

BK160 Sort Module



BK160 Conveyor Sort Module User's Guide

Published by:

Buskro Ltd. 1738 Orangebrook Court, Unit #1 Pickering, ON, L1W 3G8 Canada Tel.: (905) 839-6018 Fax: (905) 839-6023

All Rights Reserved. No part of this book may be used or reproduced in any form or by any means, electronic or mechanical, or stored in a database or retrieval system, without prior written permission of Buskro Ltd. except in case of brief quotations embodied in critical articles or reviews. Making copies of any part of this book for any purpose other than your own personal use is a violation of copyright laws.

Copyright © 2008 Buskro Ltd.

First Edition, 2008

Printed in Canada

This manual is sold as is, without warranty of any kind, either express or implied, respecting the contents of this manual, including but not limited to implied warranties for the manual's quality, performance, merchantability, or fitness for any particular purpose. Neither Buskro Ltd. nor its dealers or distributors shall be liable to the purchaser nor any other person or entity with respect to any liability, loss, or damage caused or alleged to be caused directly or indirectly by this manual.

Manual History

Version	Date	Description	ECO No.
1.0	25-Nov-08	Release of manual.	N/A

BK160 Sort Module

Table Of Contents

1.0 Ger	neral Information	1-0
1.1 D	Description	
1.2 S _I	pecifications	
1.2.1	Dimensions	
1.2.2	Material Handling	
1.2.3	Electrical Specifications	
2.0 Set	tup	2-0
2.1 C	Conveyor Position	
2.2 M	Iaterial Speed	
2.3 C	Cable Connections	
2.4 Se	etup Button	
2.5 El	lectrical Requirements	
2.6 A	djustments	
2.7 C	Controls	
2.8 C	Conveyor Belts	
2.9 Ti	ˈips	
3.0 Con	mpose IQ	3-0
3.1 In	ntroduction	
3.2 So	oftware Setup	
3.2.1	Adding a Stack Frame	

Appendix A – Assembly Drawings

Appendix B – Electrical Drawings

General Information

Chapter

1.1 Description

The BK160 Conveyor Sort Module is a device used to separate groups of printed material on an exit conveyor positioned perpendicular to product flow. This allows for an automated method of separating the job into more manageable bundle sizes. The separation occurs when a maximum bundle size is reached (user selectable) or when a stack mark is detected.

The BK160 Conveyor Sort Module separates material by stopping it short of the previous bundle (Figure 1-1). This allows the operator to easily see the separation in a mail list or bundle size.

Figure 1-1: Material automatically separated on a Conveyor



1.2 Specifications

1.2.1 Dimensions



Table 1-1: BK160 Dimensions

Symbol	Description	Dimer	nsions
O.H.	Overall Height	10.75"	273 mm
O.L.	Overall Length	19.36"	492 mm
O.W.	Overall Width	16.00"	406 mm

1.2.2 Material Handling

Description	Dimer	nsions
Maximum Recommended Material Overlap Thickness	0.5"	13 mm
Maximum Recommended Material Length (on BK16XX Conveyor)	12"	305 mm

1.2.3 Electrical Specifications

Table 1-2: BK160 Electrical Specifications

Electrical Requirements		
Input Line Voltage	100-240 VAC, 47-63 Hz	
Power Cord (North America)	P/N 606322	
Power Cord (International)	P/N 9103256	

Setup



2.1 Conveyor Position

For optimum performance, it is recommended that the conveyor belt be approximately 1.5" (38 mm) lower than the top of the transport base where material exits and approximately 0.5" away from the base horizontally (Figure 2-1). This is to ensure a smooth transition into the Conveyor Sort Module unit. Adjusting the conveyor legs can change the conveyor height.





2.2 Material Speed

For optimum performance, it is important to ensure that the material is traveling at a sufficient enough speed to reach the bottom cone. If the material is traveling too slowly and is unable to reach the bottom cone (Figure 2-5), it may not be possible to distinguish between bundle separations. In order to compensate for this, the Conveyor Sort Module can be moved closer to the transport base. However, this will reduce the useable material size as material should not extend beyond the conveyor bed.

2.3 Cable Connections

The Conveyor Sort Module requires up to five cable connections for proper operation. They include:

Item	Connector	Description
Upstream	37-Pin	Connects to the 57-Pin round connector on the Transport Base where
	Round	printing occurs.
Downstream	57-Pin	Connects to the 37-Pin round connector of the unit following the
	Round	Transport Base where printing occurs. If there is no unit between the
		Transport Base and the conveyor, this is not connected.
Stack In	3-Pin	Connects to the 14-Pin round connector labeled "OUTPUT" going to
	DIN	the Field Connection Board (located on the side of the BK700 or on the
		back of the computer module for BK705 or BK1700 series controllers).
Stack Out	4-Pin	Connects to the 4-Pin DIN connector on the back of the Conveyor Sort
	DIN	Module unit on the conveyor.
Power	IEC	Connect to power outlet.

