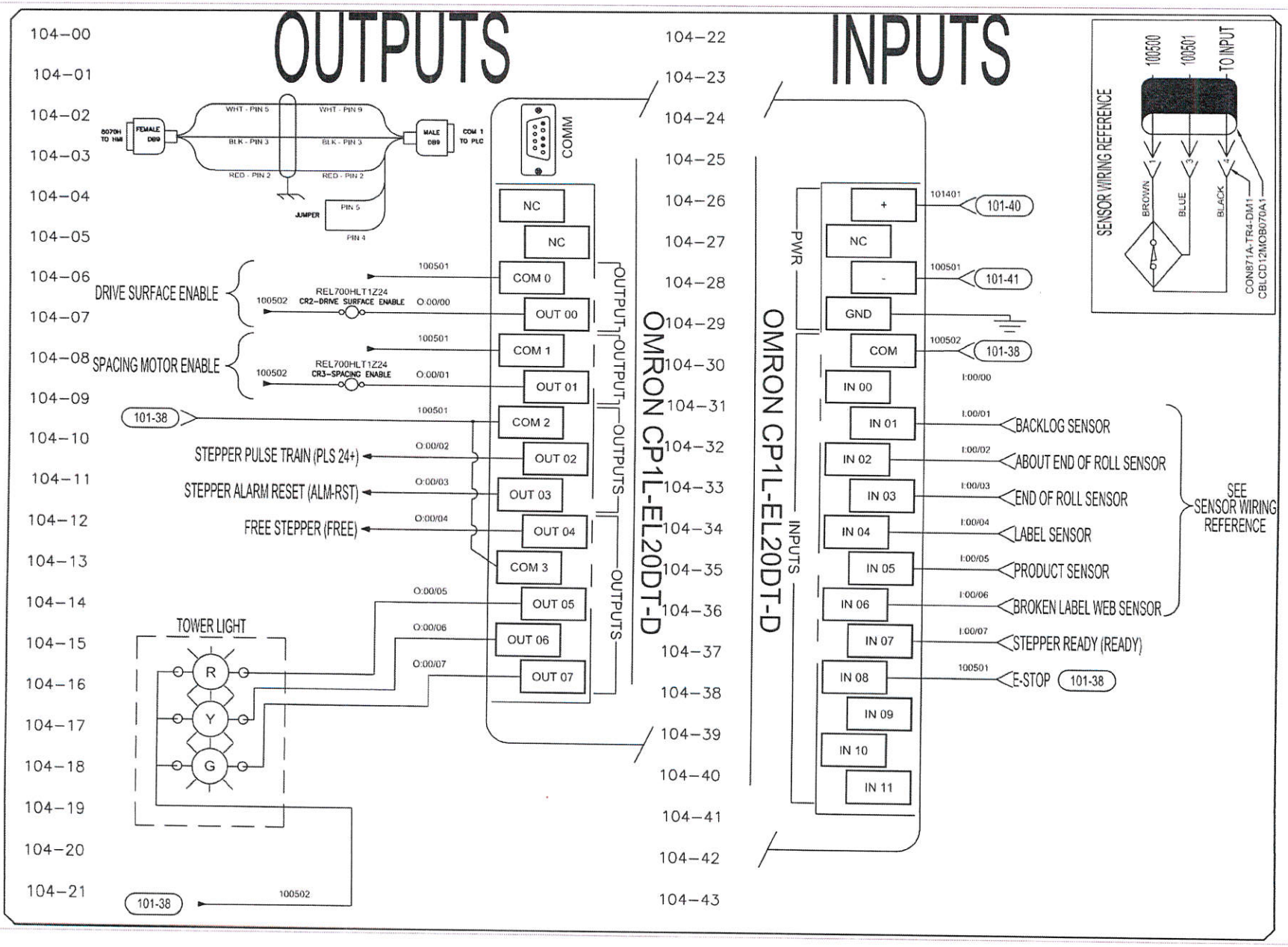
CHECKED BY	CHECKED ON
Chad Martin	29-Jan-26

W-RB-OFW-0006

SHEET NO

4 OF 7



Chad Martin	27-Mar-20
Chad Martin	29-Jan-20

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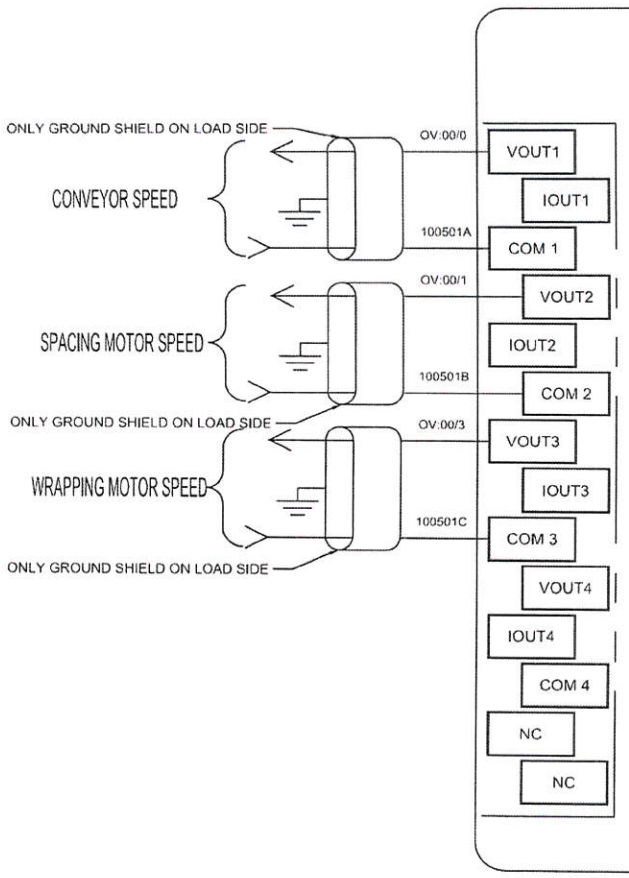
SPEED CONTROL



105–00 105–01 105–02 105–03 105–04 105–05 105–06 105–07 105–08 105–09 105–10 105–11 105–12 105–13 105–14 105–15 105–16 105–17 105–18 105–19 105–20 105–21

105–22 105–23 105–24 105–25 105–26 105–27 105–28 105–29 105–30 105–31 105–32 105–33 105–34 105–35 105–36 105–37 105–38 105–39 105–40 105–41 105–42 105–43

DRAWN	Chad Martin	PLOT DATE 27-Mar-20
DESIGNED BY	Chad Martin	CHECKED BY 29-Jan-20

DWG NO W-RB-OFW-0006

SHEET NO 6 OF 7