Table 2-1: Cable Connections

For added clarity, two examples are provided to show the cable connections between units. The first example displays the simplest case where the conveyor follows directly after the transport base (Figure 2-2). The second example displays a case where a unit is between the transport base and the conveyor (Figure 2-3). Note that longer interconnect cables may be required depending on the system setup (e.g. if there is more equipment between the transport base where printing occurs and the conveyor). For this purpose, different interconnect cable kits are available (Table 2-2).

Cable Kit	Description
BK160-CAB-1	Includes one 10' Upstream/Downstream interconnect cable. Used in example found
	in Figure 2-2.
BK160-CAB-2	Includes one 10' and one 20' Upstream/Downstream interconnect cable. Used in
	example found in Figure 2-3.
BK160-CAB-3	Includes two 20' Upstream/Downstream interconnect cables.

Table 2-2:	Upstream/Downstream	Interconnect	Cable Kits
1 0010 2 2.	opsiricana Domistricani	interconnect	Cubic mins









Note: The Conveyor Sort Module is electrically downstream of the transport base where printing occurs and upstream of equipment running after the transport base but before the conveyor.

2.4 Setup Button

In order to assist with setup, a setup button is available on the rear of the Conveyor Sort Module above the Stack In and Stack Out cable connections (Figure 2-4). This is used to manually move the separator cone into the down position to check to see if it contacts the belt.





Note: It is important to ensure that the BK160 is not physically contacting the conveyor belt or any joint in the belt. It is recommended to run the conveyor belt slowly with the separator cone in the down position to confirm there is no contact.

2.5 Electrical Requirements

The BK160 Conveyor Sort Module is designed to work with the following equipment:

- Buskro Transport Bases equipped to support a heater extension table or bases currently equipped with a Base Control Board (P/N 9102380). This provides the required run signal to the BK160 over the Upstream/Downstream cable. Examples include the BK6OB, BK7IB, and BK76IB transport bases. Bases equipped with a Base Control Board use a 12VDC run signal while older bases used 120VAC.
- Buskro controllers equipped with a Field Connection Board (P/N 9100731). This provides the stack signal to the BK160. Examples include the BK700, BK705, BK1700, BK1705, BK1710, and BK1720 controllers.

It is also important to note that depending on the transport base used, a different relay is required within the BK160 Conveyor Sort Module (either 12V or 120V). With the exception of the relay, the wiring is identical. In addition, a different I/O cable (ribbon cable connecting the base to the controller) is also required in order to disable the traditional bundle separation method of speeding up the conveyor. It can be identified by the fact that it is black instead of grey like the standard I/O cable. Depending on the base to controller combination, different kits are required (Table 2-3).

Kit	Controller	Base	Relay / Run Signal
BK160-665	BK700	BK6OB	120V
BK160-765	BK700	BK7IB	120V
BK160-765R2	BK700	BK7IB Release 2	12V
BK160-776	BK700	BK76IB	12V
BK160-1665	BK705 or BK17XX	BK6OB	120V
BK160-1765	BK705 or BK17XX	BK7IB	120V
BK160-1765R2	BK705 or BK17XX	BK7IB Release 2	12V
BK160-1776	BK705 or BK17XX	BK76IB	12V
BK160-760	Integrated	BK760	12V

Table 2-3: Base To Controller Interconnect K
--

Note: Do not connect a Conveyor Sort Module built for a 12V machine to a machine designed to work with a 120V relay otherwise the Conveyor Sort Module can be damaged. An example would be to connect a Conveyor Sort Module built to work with a BK76IB to a BK60B base. Use the appropriate kit as per Table 2-3.

Ensure that the replacement I/O cable is used when operating the Conveyor Sort Module. If not, the conveyor will also speed up when a stack signal is received.

2.6 Adjustments

The Conveyor Sort Module can be adjusted along three axes:

- Height Adjustment Adjust the Conveyor Sort Module up or down relative to the conveyor belt. This may be necessary depending on the thickness of the material or the overlap of material. When setting the height, ensure that the Conveyor Sort Module (e.g. the bottom cone or the backstop plate) does not interfere with the belt (including the belt link). Run the conveyor slowly after adjusting the height to confirm there is no interference.
- Product Length Adjustment Can be moved closer or further away from the Transport base. This may need to be adjusted based on the material size and speed at which the material enters the conveyor.
- 3. **Product Centering Adjustment** Can be adjusted in order to position the cones on the printed material. The cones should be centered on the material.

Figure 2-5: Side View of Conveyor Sort Module



2.7 Controls

The control box of the Conveyor Sort Module has three main switches on the front. They are described in Table 2-4.

Table 2-4: Control Box Switches

Name	Light	Description
Power	Green	Press to turn ON or OFF. Illuminates when ON.
Stack Mode	None	 Mode 1 – Creates a momentary separation when a stack signal is received. Momentary stack duration is user controllable (Section 3.2). Mode 2 – Creates a continuous separation until the next stack signal is received.
Reset	Red	Press to reset the separator cone in the up position. Will illuminate when the separator cone is in the down position.

Figure 2-6: Material Separated using Stack Mode 1 (Momentary Separation)





Figure 2-7: Material Separated using Stack Mode 2 (Continuous Separation)

Note: When in Mode 2 (continuous separation), the separator cone will automatically return to the up position when the transport base is stopped. Once the transport base is restarted, the cone will return to its previous state (either up or down). The "Reset" button can be used to return the cone to the up position regardless of the previous condition.

2.8 Conveyor Belts

For optimum operation, it is recommended that the BK160 be used on a conveyor equipped with a single solid belt. If multiple belts are used, it is possible for material to get caught or stopped by the edge of one of the belts. Kits to upgrade twin-belt conveyors to a solid belt design can be purchased from Buskro based on availability for customers seeking upgrades. The upgrade kit part numbers are listed in Table 2-5.

Conveyor Code	Upgrade Kit P/N	Description
BK1604	UBK1604-SB	Upgrade Kit, Solid Belt Conveyor, 4'
BK1606	UBK1606-SB	Upgrade Kit, Solid Belt Conveyor, 6'
BK1608	UBK1608-SB	Upgrade Kit, Solid Belt Conveyor, 8'
BK1610	UBK1610-SB	Upgrade Kit, Solid Belt Conveyor, 10'
BK1612	UBK1612-SB	Upgrade Kit, Solid Belt Conveyor, 12'
BK1618	UBK1618-SB	Upgrade Kit, Solid Belt Conveyor, 18'

Table 2-5: Conveyor Solid Belt Upgrade Kits Part Numbers

2.9 Tips

- A minimum transport speed is required in order for the material to reach the Conveyor Sort Module module. If the material is unable to reach the bottom cone, it will not sort properly. Note that the minimum speed is affected by material length.
- 2. When setting the distance of the Conveyor Sort Module relative to the transport base, material must fall freely between the Conveyor Sort Module and the conveyor backlash plate already attached to the conveyor (on the side closest to the transport base). The backlash plate is used to prevent material from being drawn back into the transport base after exiting onto the conveyor.
- 3. Changes in Production Rate or transport speed can result in more material overlap on the conveyor. In this case, adjust the height of the sorter unit, or change the conveyor speed. It is recommended to avoid material overlap greater than 0.5 inches in height in order to get a proper shingle.
- 4. The Conveyor Sort Module unit is designed to work in a situation where the conveyor follows immediately after the inkjet (or an extension table that is mechanically coupled to the inkjet). If another unit is placed in between the inkjet and the conveyor, it is important to ensure that it matches the transport speed of the inkjet base otherwise the stacked piece may arrive on the conveyor too early or too late.

Compose IQ



3.1 Introduction

The BK160 Conveyor Sort Module is designed to work with a Buskro Controller equipped with Compose IQ. Compose IQ is a Windows[®] based application that controls all operational aspects of a Buskro inkjet system. This easy-to-use control software delivers powerful job setup, layout, production management, record control, diagnostics, and reporting.

Compose IQ is a built-in package capable of supporting system applications in which machine control, data acquisition, print sequencing, and product tracking or a combination thereof may be required. For more detailed information about Compose IQ, reference the help file included with the software. Only some of the basic functions related to the Conveyor Sort Module are described in this manual.

3.2 Software Setup

Figure 3-1: Setup Window - Stacker/Diverter

Setup	×
Stacker/Diverter Print Heads Options OCR Master	Slave Inserter Tracking Verify Passwords
O Delays specified in Cycles	
Delays specified in Inches	
Stacker	Diverter
🔽 Stacker Enabled	Diverter Enabled
Delay in Pieces/Inches: 20	Delay in Pieces/Inches: 16
Hold in Pieces/Inches: 30	Hold in Pieces/Inches: 1
Maximum Bundle Size: 999	Minimum Bundle Size: 1
Force Stack after Reset	
	🖌 ОК 🗶 Cancel 🤣 Арріу 🍞 Неір

In order to enable the Conveyor Sort Module in Compose, hit the Setup button (**F7**) at the top of the screen. This will display the Setup Dialog box shown in Figure 3-1. Select "**Delays specified in Inches**" and check "**Stacker Enabled**". The remaining fields are as follows:

- Delay in Pieces/Inches Enter the distance in inches between the photocue sensor and where the stack signal is to be activated (the conveyor sort module). The delay must be between 1 and 250.
- Hold in Pieces/Inches This is not relevant when the Conveyor Sort Module is set to Mode 2. If set to Mode 1, enter the duration that the stack signal is to be activated (to hold the separator cone in the down position). This is based on the number of inches traveled by the transport base. The Stacker Hold must be between 1 and 30.
- Maximum Bundle Size This indicates the maximum number of pieces that will be included in a stack. If the limit is exceeded, the Sorter will be triggered automatically to create a new bundle. The maximum bundle size must be between 1 and 999.
- 4. Force Stack after Reset When checked, a stack operation is forced whenever the Job, Layout or print position is reset.

3.2.1 Adding a Stack Frame

The stack frame is used to specify the stack criteria, and optionally print a stack mark on each stack record. The stack frame must be set up in order to identify the criteria at which a stack signal is sent. Without it, the Conveyor Sort Module will not separate material. To add and edit a stack frame:

- 1. In the main Compose screen, press the Layout Button (F5)
- (F5)
- 2. Click on the Stack Mark button (Alt-S)

- 3. Click somewhere on the layout where a print head is assigned (Figure 3-2).
- 4. Double Click on the stack mark to open the Stack Frame Properties dialog box and edit the stack criteria (Figure 3-3). A description of each item in the dialog box is found in Table 3-1.

Figure 3-2: Adding a Stack Mark

Figure 3-3: Stack Frame Properties

Stack Frame Properties 🛛 🔀					
LocationHorizontal1.375InchesVertical16	Size Length 0.125 Inches Height 150 Jets				
Stack Component ABC COMPANY 1* CHARLIE SMITH 1* 2 SOUTH ROAD DR AGAWAM MA 01001-2000					
Stack on change of Compore Hide Stack Mark Stack Character(s): OK Cance	nent Value el <u>H</u> elp				

Item	Description
Horizontal Location	The horizontal position of the frame. The position is specified in inches or cm
	depending on the Layout Units setting in the Editor Preferences dialog box.
Vertical Location	The vertical position of the frame. The position is specified in Jets. The first
	jet on the print head is jet zero.
Length	The horizontal size of the frame. The length is specified in Inches or cm
	depending on the Layout Units setting in the Editor Preferences dialog box.
Height	The vertical size of the frame. The height is specified in Jets.
Stack Component	The component used to determine a stack record. To specify a component,
	select it from the sample list.
Stack on change of	When checked, a stack record occurs whenever the Stack Component
Component Value	changes.
Hide Stack Mark	When checked, the Stack Mark is <u>not</u> printed.
Stack Character(s)	The character(s) contained in the Stack Component that indicate a stack
	record.

Once a stack mark is properly configured, the List View in Compose will highlight the

stack record and display a stack record symbol to the left of the stack record (Figure 3-4).

Figure 3-4.	· List s	howing	Two	Stack	Records
-------------	----------	--------	-----	-------	---------

00000622	KIPP INSURANCE AGENCY	STEVE KIPP	PO BOX 265
00000623	**************************************	THOMAS FAHY INS. ASSOC 14*	THOMAS B FAHY
00000624	ALEXANDER & ALEXANDER OF CT	ROBERT H. CATHCART, SR.	PO 80X 631
00000625	R C KNOX & COMPANY INC	FRANK RIDLEY	151 FARMINGTON AVE
00000626	THE TRAVELERS COMPANIES	J.C. DENNIS	1 TOWER SQ
00000627	FOWLER AGENCY	BOB CARTER	1 CARDS MILL RD
00000628	G.A. MCDONALD INSURANCE AGCY.	DONNA M. PROVENCHER	239 MAIN ST
00000629	OROBELLO & WEDEGIS	HUGH WEDEGIS	P.O. BOX 206
00000630	CHARLES DYSON	MR. CHARLES DYSON	P0 B0X 522
00000631	WILCOX & REYNOLDS	BECKY PUTNAM	P.O. BOX 521
00000632	MARTIN & ROWLAND	SHERWOOD ROWLAND III	PO BOX 2303
00000633	BOZZUTO-SAYRE-DELGALLO INSURANCE	LEN DELGALLO	132 PROSPECT ST
00000634	LITCHFIELD INS GRP INC-TORRINGTON	MICHAEL MEENSGIAN	P0 B0X 1127
00000635	SULLIVAN INSURANCE AGCY	JAMES D SULLIVAN	PO BOX 549
00000636	BOZZUTO ASSOC INC	RICHARD C BOZZOTO	401 MAIN ST
00000637	W.J. BURTON INSURANCE AGENCY	PETER HOWARD	P.O. BOX J
00000638	**************************************	KENNEY, WEBBER & LOWELL 15*	JON WEBBER
00000639	CLARK & DODD INSURANCE	ANDREW MITCHELL	300 W MAIN ST
00000640	PETER M. BAKKER AGENCY, INC.	PETER BAKER, SR.	111 SIMSBURY RD
00000641	BOGINO & DE MARIA, INC.	MARNEY SMITH	200 FISHER DR
00000642	COHEN-CARPENTER INSURANCE	JIM CARPENTER	P.O. BOX 1667
			\

Stack Record

Assembly Drawings

Appendix A

List of Tables

Table A-1: BK160 – Conveyor Sort Module	A-1
Table A-2: BK160-665 – Kit, CSM, BK700 to BK6OB-2	A-2
Table A-3: BK160-760 – Kit, CSM, BK760	A-3
Table A-4: BK160-765 – Kit, CSM, BK700 to BK7IB Release 1	A-4
Table A-5: BK160-765R2 – Kit, CSM, BK700 to BK7IB Release 2	A-5
Table A-6: BK160-776 – Kit, CSM, BK700 to BK76IB	A-6
Table A-7: BK160-1665 – Kit, CSM, BK705/BK17XX To BK6OB-2	A-7
Table A-8: BK160-1765 – Kit, CSM, BK705/BK17XX To BK7IB Release 1	A-8
Table A-9: BK160-1765R2 – Kit, CSM, BK705/BK17XX To BK7IB Release 2	2 A-9
Table A-10: BK160-1776 – Kit, CSM, BK705/BK17XX To BK76IB	A-10
Table A-11: 9104770A – Conveyor Sort Assembly, BK160	A-11
Table A-12: 9104773A – Sorting Mechanism Assembly, BK160	A-12
Table A-13: 9104774A – Sort Cone Assembly, BK160	A-13
Table A-14: 9104775A – Conveyor Sort Mechanism, BK160	A-14
Table A-15: 9104862A – Control Box Chassis Assembly, BK160	A-16
Table A-16: 9104863A – Control Box Cover Assembly, BK160	A-18
Table A-17: 9104885A – Pushbutton, Start, Green Illuminated	A-19
Table A-18: 9104980A – Pushbutton, Momentary NO	A-20

List of Figures

Figure A-1: BK160 – Conveyor Sort Module A-	1
Figure A-2: BK160-665 – Kit, CSM, BK700 to BK6OB-2 A-2	2
Figure A-3: BK160-760 – Kit, CSM, BK760 A-3	3
Figure A-4: BK160-765 – Kit, CSM, BK700 to BK7IB Release 1 A-4	4
Figure A-5: BK160-765R2 – Kit, CSM, BK700 to BK7IB Release 2 A-	5
Figure A-6: BK160-776 – Kit, CSM, BK700 to BK76IB A-4	6
Figure A-7: BK160-1665 – Kit, CSM, BK705/BK17XX To BK6OB-2 A-7	7
Figure A-8: BK160-1765 – Kit, CSM, BK705/BK17XX To BK7IB Release 1 A-	8
Figure A-9: BK160-1765R2 – Kit, CSM, BK705/BK17XX To BK7IB Release 2 A-9	9
Figure A-10: BK160-1776 – Kit, CSM, BK705/BK17XX To BK76IB A-10	0
Figure A-11: 9104770A – Conveyor Sort Assembly, BK160 A-1	1
Figure A-12: 9104773A – Sorting Mechanism Assembly, BK160 A-12	2
Figure A-13: 9104774A – Sort Cone Assembly, BK160 A-13	3
Figure A-14: 9104775A – Conveyor Sort Mechanism, BK160 A-1:	5
Figure A-15: 9104862A – Control Box Chassis Assembly, BK160 A-1	7
Figure A-16: 9104863A – Control Box Cover Assembly, BK160 A-1	8
Figure A-17: 9104885A – Pushbutton, Start, Green Illuminated A-19	9
Figure A-18: 9104980A – Pushbutton, Momentary NO A-2	0

Balloon Annotation and Parts Listing



Item	Part Number	Quantity	Description	Reference
1				
2				

The following is a description of how to interpret the information in this section:

Item:

This column indicates the item number used for each unique part in an assembly drawing. It is matched with the top number in the balloon pointing at the associated part.

Part Number:

This column represents the Buskro part number.

Quantity:

This represents the total number of a given part in an assembly. It is matched with the bottom number in the balloon pointing at the associated part.

Description:

This column contains a brief description of the part.

Reference:

This column indicates the page location for sub-assemblies.

Item	Part Number	Quantity	Description	Reference
1	343151	4	Nut, 1/2-13 UNC, Black	
2	404520	2	Screw, BHCS, 10-32 UNF x 3/8"	
3	405040	4	Screw, FHCS, ¼-20 UNC x 5/8"	
4	9104770A	1	Conveyor Sort Assembly, BK160	Page A-11
5	9104862A	1	Control Box Chassis Assembly, BK160	Page A-16
6	9104863A	1	Control Box Cover Assembly, BK160	Page A-18
7	9104999	4	Leg, ½-13 UNC x 8" Lg.	

Table A-1: BK160 – Conveyor Sort Module

Figure A-1: BK160 – Conveyor Sort Module

NOTE:

9104999 IS A LONGER CONVEYOR LEG. USE TO UPGRADE CONVEYORS WITH SHORTER LEGS.



Item	Part Number	Quantity	Description	Reference
1	610100	1	Relay, 120 VAC	
2	9105000A	1	Cable, I/O, DB25 to Novo 26-Pin, 30" Lg.	
3	9105132	1	Label, Warning, 120VAC Base	

Table A-2: BK160-665 – Kit, CSM, BK700 to BK60B-2

Figure A-2: BK160-665 – Kit, CSM, BK700 to BK60B-2



Item	Part Number	Quantity	Description	Reference
1	610102	1	Relay, 12 VDC	
2	9105004A	1	Cable, I/O, Novo 26-Pin, 57" Lg.	
3	9105131	1	Label, Warning, 12VDC Base	

Table A-3: E	BK160-760 –	Kit, (CSM,	BK760
--------------	-------------	--------	------	-------

Figure A-3: BK160-760 – Kit, CSM, BK760



Item	Part Number	Quantity	Description	Reference
1	610100	1	Relay, 120 VAC	
2	9105001A	1	Cable, I/O, Novo 26-Pin, 30" Lg.	
3	9105132	1	Label, Warning, 120VAC Base	

Figure A-4: BK160-765 – Kit, CSM, BK700 to BK7IB Release 1



Item	Part Number	Quantity	Description	Reference
1	610102	1	Relay, 12 VDC	
2	9105000A	1	Cable, I/O, DB25 to Novo 26-Pin, 30" Lg.	
3	9105131	1	Label, Warning, 12VDC Base	

Table A-5: BK160-765R2 – Kit, CSM, BK700 to BK7IB Release 2

Figure A-5: BK160-765R2 – Kit, CSM, BK700 to BK7IB Release 2



Item	Part Number	Quantity	Description	Reference
1	610102	1	Relay, 12 VDC	
2	9105000A	1	Cable, I/O, DB25 to Novo 26-Pin, 30" Lg.	
3	9105131	1	Label, Warning, 12VDC Base	

Table A-6: BK160-776 – Kit, CSM, BK700 to BK76IB

Figure A-6: BK160-776 – Kit, CSM, BK700 to BK76IB



Item	Part Number	Quantity	Description	Reference
1	610100	1	Relay, 120 VAC	
2	9105002A	1	Cable, I/O, DB25, 180" Lg.	
3	9105132	1	Label, Warning, 120VAC Base	

Table A-7: BK160-1665 – Kit, CSM, BK705/BK17XX To BK60B-2

Figure A-7: BK160-1665 – Kit, CSM, BK705/BK17XX To BK60B-2



Item	Part Number	Quantity	Description	Reference
1	610100	1	Relay, 120 VAC	
2	9105003A	1	Cable, I/O, DB25 to Novo 26-Pin, 180" Lg.	
3	9105132	1	Label, Warning, 120VAC Base	

Table A-8: BK160-1765 – Kit, CSM, BK705/BK17XX To BK7IB Release 1

Figure A-8: BK160-1765 – Kit, CSM, BK705/BK17XX To BK7IB Release 1



Item	Part Number	Quantity	Description	Reference
1	610102	1	Relay, 12 VDC	
2	9105002A	1	Cable, I/O, DB25, 180" Lg.	
3	9105131	1	Label, Warning, 12VDC Base	

Table A-9: BK160-1765R2 – Kit, CSM, BK705/BK17XX To BK7IB Release 2

Figure A-9: BK160-1765R2 – Kit, CSM, BK705/BK17XX To BK7IB Release 2



Item	Part Number	Quantity	Description	Reference
1	610102	1	Relay, 12 VDC	
2	9105002A	1	Cable, I/O, DB25, 180" Lg.	
3	9105131	1	Label, Warning, 12VDC Base	

Table A-10: BK160-1776 – Kit, CSM, BK705/BK17XX To BK761B

Figure A-10: BK160-1776 – Kit, CSM, BK705/BK17XX To BK76IB



Item	Part Number	Quantity	Description	Reference
1	330165	1	Backstop Mounting Bracket	
2	340165	2	Backstop Adjustment Bar	
3	343165	1	Backstop Bracket Bar	
4	404550	2	Screw, BHCS, 10-32 UNF x ¾"	
5	405050	4	Screw, FHCS, ¼-20 UNC x ¾"	
6	406670	2	Screw, HHMS, 5/16-18 UNC x 1"	
7	438150A	2	Rosette Knob Assembly, 3/8"	
8	439015	2	Lockwasher, 5/16" ID	
9	440015	2	Washer, 5/16" ID	
10	440020	2	Washer, 3/8" ID	
11	9104775A	1	Conveyor Sort Mechanism	Page A-14
12	9104778	1	Cover, Solenoid, Top	
13	9104780	1	Plate, Stacker Assembly Support	
14	9104859	1	Backplate, Stacker Integrated	

Figure A-11: 9104770A – Conveyor Sort Assembly, BK160



Item	Part Number	Quantity	Description	Reference
1	404250	1	Screw, SHCS, 10-32 UNF x 3/4"	
2	414120	2	Shoulder Bolt, ¼" x 3/8" (10-24)	
3	414130	1	Shoulder Bolt, ¼" x ½" (10-24)	
4	420008	2	Nut, 10-32 UNF	
5	439009	1	Lockwasher, No. 10	
6	9104770	1	Solenoid, Push Type, Tubular	
7	9104772	1	Cone, Short, Stacker	
8	9104773	1	Bracket, Fixed Roller	
9	9104774A	1	Sort Cone Assembly, BK160	Page A-13
10	9104783	1	Spring, SS, Extension, 0.240" x 1.25" Lg.	

Table A-12: 9104773A – Sorting Mechanism Assembly, BK160

Figure A-12: 9104773A – Sorting Mechanism Assembly, BK160



Item	Part Number	Quantity	Description	Reference
1	404250	1	Screw, SHCS, 10-32 UNF x 3/4"	
2	404510SS	2	Screw, BHCS, 10-32 UNF x ¼", SS	
3	414130	1	Shoulder Bolt, ¼" x ½" (10-24)	
4	420008	2	Nut, 10-32 UNF	
5	439009	1	Lockwasher, No. 10	
6	505056	2	Flange Bushing, ¼ ID x 3/8 OD x ¼" Lg.	
7	9104772	1	Cone, Short, Stacker	
8	9104774	1	Bracket, Stacker	
9	9104796	1	Bracket, Pusher	

Table A-13: 9104774A – Sort Cone Assembly, BK160

Figure A-13: 9104774A – Sort Cone Assembly, BK160



Item	Part Number	Quantity	Description	Reference
1	401310	2	Screw, PHMS, 4-40 UNC x ¼"	
2	404275	1	Screw, SHCS, 10-32 UNF x 1 ¼"	
3	404510	7	Screw, BHCS, 10-32 UNF x ¼"	
4	404810	1	Screw, SHSS, 10-32 UNF x ¼"	
5	405540	4	Screw, BHCS, 1/4-20 UNC x 5/8"	
6	416186	2	Shoulder Bolt, 3/8" x 2 ¼" (5/16-18)	
7	438010	1	Knob, Gate Adjustment	
8	440008	1	Washer, #10 ID	
9	505463	1	Flange Bushing, 1/4 ID x 3/8 OD x 3/8 Lg.	
10	505464	1	Flange Bushing, 1/4 ID x 3/8 OD x 1/2 Lg.	
11	9100777A	1	Cable, Stacker Solenoid Panel Mount	
12	9101874	1	Spring, Compression	
13	9102209	2	Knob, Thumb, ¼-20 UNC Screw	
14	9102610	2	Contact, Male, 24-20 AWG, Micro-Fit 3.0	
15	9102717	1	Connector, Female, 2-Pin, Micro-Fit	
16	9104773A	1	Sorting Mechanism Assembly	Page A-12
17	9104775	1	Slider, Height Adjuster	
18	9104776	1	Block, Height Adjuster Slider	
19	9104777	1	Cover, Solenoid, Bottom	
20	9104779	1	Threaded Rod, 3/8-24 UNF, Stacker	
21	9104784	1	Cap, Screw	
22	9104838	1	Shield, Deflection, Stacker	

Table A-14: 9104775A – Conveyor Sort Mechanism, BK16	0
--	---



Figure A-14: 9104775A – Conveyor Sort Mechanism, BK160

Item	Part Number	Quantity	Description	Reference
1	401010	2	Screw, FHCS, 4-40 UNC x ¼"	
2	401310	4	Screw, PHMS, 4-40 UNC x ¼"	
3	402320	8	Screw, PHMS, 6-32 UNC x 3/8"	
4	420007	2	Nut, 8-32 UNC	
5	439008	2	Lockwasher, #10, External Tooth	
6	440008	2	Washer, #10 ID	
7	606000	1	Wire, #16, Black, 5" Lg.	
8	606000	1	Wire, #16, Black, 14" Lg.	
9	606001	1	Wire, #16, Red, 12" Lg.	
10	606009	1	Wire, #16, White, 5" Lg.	
11	606009	1	Wire, #16, White, 9" Lg.	
12	609001	1	Shrink Wrap, ¼" ID, 1.5" Lg.	
13	609110	2	Connector, Push-on, 16-14 AWG, Blue	
14	609111	1	Terminal, Ring, #10, 16-14 AWG, Blue	
15	614107A	1	Cable, FCB, Output-Stack	
16	614109A	1	Cable, Stack Out, BK160	
17	614111A	1	Cable, Stack In, BK160	
18	614120A	1	Cable, Relay to PCB, BK160	
19	614121A	1	Cable, PS to PCB, BK160	
20	614135	1	Receptacle, Female, 23-37	
21	615004	1	Relay Base	
22	615021	1	T-Rail, DIN, 5"	
23	646003	2	Fuse, 1A, 250V, ¼ x 1-1/4", AGC	
24	9100218A	1	Setup Button Assembly, BK160	
25	9100730A	1	Cable, Stack Out, BK160	
26	9102056A	1	Cable, Downstream, BK160	
27	9102247	2	Shrink Wrap, ½" ID	
28	9102681	1	Wire, #14, Green/Yellow, 6" Lg.	
29	9102862	1	Receptacle, Male, 250VAC/10A, IEC	
30	9103435	2	Ferrule, #16 AWG, Red	
31	9103442	2	End Bracket, EW 35	
32	9103465	1	Power Supply, Switching, 12VDC/1.5A	
33	9103538	2	Ferrule, #20 AWG, Orange	
34	9103827	2	Fuse Holder, Panel Mount, Shock Proof	
35	9104848	1	Board, Stacker Control, BK160	
36	9104862	1	Bed, Stacker Control Bracket	
37	9104878	2	Sleeve, Insulation, For Flat Receptacle	
38	9104880	2	Terminal, Flat, For Plug-In, EAO Type	

Table A-15: 9104862A – Control Box Chassis Assembly, BR	3160
---	------



Figure A-15: 9104862A – Control Box Chassis Assembly, BK160

Item	Part Number	Quantity	Description	Reference
1	420007	2	Nut, 8-32 UNC	
2	439005	2	Lockwasher, #8	
3	439008	2	Lockwasher, #10, External Tooth	
4	609111	2	Terminal, Ring, #10, 16-14 AWG, Blue	
5	9102057A	1	Cable, Front Panel	
6	9102681	1	Wire, #14, Green/Yellow, 10" Lg.	
7	9103538	1	Ferrule, #20 AWG, Orange	
8	9103540	3	Ferrule, #24 AWG, Light Blue	
9	9104863	1	Cover, CSM Control Box, BK160	
10	9104873	1	Switch, Run/Jog, 2 Position	
11	9104875	1	Contact, N/O Block	
12	9104876	1	Adapter, Front Mounting	
13	9104877	4	Sleeve, Insulation, For Flat Receptacle	
14	9104878	4	Sleeve, Insulation, For Flat Receptacle	
15	9104879	4	Receptacle, Flat, For Universal Terminal	
16	9104880	4	Terminal, Flat, For Plug-In, EAO Type	
17	9104883	1	Contact, N/C, Block	
18	9104 <mark>885A</mark>	1	Pushbutton, Start, Green Illuminated	Page A-19
19	9104980A	1	Pushbutton, Momentary, NO	Page A-20
20	9104998	1	Resistor, 15 Ohm, 3W, 20 Series	

T 11 1 16 010 (0C) 1	C 1 D	C 1 11	D771(0
Table A-10: 9104803A –	Control Box	Cover Assembly	, BK10 0

Figure A-16: 9104863A – Control Box Cover Assembly, BK160



Item	Part Number	Quantity	Description	Reference
1	9104868	1	Bezel, Aluminum Raised	
2	9104869	1	Cap, Green Lens	
3	9104871	1	LED, Green, 12 VDC	
4	9104885	1	Pushbutton, Start	
5	9104928	1	Diffuser, EAO Type	

Table A-17. 91048854 _	Pushbutton	Start	Groon	Illuminated
Tuble A-17. 910400JA -	· I usnounon,	Siuri,	Green	mumuneu

Figure A-17: 9104885A – Pushbutton, Start, Green Illuminated



Item	Part Number	Quantity	Description	Reference
1	9104866	1	Pushbutton, Start, Momentary	
2	9104868	1	Bezel, Aluminum Raised	
3	9104872	1	LED, Red, 12VDC	
4	9104890	1	Cap, Red Lens	
5	9104928	1	Diffuser, EAO Type	

Table A-18: 9104980A – Pushbutton, Momentary NO

Figure A-18: 9104980A – Pushbutton, Momentary NO



Electrical Drawings



List of Schematics

Figure B-1	: 9104862AC (Page 1/2) –	Wiring I	Diagram,	BK160 Control	Box	B-1
Figure B-2	: 9104862AC (Page 1/2) –	Wiring I	Diagram,	BK160 Control	Box	B-2





